APPENDIX A

Biological Resources Report

Water Right Applications A31176 (Montna) and A31572 (Leal)

This page intentionally
left blank.

Biological Resources Report
Water Right Applications
A31176 (Montna) and A31572 (Leal)

Prepared for:

environmental PLANNING PARTNERS, INC.

Prepared by:

Craig Stevens
Stevens Consulting
1241 Larkin Way
Sacramento, CA 95818
(916) 443-5414

Mike Podlech
Aquatic Ecologist
6075 Pringle Lane
Soquel, CA 95073
(831) 458-4144

Kevin Crouch
Padre Associates, Inc.
555 University Avenue, Ste 110
Sacramento CA 95825
(916) 333-5920

March 17, 2016

I. INTRODUCTION

PURPOSE OF THE REPORT

The purpose of this report is to detail the findings of the biological reconnaissance investigation of Water Right Application 31176 for A&G Montna Properties, L.P. and Application 31572 of the Leal Family Trust and Odysseus Farms, near the town of Nicolaus, Sutter County, California. The properties under Application 31176 and Application 31572 are located very close to each other and involve the use of water for the same purposes, so this biological report has been prepare to cover both projects. This reconnaissance report includes a review of pertinent literature, a review of regulatory requirements, results of reconnaissance field surveys, and a preliminary analysis of general impacts of project implementation on biological resources.

Following this introduction, there is a description of the Project, followed by the methodology section, which describes field studies and analytical methods used to assess the project site. The methodology section includes a review of the regulatory requirements; a review of pertinent literature concerning special-status species, sensitive habitats, and general biological conditions; and, a description of field reconnaissance methods. The environmental setting describes abiotic and biotic conditions at the project site including climate, soils, typical habitats and associated plant and wildlife species, and special-status species reported in or near the project area. The final section details the anticipated impacts of project implementation along with suggested general mitigation measures to reduce project impacts to less than significant levels.

Limitations of this report include the following:

- Original reconnaissance-level surveys were conducted in 2005.
- Recent walk-over surveys were conducted in February 2013 when most plant species are not typically in bloom; therefore, vegetative surveys were conducted only for the purposes of characterizing cover types.
- Surveys were conducted before the onset of breeding by most bird species.
- No protocol level surveys for special-status species were conducted for the report.

The terrestrial biology portions of this report were prepared by Padre Associates, Inc. (Padre). The aquatic biology portions were prepared by Mike Podlech, Aquatic Ecologist (Podlech).

PROJECT LOCATION

Both project sites are located within the Feather River watershed, just west of the Feather River, between the Sutter Bypass to the south, State Route (SR) 99 to the east, Everglade Road to the north, and Hwy 113 to the west. These properties are located within the Nicolaus and Sutter Causeway 7.5-minute USGS topographic quadrangles, and within Sections 20, 21, 26, 27, 28, 29, 33, and 34 of Township 13 North, Range 3 East, MDB&M.

BACKGROUND ON THE PROPOSED PROJECT

This report covers two separate, but related projects, both located west of the Feather River, between the Sutter Bypass to the west and SR 99 to the east, in the vicinity of the small community of Nicolaus in Sutter County, California (Figures 1 and 4).

A&G Montna Properties, L.P. has submitted Application 31176 for an appropriative water right to use up to 2,050 acre-feet each year on two properties it owns in rural Sutter County, east of the Sutter Bypass (Figures 2 and 3). The water would be diverted at three existing pumps onto existing rice lands between September 1 of each year and March 31 the succeeding year for rice straw decomposition, wildlife enhancement, recreation, and incidental irrigation. The source of the water would be flow from the channels abutting the properties, and originating upstream in the surrounding lands. The properties consist of the following five Sutter County Assessor's Parcel Numbers (APN): 25-130-041, 25-200-006, 25-210-030, 25-210-034, and 25-210-044.

The Leal Family Trust and Odysseus Farms have submitted Application 31572 for an appropriative water right to use up to 1,770 acre-feet each year on two properties it owns in rural Sutter County, east of the Sutter Bypass (Figures 5 and 6). The water would be diverted at six existing pumps onto existing rice lands between September 1 of each year and March 31 the succeeding year for rice straw decomposition, wildlife enhancement, recreation, and incidental irrigation. The source of the water would be flow from the channels abutting the properties and originating upstream in the surrounding lands. The properties consist of the following five Sutter County Assessor's Parcel Numbers (APN): 25-130-060, 25-130-061, 25-210-032, and 25-210-036.

Both applications request that the water be diverted for rice straw decomposition, wildlife enhancement, recreation, and incidental irrigation.

II. METHODOLOGY

TERRESTRIAL BIOLOGY

LITERATURE REVIEW

Padre biologists reviewed available project information, county soil survey maps, topographic maps, and other environmental documents. They obtained the results of a query of the California Natural Diversity Database (CNDDB) for records of special-status species reported within the Nicolaus and Sutter Causeway, California quadrangles (California Department of Fish and Wildlife [CDFW], 2013) and a March 2, 2016 update to that search (CDFW, 2016). They also obtained a list of federally listed Threatened and Endangered species from the U.S. Fish and Wildlife Service (USFWS) (USFWS, 2013) and an update to that list on March 3, 2016 (USFWS, 2016). Special-status taxa that are known to exist or have the potential to exist on the project site were identified through a review of relevant literature (California Native Plant Society [CNPS], 2013; Zeiner et al., 1988; 1990a, b).

FIELD RECONNAISSANCE SURVEYS

Padre conducted reconnaissance-level field surveys in 2005, and follow-up site surveys on February 26, 2013. These surveys were conducted to assess biological resources and to determine the likelihood of occurrence for special-status species and/or sensitive and regulated habitats on the site. Detection methods included direct observation with binoculars; examination and identification of tracks, scats, burrows/diggings, and carcasses/skeletal remains; and identification of vocalizations (calls and songs). No trapping or netting was performed during surveys. Plants not identified in the field were collected and returned to the lab for identification using standard taxonomic references (Hickman, 1993; Baldwin, 2012). Prior to the field surveys, the CNDDB query was reviewed to identify occurrences of special-status plant and animal species in the project vicinity. During the field surveys, vegetative cover types and significant habitat features, such as wetlands, potential nest trees, and potential dens or burrows, were noted.

IMPACT MECHANISMS

Effects on terrestrial biological resources in natural or semi-natural areas due to agricultural production can take the form of direct impacts, including habitat loss and fragmentation, introduction of barriers to movement and dispersion, and conversion of native communities to developed conditions. Agricultural production may also result in indirect impacts that affect the quality of habitat on the project site and in the project area. Indirect impacts may include increasing the likelihood of invasion of non-native plants into natural areas, noise disturbances, and declines in air and water quality. However, both of the proposed projects were converted to agricultural production decades ago. While both of the Proposed Projects are currently flood irrigated both during the growing season and during the winter, they have the potential to impact terrestrial biological species if they would increase the duration, intensity, depth, or frequency of flooding, which could disrupt species hibernating, reproducing, or foraging during the proposed season of diversion.

Effects on aquatic biological resources could occur if the rate or duration of diversion pumping would entrain protected species in the vicinity of the pumps or disrupt their migration patterns.

AQUATIC BIOLOGY

Podlech conducted a reconnaissance-level aquatic habitat assessment of the two project sites on February 26, 2013. The assessment focused on reaches of the Sutter Bypass adjacent to the project sites, representative sites along the State Reclamation Drain system, and the existing diversion facilities. The biological and physical conditions of the channel(s) were recorded qualitatively, and photo-documentation of representative sites was collected (Appendix A). Due to the reconnaissance-level nature of the assessment, habitat conditions were assessed qualitatively; no protocol level surveys for special-status species were conducted.

In addition to the reconnaissance-level field investigation of the project site, the results of the Padre CNDDB query were reviewed for special-status fish species occurrences within

the project area and vicinity (CDFW, 2013). Special-status fish species that are known to occur or have the potential to occur on the project site or vicinity were also identified through a review of relevant literature.

In addition, a detailed assessment of fish passage and entrainment risks within the lower Butte Creek/Sutter Bypass area (ICF, 2009), and a previous assessment of the small pumping plant sites on the East Borrow Channel of the Sutter Bypass (Ducks Unlimited, 2005), were also reviewed. These two documents formed the basis for the description of existing conditions as well as the preliminary aquatic resources impact assessment contained in this report.

SIGNIFICANCE CRITERIA

The impact of the project on biological resources was evaluated in terms of mandatory findings of significance at Section 15065 of CEQA and Appendix G of the State CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000 through 15387, 2012). The various components of the project were considered in association with site conditions and were evaluated against CEQA criteria pertaining to biological issues. In accordance with these CEQA Guidelines, a project will normally result in a significant impact if any of the following conditions would result from project implementation:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, USFWS, or NMFS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulation, or by the CDFW, USFWS, or NMFS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site;
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan;
- Conflict with any local polices or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
    - Substantially degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare or threatened species;

- Cause a fish or wildlife population to drop below self-sustaining levels;
- Threaten to eliminate a plant or animal community; or
- Substantially reduce the number or restrict the range of an endangered, rare or threatened species.

Additionally, the CEQA Guidelines Initial Study Land Use and Planning checklist notes that conflicts with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project should be considered during a project's environmental review.

III. ENVIRONMENTAL SETTING

REGIONAL SETTING

The project site is within the Yolo and American basins subsection of the Great Valley Ecological Region of California (Miles and Goudey, 1997), most of which is on an alluvial plain adjacent to the lower Sacramento River that historically flooded in most winters and springs. The subsection includes recent alluvium of stream channel, stream overflow, and alluvial fan deposits. The alluvium is derived from granitic, volcanic, sedimentary, and metamorphic rocks from the mountains and foothills surrounding the valley. The topography of the subsection varies from nearly level to very gently sloping. Elevations range from about 10 to 40 feet, mean sea level (msl). Fluvial erosion and deposition are the principal geomorphic processes (Miles and Goudey, 1997). The mean annual precipitation is 14 to 18 inches, almost all as rain, and the mean annual temperature is between 60°and 62° F. The mean freeze-free period is between 250 and 275 days.

PROJECT SETTING

The properties consist of rice fields with adjacent farm roads, ditches, canals, and levee systems. The surrounding land uses consist of agricultural lands, primarily in rice production. Some of the agricultural lands are planted in orchards and other land uses include rural residential and open space watershed. Additionally, the small community of Nicolaus occurs southeast of the project area.

Most soils are moderately well drained to poorly drained with thermic soil temperature regimes and aquic and xeric soil moisture regimes (Miles and Goudey, 1997). According to the Natural Resources Conservation Service (NRCS, 2013), the properties are underlain by the seven soil-mapping units shown in Table 1.

Table 1. Soil Classification of the Project Site

Soil Classification	Slope	Acreage
Capay silt clay	0-2 percent	131.4 ac (6.9%)
Capay silty clay, siltstone substratum	0-2 percent	301.2 ac (15.8%)
Marcum clay loam, siltstone substratum	0-1 percent	210.4 ac (11.0%)
Marcum clay loam, occasionally flooded	0-1 percent	72.2 ac (3.4%)
Marcum-Gridley clay loams	0-1 percent	355.0 ac (18.6%)
Oswald clay	0-2 percent	238.3 ac (12.5%)
Yuvas loam	0-2 percent	500.9 ac (26.2%)
Yuvas loam, frequently flooded	0-2 percent	99.1 ac (5.2%)

The Capay, Oswald, and Yuvas mapping units are considered hydric soils (U.S. Soil Conservation Service, 1992). The Marcum units are not hydric soils, but may contain hydric inclusions of Capay and Oswald soils.

REGULATORY SETTING

FEDERAL

Special-Status Species

The federal Endangered Species Act (FESA), administered by the USFWS and the National Marine Fisheries Service (NMFS) (collectively referred hereafter as the "Services"), provides protection to species listed as Threatened (FT) or Endangered (FE), or proposed for listing as Threatened (PFT) or Endangered (PFE). The Services maintain lists of species that are neither formally listed nor proposed, but could be listed in the future. These federal candidate species (FC) include taxa for which substantial information on biological vulnerability and potential threats exists, and are maintained in order to support the appropriateness of potential future efforts to list the taxa as an endangered or threatened species.

Projects that will result in the "take" of a federally listed or proposed species (as defined by FESA Section 9) are required to consult with the Services. The objective of consultation is to determine whether the project will jeopardize the continued existence of a listed or proposed species, and to determine what mitigation measures will be required to avoid jeopardy. Consultations are conducted under Section 7 of FESA if there is involvement by the federal government, and Section 10 if there is not.

The USFWS administers the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) and the Bald Eagle and Golden Eagle Protection Act (16 USC 668-688). The MBTA prevents the removal of trees, shrubs, and other structures containing active nests of migratory bird species that may result in the loss of eggs or nestlings. Adherence to construction windows either before the initiation of breeding activities or after young birds have fledged is a typical step to protect migratory birds and comply with the MBTA. The Bald Eagle and Golden Eagle Protection Act prohibits the taking or possession of bald and golden eagles, their eggs, or their nests without a permit from the USFWS.

Waters and Wetlands

The U.S. Army Corps of Engineers (Corps) is responsible for the issuance of permits for the placement of dredged or fill material into "waters of the United States" (WoUS) pursuant to Section 404 of the Clean Water Act (33 USC 1344). As defined by the Corps at 33 CFR 328.3(a)(3), WoUS are those waters that are used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; tributaries and impoundments to such waters; interstate waters including interstate wetlands; and, territorial seas. Based on the U.S. Supreme Court decision in Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (U.S. Supreme Court, 2001), and guidance from the Corps and U.S. Environmental Protection Agency (EPA) (2001), the federal government no longer asserts jurisdiction over isolated waters and wetlands under Section 404 of the Clean Water Act using the "migratory bird rule".

The U.S. Supreme Court held that the Corps' jurisdiction under Section 404 of the CWA does not extend to non-navigable, isolated, intrastate waters based solely on the fact that these waters are used as habitat by migratory birds. In 2006, the Supreme Court again attempted to clarify the Corps' jurisdiction in Rapanos v. United States (U.S. Supreme Court, 2006). The test established in Rapanos is that only a water that possesses a "significant nexus to waters that are navigable-in-fact, or that could reasonably be so made" are subject to regulation under the Clean Water Act.

On June 5, 2007, the USEPA and Corps issued joint guidance to establish the protocol for determining the presence of WoUS under the U.S. Supreme Court's 2006 Rapanos decision. The guidance directs the agencies to more thoroughly document jurisdiction using a standardized form. Agencies will continue to assert jurisdiction over traditional navigable waters (TNW) and adjacent wetlands. The agencies will have jurisdiction over a water body that is not a TNW if that water body is "relatively permanent." Jurisdiction will be asserted over tributaries that are not relatively permanent on a case-by-case basis applying a "significant nexus" analysis to determine whether there is a significant nexus between the tributary and a TNW.

Under Corps and EPA regulations, wetlands are defined as: "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

In non-tidal waters, the lateral extent of Corps jurisdiction is determined by the ordinary high water mark (OHWM), which is defined as the: "…line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." (33 CFR 328[e]).

STATE

Special-Status Species

The CDFW administers a number of laws and programs designed to protect the state's fish and wildlife resources. Principal among these is the California Endangered Species Act of 1984 (CESA) (Fish and Game Code Section 2050), which regulates the listing and take of state endangered (SE) and threatened species (ST). Under Section 2081 of CESA, CDFW may authorize an incidental take permit allowing the otherwise unlawful take of a SE or ST species.

CDFW maintains lists of Candidate-Endangered species (SCE) and Candidate-Threatened species (SCT). These candidate species are afforded the same level of protection as listed species. CDFW designates Species of Special Concern (SSC) that are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species, but may be added to official lists in the future. The SSC list is intended by CDFW as a management tool for consideration in future land use decisions.

Other State laws also protect wildlife and plants. Section 3511 of the California Fish and Game Code (F&G Code), for example, designates species that are afforded "Fully Protected" (FP) status. F&G Code Sections 4700 and 5515 assign the same status to specified mammals and fish. These statutes generally provide that specifically identified birds, mammals, and fish "or parts thereof may not be taken or possessed at any time and no provision of [the Fish and Game] code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird, mammal, or fish] and no permits or licenses heretofore issued shall have any force or effect" for any such purpose. For fully protected fish and mammals, the only exception to the take prohibition is that the Fish and Game Commission may authorize the collecting of such species "for necessary scientific research" (F&G Code, Sections 4700, 5515). With a proper permit, fully protected species may also be captured live and relocated "for the protection of livestock" (Section 3511). Section 3503.5 protects birds-of-prey (Falconiformes and Strigiformes), their eggs, and their nests. That statute provides that, "[I]t is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) 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."

CDFW manages the California Native Plant Protection Act (CNPPA) of 1977 (F&G Code Section 1900, et seq.), which was enacted to identify, designate, and protect rare plants. In accordance with CDFW guidelines, all CNPS 1B list plants, most CNPS List 2 and 3,

and some CNPS List 4 plants are considered "rare" under the Act, and potential impacts to these species are considered during a CEQA review of a proposed project. The CNPPA allows landowners, under most circumstances involving new development, to take rare plant species, provided that the owners first notify CDFW and give the agency at least 10 days to come and retrieve (and presumably replant) the plants before they are plowed under or otherwise destroyed (F&G Code Section 1913 exempts from "take" prohibition "the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way").

Waters and Wetlands

Pursuant to Section 1602 of the Fish and Game Code, a Lake or Streambed Alteration Agreement (LSAA) between the CDFW and state or local governmental agency, public utility, or private citizen is required before the initiation of a construction project that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of a river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Pursuant to Section 401 of the Clean Water Act, the Corps cannot issue a federal Section 404 dredge or fill permit until the State of California first issues a water quality certification to ensure that a project will comply with state water quality standards. The authority to issue water quality certifications in the Project area is vested with the Central Valley Regional Water Quality Control Board (CVRWQCB).

TERRESTRIAL BIOLOGICAL SETTING

Terrestrial Habitats

The potentially affected terrestrial areas within the project site all consist of agricultural fields currently in rice production so naturally occurring vegetation was very limited. Non-crop vegetation was limited to the areas adjacent to the farm roads and the banks of the farm ditches. Vegetation in these areas consists primarily of ruderal (weedy) species. Typical vegetation associated with ruderal areas included Bermuda grass (*Cynodon dactylon*), dallies grass (*Paspalum dilatatum*), yellow star-thistle (*Centaurea solstitialis*), puncture vine (*Tribulus terrestris*), wild radish (*Raphanus sativus*), turkey mullein (*Croton setiger*), chicory *(Cichorium intybus*), and horseweed (*Conyza canadensis*). Typical vegetation associated with the farm ditches consisted of hydrophytes including cattail (*Typha latifolia*), smartweed (*Polygonum* sp.), tall cyperus (*Cyperus eragrostis*), tule (*Schoenoplectus acutus*), red-rooted cyperus (*Cyperus erythrorhizos*), Himalayan blackberry (*Rubus armeniacus*), and giant reed (*Arundo donax*). There were very few trees or shrubs in the vicinity of the agricultural fields with the exception of several remnant blue oaks (*Quercus lobata*). Additionally, there were riparian species at the perimeter of the Sutter Bypass consisting primarily of Fremont cottonwood (*Populus fremontii)*, California box elder (*Acer negundo*), Goodding's willow (*Salix gooddingii*), California black walnut (*Juglans hindsii*), and button willow (*Cephalanthus occidentalis*).

The majority of potential affected areas are flooded rice fields, which maintain many species associated with wetlands. Approximately 230 species of wildlife are known to use California ricelands (Sterling and Buttner, 2011). Studies have reported that winter-flooded rice fields, even after harvest, have almost as much food available to waterfowl as natural wetlands (Brouder and Hill, 1995). Typical species observed included bufflehead (*Bucephala albeola*), mallard (*Anas platyrhynchos*), common moorhen (*Gallinula chloropus*), American coot (Fulica americana), great blue heron (*Ardea herodias*), green heron (*Butorides striatus*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), white-faced ibis (*Plegadis chihi*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), white-crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), and common bushtit (Psaltriparus minimus).

In addition to the riparian corridor along the Sutter Bypass, the Bobelaine Audubon Sanctuary on the Feather River and the Nelson Slough Unit of the Feather River Wildlife Area are located approximately two miles east and south of the project site, respectively. These sites have a high species diversity and provide habitat for breeding roosting and/or loafing. Some of the species associated with these sites can be found on the project site along roads, farm ditches and ruderal areas of the site. Some of these species include savannah sparrow (*Passerculus sandwichensis*), oak titmouse (*Baeolophus inornatus*), Bewick's wren (*Thryomanes bewickii*), lesser goldfinch (*Carduelis psaltria*), black phoebe (*Sayornis nigricans*), western scrub-jay (*Aphelocoma californica*), and house finch (*Carpodacus mexicanus*). Mammalian wildlife species are not as common on the project site because of the lack of upland habitat. Most of mammals in the area likely travel from Nelson Slough. These species include black-tailed deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), black tailed hares (*Lepus californicus*), striped skunk (*Mephitis mephitis*), and California ground squirrel (*Spermophilus beecheyi*).

The flooded rice fields are known to provide habitat for the federal and state Threatened giant garter snake (*Thamnophis gigas*). This species has been found in the area of the project site; however, none were seen while conducting field surveys due to the season. The northern western pond turtle (*Actinemys marmorata*), a state Species of Special Concern, may also occur in the irrigation canals and could occur on the project site.

The project site also represents foraging habitat for raptor species in the area. Because of the paucity of trees within the project site, most raptors in the area breed and/or roost at the Sutter Bypass, Nelson Slough, Feather River, or adjacent properties, which include the Swainson's hawk (*Buteo swainsoni*), a state-listed Threatened species. Several northern harriers (*Circus cyaneus*) and red-tailed hawks (*Buteo jamaicensis*) were observed foraging in the surrounding area. American kestrel (*Falco sparverius*) and white-tailed kite (*Elanus leucurus*) were also seen within the project site.

TERRESTRIAL SPECIAL-STATUS SPECIES

Sterling and Buttner (2011) have identified 27 special-status birds and two special-status reptiles that are known to use rice fields as habitat during a portion of the year. Of the 27 bird species, nine are winter residents, and the remainder are year-long residents (Appendix B)

Prior to conducting field surveys, special-status wildlife and plant species potentially occurring on or near the project area were identified through a query of the CNDDB and the CNPS databases for the 12, 7.5-minute USGS quadrangles surrounding the Sutter Causeway and Nicolaus quadrangles. In total, nine plants species, four invertebrates, six fish species, three amphibian, two reptiles, 9 bird species, and two mammal species have been recorded in this 700 square mile area (Appendix C). An analysis of the likelihood of occurrence for each species was conducted on the basis of species ranges, previous observations, contemporary sightings, and presence of suitable habitat elements. In evaluating the likelihood of occurrence of each species, we first determined whether the project site is located within the known range of the species. If the site was within the known range, we determined whether the site contains suitable habitat, such as vernal pools, oak woodland, riparian woodland, etc. for the species (Appendix C).

Within about one mile of the site, the CNDDB reported seven occurrences of Swainson's hawk, 14 occurrences of giant garter snake, one occurrence of tricolored blackbird (*Agelaius tricolor*), and one occurrence of rose-mallow (*Hibiscus lasiocarpus*). Those species, assumed to have the highest probability of occurrence on the project site, are discussed below.

Special-Status Plant Species

Rose-mallow. Rose mallow is not a federal or state listed species; however, it is a CNPS List 2 species (rare, threatened, or endangered in California, but more common elsewhere). It is a perennial herbaceous species that blooms from June through September. There is an occurrence from 2009 that occurs within a freshwater marsh approximately 0.25-mile from the project site at the eastern perimeter of the Sutter Bypass (CDFW, 2016). Suitable habitat for this species could occur along the bank of sloughs and waterways within and or adjacent to the project site.

Special-Status Reptiles

Giant garter snake. The giant garter snake (GGS) is a state and federally listed Threatened species. It is found in emergent marsh habitats associated with waterways during spring and summer, and hibernates in adjacent upland habitat during the winter. They inhabit the edges of marshes, sloughs, ponds, and rice fields where they forage for fish, tadpoles and frogs. The species requires water during its active season (early spring to mid-fall), emergent wetland vegetation for hunting cover, openings in waterside vegetation for basking, and higher upland areas for the winter dormant season. GGS are usually absent from wetlands with sand, gravel, or rock substrates.

Historically, the range of the GGS included the Central Valley from the vicinity of Sacramento and Antioch southward to Buena Vista Lake near Bakersfield in Kern County (Hansen and Brode, 1980). The present known distribution extends from just south of Chico in Butte County southward to the vicinity of Burrel in Fresno County (Ellis, 1987). Telemetry studies in the Natomas Basin conducted by Wylie and Casazza (2000a) reported little, if any, use of non-rice agricultural lands. During the summer, GGS were found in canals and sloughs and in rice fields 91 and nine percent of the time, respectively. Prior to the flooding of rice fields in the spring, GGS were found in sloughs 93 percent of

the time, field roads six percent, and rice fields one percent. They further noted that particular parcels of upland pasture in the Natomas area did not support GGS.

There are 14 recorded occurrences of GGS in the canals and ditches bordering the project area dating from 2007 to 2012 (Figure 5).

Northern Western Pond Turtle. The northern western pond turtle is a California Species of Special Concern that occurs primarily in foothills west of the Cascade-Sierra crest throughout California. The northern subspecies ranges north of the San Francisco Bay area and intergrades with the southern western pond turtle in the southern portion of the Central Valley (Holland, 1993). Pond turtles are an aquatic turtle inhabiting streams, marshes, ponds, and irrigation ditches within woodland, grassland, and open forest communities. It requires upland sites for nesting and over-wintering. The species inhabits stream as well as pond habitats. Stream habitat must contain large, deep pool areas (six feet) with moderate-to-good plant and debris cover, and rock and cobble substrates for escape retreats (Todd, 1993; Bury, 1993). Preferred depths in pond habitat is between three and five feet with mud substrate. Dense inshore vegetation is especially critical for hatchlings where they spend their first few years of life. Turtles from riverine systems overwinter in upland areas, while pond dwellers may remain as permanent residents with only nesting forays performed annually by gravid females (Rathbun et al., 1993).

The nearest recorded occurrence of the northern western pond turtle to the project sites was approximately one mile east in a slough adjacent to the Feather River. This occurrence consisted of four adults and one juvenile observed basking in Wood Duck Slough in 1996.

Special-Status Birds

Swainson's Hawk. Swainson's hawk is a state-listed Threatened species. This species breeds in open habitats in western North America from Alaska south to Mexico. It breeds in California, mainly in the Central Valley, Klamath Basin, Northeastern Plateau, and Mojave Desert (CDFG, 1994). It winters primarily on the pampas of southern South America, Mexico, though a few winter in California, the southwestern U.S. and Florida. In California, Swainson's hawks usually arrive in March and April and leave in September or October.

It is absent from most of its former range in California, where its population has declined by more than 90 percent during the 20th century (CDFG, 1994).

This species forages in grasslands or areas of sparse trees or shrubs, and often forages in agricultural areas in the Central Valley. It nests in the scattered trees within these habitats particularly those along waterways. During the breeding season, it feeds primarily on small mammals and reptiles. During other seasons, large insects (especially grasshoppers) are the bulk of its diet. Flooded rice fields are not suitable foraging habitat for Swainson's hawk, but they will use fallow fields and berms occasionally for resting and foraging (Sterling and Buttner, 2011).

Loss of habitat is the major threat to this species in California. Residential and commercial development continues to replace Swainson's hawk habitat. Pesticides and herbicides are also a major threat, particularly on their wintering grounds. They are also sensitive to disturbance while nesting and may abandon nests if disturbed before the eggs hatch.

There are seven Swainson's hawk occurrences within one mile of the project area. Most of the occurrences are within the riparian zone along the perimeter of the Sutter Bypass. Additionally, there are many recorded occurrences within the riparian corridor on the Feather River east of the project site. The nearest recorded occurrences are in the Sutter Bypass, within one-half mile of project, site in 2004 and 2010.

Because Swainson's hawk has generally begun its southern migration when the fields are flooded in the fall, the project is not likely to have any impact on the species.

Sensitive and Regulated Habitats

The site was examined for evidence of regulated habitats such as waters and wetlands under regulatory authority of the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The site contains a variety of potentially jurisdictional areas. According to the National Wetland Inventory (NWI) Map, the Sutter Bypass supports freshwater forested shrub wetland, freshwater emergent marsh, and riverine habitat in the vicinity of the project. In addition, the project area outside the bypass contains farm ditches and stockponds that may or may not be considered jurisdictional.

The Montna and Leal project sites contain farm ditches at the perimeter and throughout the rice fields. These may be considered jurisdictional depending on their adjacency or connectivity to the Sutter Bypass and the Feather River, both of which are WoUS, and within the jurisdiction of the Corps. Isolated wetlands are no longer regulated under Corps jurisdiction based on the U.S. Supreme Court decision in Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers (2001). Based on this court decision and guidance from the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency (2001), the federal government no longer asserts jurisdiction over isolated waters and wetlands under Section 404 of the Clean Water Act based on the "migratory bird rule." The status of stock ponds and ditches must be confirmed by the Corps. All features discussed above may be considered WoUS, and under Corps jurisdiction.

Wildlife Corridors

Wildlife migration corridors are generally defined as connections between fragmented habitat patches that allow for physical and genetic exchange between otherwise isolated wildlife populations. Migration corridors may be local, such as those between foraging and nesting or denning areas, or they may be regional in extent. Migration corridors are not unidirectional access routes; however, reference is usually made to source and receiver areas in discussions of wildlife movement networks. "Habitat linkages" are migration corridors that contain contiguous strips of native vegetation between source and receiver areas. Habitat linkages provide cover and forage sufficient for temporary inhabitation by a variety of ground-dwelling animal species. Wildlife migration corridors are essential to the

regional fitness of an area as they provide avenues of genetic exchange and allow animals to access alternative territories as fluctuating dispersal pressures dictate.

The project sites provide resting and foraging habitat for migratory waterfowl. Coupled with the riparian corridors along Sutter Bypass and the Feather River, the area is an extensive and high value wildlife corridor.

AQUATIC BIOLOGICAL SETTING

The East Borrow Channel of the Sutter Bypass (Appendix A, Photo 1) adjacent to the project sites is approximately 100 feet (ft) wide. The bed and bank of the channel within the project area are largely unvegetated or are occupied by floating aquatic vegetation, with ruderal vegetation in areas above the waterline and up to the top of the bank. The only riparian vegetation in the project area consists of scattered mature riparian trees located primarily on the far (west) bank of the channel (Appendix A, Photo 2), providing only minimal shading of the aquatic habitat. The Sutter Bypass is known to offer excellent rearing habitat for special-status fish species when it is flooded (California Department of Water Resources [DWR], 2009). After floodwaters recede, water temperatures begin to increase, reducing the quality of habitat for special-status fish species (DWR, 2009).

DWR Pumping Plant No. 1 (Appendix A, Photo 3) is located on the outboard side of the eastern levee of the channel within the project area. The plant comprises the old pumping facility constructed in the 1930s and the new pumping facility constructed in the 1980s (ICF, 2009). Pumps at the old facility were removed when the new facility was constructed. Now, the old facility is used strictly for gravity flow. The old facility has three, four-foot-wide by six-foot-tall culverts, each equipped with flapgates (Appendix A, Photo 4) that can be held in an open position in two of the three culverts to allow water to flow by gravity in either direction, depending on the elevation difference between the East Side Channel and the drainage canals (ICF, 2009). The culverts extend through the entire levee, terminating in the sump below the old pump house. Slide gates approximately halfway through the levee are used to control the flow of water through the culverts and help maintain pool elevations inside and outside the levee (ICF, 2009). The culverts are currently not fitted with fish screens, but DWR (2004) has evaluated the feasibility of screening them.

Within the project boundaries (i.e., outside of the Bypass), a network of irrigation ditches (including the State Reclamation Drain) that is hydrologically connected to the Bypass via the DWR Pumping Plant culverts, traverse the agricultural fields. These ditches are generally 35 to 55 ft wide, contain largely slow-moving/still water flows, and consist of earthen banks and substrates. The channels generally do not contain any emergent or riparian vegetation (Appendix A, Photo 5). These channels do not provide spawning or rearing habitat for special-status fish species, but temporary straying of these species into the ditches (via the DWR culverts) may occur at times. The existing diversion pumps (e.g., Photo 6) also are not fitted with fish screens.

AQUATIC SPECIAL-STATUS SPECIES

Prior to conducting field surveys, special-status fish species potentially occurring on or near the project area were identified through a query of the CNDDB for the 12, 7.5-minute USGS quadrangles surrounding the Sutter Causeway and Nicolaus quadrangles. In total, five fish species have been recorded in this 700 square mile area (Appendix C) by CNDDB (2013). However, based on data summarized by DWR (2009), Sacramento River Winter-run Chinook salmon (*Oncorhynchus tshawytscha)*, , and Central Valley Fall/Late Fall-run Chinook salmon are also known to occur in the Sutter Bypass, and green sturgeon (*Acipenser medirostris*) may potentially occur in the Sutter Bypass, and thus in the project area. Appendix C lists special-status fish species with a potential to occur in the vicinity of the project areas. The following description of the life history traits, habitat requirements, and project area occurrences of special-status fish assumed to have the highest probability of occurrence on the project site has been adapted from DWR (2009) for purposes of this reconnaissance-level fisheries resource assessment.

Green Sturgeon

The Southern Distinct Population Segment (DPS) of North American green sturgeon is listed as a threatened species under FESA and a Species of Special Concern by CDFW. Critical habitat for the DPS has been designated and includes the mainstem Sacramento River downstream of Keswick Dam (including the Yolo and Sutter bypasses), the Feather River below Oroville Dam, the Yuba River below Daguerre Point Dam, and the Sacramento-San Joaquin Delta.

The Southern DPS of North American green sturgeon consists of populations originating from coastal watersheds south of the Eel River, with the only confirmed spawning population occurring in the Sacramento River basin. Historically, spawning in the Sacramento River may have extended up into its three major branches: the Little Sacramento River, the Pit River System, and the McCloud River. Spawning may also have occurred in the Feather River. Loss of habitat in river reaches blocked by dams is the primary factor in this species' decline. Shasta and Keswick dams on the Sacramento River and Oroville Dam on the Feather River block access to historical spawning and rearing areas, restricting spawning and rearing to the Sacramento River downstream of Keswick Dam. Other factors contributing to the species' decline include degradation of habitat conditions, entrainment in water diversions, and over-harvest (DWR, 2009).

Adult green sturgeon are thought to spawn every three to five years. During spawning runs, adult southern DPS sturgeon enter San Francisco Bay between mid-February and early May and migrate rapidly up the Sacramento River. Spawning occurs in cool sections of the upper Sacramento River with deep, turbulent flows and clean, hard substrate. In fall, these post-spawn adults move back down the river and re-enter the ocean. After hatching, larvae and juveniles migrate downstream toward the Sacramento-San Joaquin Delta and Estuary. After rearing in the Delta and Estuary for several years, they move out to the ocean. As adults, green sturgeon migrate seasonally along the west coast, congregating in bays and estuaries in Washington, Oregon, and California during the

summer and fall months and off northern Vancouver Island, Canada during the winter and spring months.

Although there are no spawning populations of green sturgeon in Butte Creek, their presence in lower Butte Creek, including the East Borrow Channel, is likely because of the connection to the Sacramento River during high flows (DWR, 2009).

Central Valley Steelhead

The Central Valley DPS of steelhead is listed as threatened under the ESA. Critical habitat for the DPS has been designated by NMFS and includes all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries, including the Sutter Bypass.

The Central Valley DPS historically inhabited large and small streams throughout the Sacramento-San Joaquin watershed. Currently, populations are found in the Sacramento River and its tributaries and the Cosumnes and Mokelumne rivers. In the San Joaquin River basin, they are limited to reaches below major dams on the Stanislaus, Tuolumne and Merced rivers and to the mainstem San Joaquin River downstream of its confluence with the Merced River. Loss of habitat in river reaches blocked by dams is the primary factor in this species' decline. Below dams, steelhead populations are affected by varying flow conditions, high summer and fall water temperatures, and entrainment losses at unscreened diversions (DWR, 2009).

Juvenile steelhead typically migrate to marine waters in the spring after spending one or more years rearing in freshwater. They typically reside in marine waters between two and three years prior to returning to their natal stream in winter and spring to spawn as four- or five-year olds. Females usually choose spawning sites near the head of a riffle, just downstream of a pool (pool tail-out), where the water flow changes from a smooth to a turbulent flow. Eggs are deposited in redds (spawning "nests") constructed by the female in areas containing coarse gravel (0.5- to 3-inch diameter). Juvenile steelhead require cool (ideally less than 65ºF), clean water in streams that contain instream cover, pools, and riparian shading.

Juvenile steelhead are present in the Butte Creek system year-round and use the lower Butte Creek system as seasonal rearing habitat and a migratory route during their seaward migration (ICF, 2009). Although there are only limited observations, steelhead are thought to ascend Butte Creek in the late-fall and winter where they proceed to spawn in both the mainstem and tributaries. Spawning takes place through the winter and into spring (generally December through April). There is very little information regarding the numbers of steelhead in Butte Creek. Estimating production of steelhead in Butte Creek is complicated because of its hydrologic connections with the Sacramento River. Steelhead adults have been captured in Butte Creek during DFW trapping efforts for juvenile spring-run salmon, and the Sutter Bypass is known to be used as rearing habitat by juveniles (DWR, 2009).

Central Valley Spring-run Chinook Salmon

The Central Valley spring-run Chinook salmon Evolutionarily Significant Unit (ESU) is listed as threatened under FESA and CESA. Critical habitat for the ESU has been designated and includes all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries, including the Sutter Bypass.

This run of Chinook salmon historically inhabited large and small streams throughout the Sacramento-San Joaquin watershed. Spring-run Chinook salmon have been completely extirpated in the San Joaquin drainage. Currently, spawning populations are consistently found only in Butte, Deer, and Mill creeks, which are tributaries to the Sacramento River (DWR, 2009). Adult spring-run Chinook salmon migrate up the Sacramento River to upstream spawning areas from February through June. Adults seek deep holding pools to oversummer and spawn when water temperatures begin to cool in mid-September. Juveniles emerge from the gravel as early as late November. Trapping studies indicate that the majority migrate as fry or fingerlings, while a small portion of juveniles over-summer and emigrate as yearlings the next fall.

Spring-run Chinook salmon juveniles migrate downstream primarily from December through February, entering the Sacramento River either through the Butte Slough Outfall or through the Sutter Bypass (DWR, 2009). Life history investigations have shown that many juveniles entering the Sutter Bypass remain there for several weeks. From January through April during the 2003-2004 season, the average passage time for fish that were marked just below the spawning grounds and recaptured in the Sutter Bypass near its confluence with the Sacramento River was 46 days (McReynolds et al., 2005), supporting the value of the Sutter Bypass as a nursery for spring-run Chinook salmon. By mid-May, most juveniles have left or are actively migrating in response to physiological cues and rising water temperatures. Maximum daily water temperatures in the lower Sutter Bypass are typically at or near lethal levels by early or mid-June (ICF, 2009).

Central Valley Fall/Late-Fall Run Chinook Salmon

The Central Valley fall/late fall-run Chinook salmon ESU is a federal Species of Concern as well as a California Species of Special Concern. Critical habitat has not been designated by NMFS for this ESU.

This run of Chinook salmon historically inhabited the entire Sacramento-San Joaquin watershed. Currently populations are found in the Sacramento River and its tributaries and the Cosumnes and Mokelumne rivers. In the San Joaquin River basin, they are limited to reaches below major dams on the Stanislaus, Tuolumne and Merced rivers and to the mainstem San Joaquin River downstream of its confluence with the Merced River. Loss of habitat in river reaches blocked by dams is the primary factor in this species decline. Below dams, populations are affected by varying flow conditions, alteration of stream flows, high summer and fall water temperatures, over-harvest, and entrainment losses at unscreened diversions (DWR, 2009).

Chinook salmon require cold, freshwater streams with suitable gravel for reproduction. Adults spawn in fall when water temperatures decline to 60°F. After emerging, many

Chinook salmon fry tend to seek shallow, nearshore habitat with slow water velocities and move to progressively deeper, faster water as they grow. Many emerging fry are transported downstream into the lower rivers and the Delta where they rear in shallow marshes and side channels. Juveniles typically rear in fresh water for up to five months before migrating out to sea after reaching a length of between four and six inches.

In general, fall-run Chinook salmon emigrate as fry from December through March and as older juveniles from April through June. Late fall-run Chinook salmon emigrate as fry from April through June. Tagged juveniles released in the upper Sacramento River and recaptured in the Sutter Bypass following winter flood events indicate that rearing and emigration of fall- and late fall-run juveniles in the lower Butte Creek system can extend through June, with most leaving the Sutter Bypass by mid-May (ICF, 2009).

Sacramento River Winter-run Chinook Salmon

The Sacramento River winter-run Chinook salmon ESU is listed as endangered under the ESA and CESA. Within the Sacramento River, critical habitat for this ESU has been designated from Keswick Dam (River Mile 302) to Chipps Island at the westward margin of the Sacramento-San Joaquin Delta. This run of Chinook salmon historically spawned in the upper reaches of the Sacramento River and its major tributaries, the McCloud and Pit rivers. Impedance of migration and predation below the Red Bluff Diversion Dam, deterioration of water temperatures below Keswick Dam, and entrainment losses at unscreened diversions are the primary factors in this species' decline (DWR, 2009).

Winter-run adults migrate through the Delta and into the Sacramento River in winter and early spring and spawn in the mainstem Sacramento River and Battle Creek during late spring and early summer (Moyle, 2002). Juvenile salmon rear in the Sacramento River in summer and fall, gradually moving downstream before entering the Delta from November through March. Juveniles typically rear in fresh water for up to five months before migrating to sea when they reach a length of between four and six inches. They migrate out of the Delta to the Bay from February through April.

Winter-run Chinook salmon do not spawn in Butte Creek (DWR, 2009), but juveniles may enter the lower Butte Creek system (Butte Basin, Butte Sink, Butte Slough, and Sutter Bypass) when the Sacramento River flows in excess of approximately 22,000 cubic feet per second (cfs) are diverted into the lower Butte Sink and Sutter Bypass via overflows from the Tisdale, Colusa, and Moulton weirs during the primary emigration period (November through March) (ICF, 2009). During these flows, the Sutter Bypass functions as a migratory corridor for juvenile winter-run Chinook salmon (DWR, 2009).

Tagged juveniles released in the upper Sacramento River and recaptured in the Sutter Bypass following winter flood events indicate that rearing and emigration of winter-run juveniles in the lower Butte Creek system can extend through March (ICF, 2009).

Sacramento Splittail

The Sacramento splittail is California Species of Special Concern. Splittail are found primarily in the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh. During wet years,

they may migrate as far upstream as Red Bluff Diversion Dam (Moyle, 2002). Historically, they ranged throughout the Sacramento and San Joaquin rivers and their tributaries. They have disappeared from much of these waterways because of dams, diversions and drastically altered habitat.

Splittail exhibit a great ability to recover when they are presented with favorable conditions. However, based on their history and distribution, their long-term survival as a species remains in doubt (Moyle, 2002). Adult splittail begin upstream migration during the winter and spring to feed and spawn in flooded areas. During wet years, splittail have the ability to move much further upstream, which mimics their historic migration (Moyle, 2002). Splittail production is greatest during wet years when floodplain habitat is inundated and high Delta outflows occur. This correlation is likely because floodplains offer suitable spawning and rearing habitat for splittail (Moyle, 2002). Splittail typically spawn in the spring months, although, spawning has been documented as early as January and as late as July (Moyle, 2002). During late winter and spring, young of the year juveniles are found in sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open water habitats of Suisun and San Pablo bays (Moyle, 2002).

The Sutter Bypass offers good spawning habitat for splittail when it is flooded for several weeks in March and April (DWR, 2009). When these conditions occur, an abundance of juvenile splittail can be expected in the Sutter Bypass through the spring (Moyle, 2002).

IV. IMPACTS AND MITIGATION MEASURES

IMPACT CATEGORIES

Both the construction and operations-related impacts of the Proposed Project are analyzed below. For each type of impact, a statement is provided that classifies the level of significance of the impact, based on the significance thresholds stated above, and the availability of measures to feasibly mitigate project effects. Impact categories include:

- **Significant Unavoidable Impact** is an adverse effect that cannot be mitigated. This category of impact is one for which a solution has not been formulated, either because of the limits of technical and/or scientific knowledge, or unfeasibility from a technical, economic, and/or political perspective. Under CEQA, a Significant Unavoidable impact in an Initial Study would require the preparation of an Environmental Impact Report.
- **Less Than Significant Impact with Mitigation Incorporated** is an adverse environmental effect that can be mitigated to less than significant levels through the adoption of mitigation measures. For this category, feasible mitigation measures will be identified that: avoid the impact altogether by changing the Proposed Project; minimize impacts by limiting the degree or magnitude of the action and its implementation; rectify the impact by repairing, rehabilitating, or restoring the affected environment; or compensate for the impact by replacing or providing substitute resources or environments.

- **Less than Significant Impact** is an adverse environmental effect of insufficient magnitude, intensity, or duration to disrupt the environment, and have no serious consequences. As a result, no mitigation is required.
- **No Impact** is designated for impact categories where no effect whatsoever would occur to the environment and no mitigation is required.

IMPACT ANALYSIS

The following impact analysis is based on CEQA Checklist questions related to both *Biological Resources* and *Hydrology and Water Quality*.

The Proposed Projects have the potential to create both construction-related (short-term) or operations-related (long-term) impacts on biological resources. Because neither Proposed Project would involve the need for construction, neither project would have construction-related impacts. Therefore, construction-related impacts are not further considered in this report. Instead, the focus of this analysis is on operations-related impacts.

BIOLOGICAL RESOURCES

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant Impact; No mitigation required

No construction-related impacts would occur for either the Montna or Leal project because all required facilities already exist and no new construction is required.

Terrestrial Species and Habitats

The project rice fields have been in agricultural production for many years. As detailed above under Setting, water operations under the proposed projects would not change, compared to existing operations, with respect to:

- Acreage inundated;
- Timing, frequency, duration, and depth of inundation;
- Quality of water.

The only change in operations would be a small increase in the amount of water diverted, to provide greater flow-through, and reduce the likelihood of avian disease outbreaks.

Vegetation. The proposed project would not change drainage patterns in the area; it would only divert additional water temporarily onto fields before discharging it again to flow

as it would have in the absence of the diversion. These diversions would not lead to increased flooding, as water would only be temporarily diverted onto project fields, and sufficient capacity exists in the channels surrounding the proposed projects and in the Sutter Bypass to manage these very small changes in flows. The proposed project would not contribute substantial amounts of pollutant sources to the water or lead to any substantial increases in erosion, as water is already applied to these fields at these depths. While flow velocities and the volume of water diverted will increase slightly under the proposed projects, the fields are designed to handle these flows. These changes are not expected to affect native vegetation on the berms since there is no increase in depth and no erosion hazard.

Wildlife. Water operations under the proposed projects, would not change in terms of the depth, extent, or duration of flooding, compared to the baseline condition. The continuation of present operations would not result in significant adverse impacts on wildlife resources. The current operations of the Applicants has not impacted GGS in the past as evidenced by the increased number of sightings between 2007 and 2011, during which current operations were probably occurring. Further, the greatest threat to GGS during the wintering months is the flooding of hibernacula. Because the water surface elevation will not increase, no incremental flooding of the levees will occur, and GGS above that historic elevation will not be flooded by the operation.

The current water rights permits for the project permit flooding of fields beginning in the March-April timeframe, which is the beginning of the breeding season for a number of bird species. As such, no ground-nesting habitat is available in the rice fields, and the longer duration of flooding (Oct-Nov to Mar-Apr) under the proposed projects would not substantially adversely affect breeding birds. Winter flooding could result in a beneficial effect in that it would deter any potential early nests, which would subsequently be destroyed by spring flooding. Increased flow rates through the field could also aid in preventing avian botulism.

Species that could be nesting on the rice checks, berms, and levees, such as western burrowing owl, or those that could forage on them, like northern harrier, would be unaffected by the winter flooding regime because the project proposes no change in water depths and, therefore, no higher encroachment onto vegetated side slopes would occur.

Aquatic Species and Habitats

The seasonal drainage area upstream of the project area (i.e., the source of water for the proposed diversions) does not support special-status fish species. However, the Sutter Bypass is known to support a number of special-status fish species, and the hydrologic connection (via the DWR Pumping Plant culverts) between the Bypass and the network of irrigation ditches (including the State Reclamation Drain) containing the pumps, special-status fish species may potentially occur in the vicinity of the existing pumps. The pumps used for diversion of water under Applications 31176 and 31572 are unscreened. Unscreened diversions pumps have the potential to result in entrainment and mortality of special-status fish species if individuals of these species are within the immediate vicinity of the pumps while the pumps are operating. The likelihood of entrainment at the pumps

is currently unknown as no fish distribution, abundance, or entrainment studies have been conducted within the canals and ditches containing the pumps. However, a detailed analysis of fish entrainment potential within the lower Butte Creek system, including the Sutter Bypass, was recently conducted (ICF, 2008; 2009) as part of the Lower Butte Creek Project (LBCP), funded through grants from CALFED and the USFWS's Anadromous Fish Restoration Program (AFRP). The purpose of the assessment was to evaluate the potential effects (benefits) of installing fish screens on 24 small pumps (with a total of 27 intakes), DWR Pumping Plants 1, 2, and 3 within the East Borrow Channel of the Sutter Bypass, and pumps located on Butte Slough and the West Borrow Channel (ICF, 2008). It is important to note that all of the small pumps evaluated in the ICF (2008) study are located within the actual Bypass or Slough, not outside the levees where the existing pumps included in Applications 31176 and 31572 are located.

The assessment utilized a salmon habitat simulation model (Ecosystem Diagnosis and Treatment) to evaluate the effects of diversions in the Lower Butte Creek study area in context of other factors (e.g., water temperature, predation, habitat quantity, flow) that affect the survival of Butte Creek spring-run Chinook salmon. The model reports the effect of the diversions and the overall environment in terms of juvenile and adult abundance and population productivity. The assessment was based on the results of long-term population monitoring of Butte Creek spring-run Chinook salmon and general survival relationships developed from the existing data and scientific literature. Where applicable, the results are applied to Butte Creek steelhead based on the general life history attributes of Central Valley steelhead. (ICF, 2008)

The results of the analysis indicate that under existing conditions, which were assumed to include negligible winter pumping demands, the highest entrainment losses would be expected to occur from April through June of dry and critical water years, with the majority of entrainment losses occurring in the East Borrow Channel. Monthly entrainment probabilities at individual diversions range from less than 0.5% (most small pumps in the East Borrow Channel) to 4.6% (DWR Pumping Plant 1). The analysis indicates that screening the culverts at the DWR pumping stations would have the greatest benefit of any single action, considering all water type years. In other words, entrainment mortality is likely at these three stations under all flow conditions during the spring. However, ICF (2009) also note that modeling of habitat conditions and diversion entrainment probabilities in the creek and a review of data by fisheries professionals indicate that the spring-run Chinook salmon population in the Butte Creek system is healthy, and that entrainment at diversions is not a significant factor limiting abundance of spring-run Chinook salmon and steelhead. The factors limiting the long-term success of these populations are associated with availability of upstream spawning habitat and adequate flows to allow juvenile and adult passage through the lower reaches of the creek. The predicted effect of entrainment on the adult population size is small; modeling suggests that screening all remaining diversions on the lower reaches of the creek would increase returning adult numbers by only 3-10%, depending on water year type. According to ICF, actions associated with ensuring adequate flows in lower Butte Creek during the juvenile and adult migration periods are expected to be a more cost-effective and practical way to ensure long-term sustainability of salmon and steelhead populations in Butte Creek (ICF, 2009).

The results of the ICF (2009) analysis provide context for the analysis of potential entrainment of listed species at the existing diversion pumps proposed to be used under Applications 31176 and 31572. ICF (2009) determined that entrainment at the small pumps located within the East Borrow Channel is essentially less than significant in terms of overall spring-run Chinook salmon and steelhead population trends in the Butte Creek system. Although the analysis assumed peak diversion demands to occur during the spring and summer months, and proposed diversions would be operated in the fall and winter, the existing pumps proposed for use under Applications 31176 and 31572 are located outside the Bypass within irrigation ditches and canals that do not provide suitable spawning or rearing habitat for special-status fish species. As such, the likelihood of entrainment at the existing Montna and Leal pumps is considerably lower than that of the small pumps located within the Bypass, and the effects of entrainment on population dynamics would also be considered less than significant. Furthermore, ICF (2009) recommend that the culverts at the DWR pumping plants, including Pumping Plant 1, be screened. If these culverts are, in fact, screened in the future, the potential for entrainment at the existing Montna and Leal pumps would be eliminated entirely. (ICF, 2009)

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant; No Mitigation Required

Construction-Related impacts

No construction-related impacts for either the Montna or Leal project would occur, because all required facilities already exist and no construction will occur.

Operations-Related Impacts

The project rice fields have been in agricultural production for many years. As detailed above, water operations under the proposed projects would not change, compared to existing operations, with respect to:

- Acreage inundated
- Timing, frequency, duration, and depth of inundation
- Quality of water

The only change in operations may be a small increase in the amount of water diverted, to provide greater flow-through, and reduce the likelihood of avian disease outbreaks.

Vegetation and Wildlife Species

The proposed project would not change drainage patterns in the area; it would only divert additional water temporarily onto fields, before discharging it again to flow as it would have

in the absence of the diversion. These diversions would not lead to increased flooding, as water would only be temporarily diverted onto project fields, and sufficient capacity exists in the channels surrounding the proposed projects and in the Sutter Bypass to manage these very small changes in flows. The proposed project would not contribute substantial amounts of pollutant sources to the water or lead to any substantial increases in erosion, as water is already applied to these fields at these depths. While flow velocities and the volume of water diverted may increase slightly under the proposed projects, the fields are designed to handle these flows. These changes are not expected to affect native vegetation on the berms since there is no increase in depth and no erosion hazard.

Because water operations under the proposed projects, would not change the depth, extent, or duration of flooding, compared to the baseline condition, the continuation of present operations would not result in significant adverse impacts on wildlife resources.

Fish Species

The seasonal drainage area upstream of the project area (i.e., the non-Bypass source of water for the proposed diversions) does not support special-status fish species. However, the Sutter Bypass is known to support a number of special-status fish species, and the hydrologic connection (via the DWR Pumping Plant culverts) between the Bypass and the network of irrigation ditches (including the State Reclamation Drain) containing the pumps, special-status fish species may potentially occur in the vicinity of the existing pumps. The pumps used for diversion/rediversion of water under Applications 31176 and 31572 are unscreened. Unscreened diversions pumps have the potential to result in entrainment and mortality of special-status fish species if individuals of these species are within the immediate vicinity of the pumps while the pumps are operating. The likelihood of entrainment at the pumps is currently unknown as no fish distribution, abundance, or entrainment studies have been conducted within the canals and ditches containing the pumps. However, a detailed analysis of fish entrainment potential within the lower Butte Creek system, including the Sutter Bypass, was recently conducted (ICF, 2008; 2009) as part of the Lower Butte Creek Project (LBCP) funded through grants from CALFED and the U.S. Fish and Wildlife Service's (USFWS's) Anadromous Fish Restoration Program (AFRP). The purpose of the assessment was to evaluate the potential effects (benefits) of installing fish screens on 24 small pumps (with a total of 27 intakes), DWR Pumping Plants 1, 2, and 3 within the East Borrow Channel of the Sutter Bypass, and pumps located on Butte Slough and the West Borrow Channel (ICF, 2008). It is important to note that all of the small pumps evaluated in the ICF (2008) study are located within the actual Bypass or Slough, not outside the levees where the existing pumps included in Applications 31176 and 31572 are located.

The assessment utilized a salmon habitat simulation model (Ecosystem Diagnosis and Treatment) to evaluate the effects of diversions in the Lower Butte Creek study area in context of other factors (e.g., water temperature, predation, habitat quantity, flow) that affect the survival of Butte Creek spring-run Chinook salmon. The model reports the effect of the diversions and the overall environment in terms of juvenile and adult abundance and population productivity. The assessment was based on the results of long-term population monitoring of Butte Creek spring-run Chinook salmon and general survival relationships

developed from the existing data and scientific literature. Where applicable, the results are applied to Butte Creek steelhead based on the general life history attributes of Central Valley steelhead. (ICF, 2008)

The results of the analysis indicate that under existing conditions, the highest entrainment losses would be expected to occur from April through June of dry and critical water years, with the majority of entrainment losses occurring in the East Borrow Channel. Monthly entrainment probabilities at individual diversions range from less than 0.5% (most small pumps in the East Borrow Channel) to 4.6% (DWR Pumping Plant 1). The analysis indicates that screening the culverts at the DWR pumping stations would have the greatest benefit of any single action, considering all water type years. In other words, entrainment mortality is likely at these three stations under all flow conditions during the spring. However, ICF (2009) also note that modeling of habitat conditions and diversion entrainment probabilities in the creek and a review of data by fisheries professionals indicate that the spring-run Chinook salmon population in the Butte Creek system is healthy, and that entrainment at diversions is not a significant factor limiting abundance of spring-run Chinook salmon and steelhead. The factors limiting the long-term success of these populations are associated with availability of upstream spawning habitat and adequate flows to allow juvenile and adult passage through the lower reaches of the creek. The predicted effect of entrainment on the adult population size is small; modeling suggests that screening all remaining diversions on the lower reaches of the creek would increase returning adult numbers by only 3-10%, depending on water year type According to ICF, actions associated with ensuring adequate flows in lower Butte Creek during the juvenile and adult migration periods are expected to be a more cost-effective and practical way to ensure long-term sustainability of salmon and steelhead populations in Butte Creek. (ICF, 2009).

The results of the ICF (2009) analysis provide context for the analysis of potential entrainment of listed species at the existing diversion pumps proposed to be used under Applications 31176 and 31572. ICF (2009) determined that that entrainment at the small pumps located within the East Borrow Channel is essentially less than significant in terms of overall spring-run Chinook salmon and steelhead population trends in the Butte Creek system. Although the analysis assumed peak diversion demands to occur during the spring and summer months, and proposed diversions would be operated in the fall and winter, the existing pumps proposed for use under Applications 31176 and 31572 are located outside the Bypass within irrigation ditches and canals that do not provide suitable spawning or rearing habitat for special-status fish species. As such, the likelihood of entrainment at the existing Montna and Leal pumps is considerably lower than that of the small pumps located within the Bypass, and the effects of entrainment on population dynamics would also be considered less than significant. Furthermore, ICF (2009) recommend that the culverts at the DWR pumping plants, including Pumping Plant 1, be screened. If these culverts are in fact screened in the future, the potential for entrainment at the existing Montna and Leal pumps would be eliminated entirely. (ICF, 2009)

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant Impact; No mitigation required

No riparian or other sensitive natural community was identified within the project area of either Proposed Project. Also, as described above under a), the Proposed Projects are not expected to result in any adverse impacts on vegetation.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant Impact; No mitigation required

The project area outside the Bypass contains farm ditches and stock ponds that may or may not be considered jurisdictional WoUS. Discharges associated with normal farming operations, ranching, and forestry activities (e.g., plowing, cultivating, minor drainage, and harvesting), which includes rice production, are exempt under Section 404 of the Clean Water Act (Section 404(f)(1)(A)). In summary, neither of the Proposed Projects would cause any impacts on wetlands, as no construction is required, and only very minor changes in water flows would result.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant Impact; No Mitigation Required

Wildlife Species. The project sites provide resting and foraging habitat for migratory waterfowl. Coupled with the riparian corridors along Sutter Bypass and the Feather River, the area is an extensive and high value wildlife corridor. However, the Proposed Projects do not involve any physical changes to the physical environment, other than small changes in flows. As such, they would not interfere with the migration patterns of any wildlife species.

Fish Species. Special-status fish species utilize the East Borrow Channel of the Sutter Bypass as a migratory route to and from the upper Butte Creek watershed. The proposed projects are fully constructed and no new structures or facilities that would interfere with the movement of special-status fish species are proposed. Furthermore, the irrigation ditches and canals containing the existing water diversion pumps do not provide migratory habitat for special-status fish species.

The proposed diversions are not expected to significantly affect streamflow levels within the Sutter Bypass and, therefore, are not expected to interfere with the movement of special-status fish species. Ongoing regional salmonid recovery efforts are focused on the operation of major flow manipulation structures within the Butte Creek system (ICF, 2009). A series of flow management options have been developed under the LBCP as potential actions for consideration by the federal and state agencies and water user stakeholders involved in the LBCP. The flow management options are intended to work in tandem with the potential structural actions (e.g., fish passage facilities) to maximize the protection afforded to spring-run Chinook salmon and steelhead in the system while supporting the agricultural and waterfowl management uses of Butte Creek water (ICF, 2009). The guiding principles for development of flow management options were to maintain sufficient flow in the lower Butte Creek system to ensure adequate flow at all weirs and fish ladders to support juvenile and adult salmon and steelhead migration through the creek (ICF, 2009). The flow management options are focused on operations of the major flow manipulation devices in the lower Butte Creek project area, including the East-West Diversion/Weir 5 Structures at the upstream end of Sutter Bypass. Furthermore, the proposed diversions under Applications 31176 and 31572 would occur during the high flow winter and spring season, and any water indirectly diverted from the Sutter Bypass will consist of flows diverted out of the Bypass by DWR at Pumping Plant 1 for flood protection purposes. Based on these considerations, the potential effects of the proposed projects on the movement of special-status fish species as a result of instream flow impairment within the Sutter Bypass are expected to be less than significant. No special-status fish occur in the drainage area upstream of the pumps and would, therefore, not be affected by water diverted from the upstream source.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact; No Mitigation Required

The Proposed Projects would not require the removal of any trees, nor cause any adverse effects on trees.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact; No Mitigation Required

There are currently no Habitat Conservation Plans nor any Natural Community Conservation Plans that encompass either Proposed Project.

IMPACTS ON HYDROLOGY AND WATER QUALITY

g) Would the change in water volume and/or the pattern of seasonal flows in the affected watercourse result in:

iii) a significant reduction in the available aquatic habitat or riparian habitat for native species of plants and animals?

Less than Significant Impact; No Mitigation Required

As discussed above under Biological Resources impact (d), a regional approach for managing water volumes and flow patterns within the Sutter Bypass, including the East Borrow Channel, for the protection and recovery of special-status species is being developed cooperatively by the federal and state agency and water user stakeholders involved in the LBCP. The proposed projects would divert fall/winter flows from the drainage system outside of the Sutter Bypass. Any flows diverted out of the Bypass are under the direct control of DWR for flood control purposes. As such, the proposed projects are not expected to result in a reduction in the available aquatic habitat or riparian habitat for special-status fish species within the Sutter Bypass. The irrigation ditches and canals containing the existing diversion pumps do not contain suitable aquatic habitat for these species.

iv) a significant change in seasonal water temperatures due to changes in the patterns of water flow in the stream?

Less than Significant Impact; No Mitigation Required

The proposed projects would only divert fall/winter flows from the drainage system outside the Sutter Bypass when these flows are diverted out of the Bypass by DWR for flood control purposes. Water temperatures in the Sutter Bypass are under the direct control of DWR for flood control purposes. Water temperatures in the Bypass during these high flow periods are sufficiently low to support special-status fish species; temperatures only exceed tolerance levels of salmonids during the summer and early fall months. Furthermore, instream flow volumes and patterns will be managed through ongoing regional recovery efforts. As such, the proposed projects are not expected to result in a significant change in seasonal water temperatures due to changes in the patterns of water flows in the Sutter Bypass. The irrigation ditches and canals containing the existing diversion pumps do not contain suitable aquatic habitat for special-status fish species.

v) a substantial increase or threat from invasive, non-native plants and wildlife?

Less than Significant Impact; No Mitigation Required

At least 21 non-native fish species are known to occur in the Sutter Bypass (ICF, 2009). The proposed diversions are not expected to substantially increase the existing threat from invasive, non-native species.

V. REFERENCES

Baldwin, B., D. Goldman, D. Keil, and T. Rosatti. 2012. *The Jepson Manual: Vascular Plants of California, Second Edition*. University of California Press. Berkeley, CA.

Brouder, S. and J. Hill. 1995. Conjunctive use of farmland adds value: Winter flooding of ricelands provides waterfowl habitat. California Agriculture: 49 (6): 1-5. http://ucanr.org/repository/CAO/landingpage.cfm?article=ca.v049n06p58&fulltext=yes#tab4906p60.

Bury, R. 1993. Conservation Strategies for Western Pond Turtles and Tortoises. Presentation at Western Section of The Wildlife Society, February 22-27, 1993. Monterey, CA.

California Department of Fish and Game. 1994. Five-Year Status Review: Swainson's Hawk. Reported to: California Fish and Game Commission. Wildlife Management Division, Nongame Bird And Mammal Program. Sacramento, CA.

California Department of Fish and Game. 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California Central Valley. Swainson's Hawk Technical Advisory Committee, May 31, 2000.

California Department of Fish and Wildlife. 2013. California Natural Diversity Database (CNDDB) RAREFIND-4 Query for the Nicolaus and Sutter Causeway 7.5-minute quadrangle. California Department of Fish and Game. Sacramento, CA. Data accessed February, 2013.

California Department of Fish and Wildlife. 2016. California Natural Diversity Database (CNDDB) RAREFIND-12 Query for the Nicolaus and Sutter Causeway 7.5-minute quadrangle. California Department of Fish and Game. Sacramento, CA. Data accessed March, 2016.

California Department of Water Resources (DWR). 2009. Mitigated Negative Declaration and Initial Study for the Sutter Bypass East Borrow Canal Water Control Structures Project. Division of Planning and Local Assistance, September 2009.

Department of Water Resources (DWR). 2004. Lower Butte Creek - Sutter Bypass Department of Water Resources Pumping Plants Fish Screening Project, Preliminary Engineering Technical Report. August 2004.

California Native Plant Society. 2013. Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society, Sacramento, CA. Accessed on February 2013 at <http://northcoastcnps.org/cgi-bin/inv/inventory.cgi>

California Natural Resources Agency. 2012. California Environmental Quality Act (CEQA) Statute and Guidelines. Sacramento, CA.

Ducks Unlimited, Inc. 2005. Draft Lower Butte Creek Project Characterization and Analysis of Small Pumping Plant Sites on the Sutter Bypass East Borrow Channel. Prepared for Central Valley Project Improvement Act, Anadromous Fish Restoration Program. Rancho Cordova, CA.

Ellis, S. 1987. Five Year Status Report on the Giant Garter Snake, Thamnophis couchi gigas. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Hansen, G. and J. Brode. 1980. Status of the Giant Garter Snake, *Thamnophis couchi gigas* (Fitch). California Department of Fish and Game, Inland Fisheries Branch. Sacramento, CA.

Hickman, J. 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA.

Holland, D. 1993. Rangewide Overview of Western Pond Turtle. Presentation at Western Section of The Wildlife Society, February 22-27, 1993. Monterey, CA.

ICF Jones & Stokes (ICF). 2008. Butte Slough/Sutter Bypass Fish Passage and Entrainment Assessment. Prepared for Ducks Unlimited, Inc. Rancho Cordova, CA.

ICF Jones & Stokes (ICF). 2009. Lower Butte Creek Project, Phase III, Consolidated Lead Action Summary Report. Prepared for Ducks Unlimited, Inc. Rancho Cordova, CA.

Mallette, R. and G. Gould. 1976. Raptors of California. California Department of Fish and Game. Sacramento, CA.

McReynolds, T.R., C.E. Garman, P.A. Ward and M.C. Schommer. 2005. Butte and Big Chico Creeks, Spring-Run Chinook Salmon, *Oncorhynchus tshawytscha*. Life history investigation 2003-2004. 46 pp.

Miles, S. and C. Goudey. 1997. Ecological Subregions of California: Section and Subsection Descriptions. USDA Forest Service, Pacific Southwest Region Publication R5-EM-TP-005. San Francisco, CA.

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

Natural Resources Conservation Service. 2013. Web Soil Survey. U.S. Department of Agriculture. http://websoilsurvey.nrcs.usda.gov/app/

Rathbun, G., T. Murphey, and N. Siepel. 1993. Use of Upland Habitats by Western Pond Turtles in Coastal Central California. Presentation at Western Section of The Wildlife Society, February 22-27, 1993. Monterey, CA.

Sawyer, J. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, CA.

Shuford, W. D., and Gardali, T., eds. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game. Sacramento, CA.

Snodgrass, Nancy, Department of Water Resources, personal communication with Craig Stevens, Stevens Consulting, on March 16, 2013.

Sterling, J. and P. Buttner. 2011. Wildlife Known to Use California Ricelands. Prepared by: ICF Jones & Stokes. Prepared for: California Rice Commission.

Todd, L. 1993. A Comparison of Habitat Use by Western Pond Turtles in a Lake and River System. Presentation at Western Section of The Wildlife Society, February 22-27, 1993. Monterey, CA.

U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. 2001. Memorandum: Supreme Court Ruling Concerning CWA Jurisdiction over Isolated Waters. January 19, 2001. Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service. 1992. Field Office Official List of Hydric Soil Map Units for Sutter County, California.

U.S. Fish and Wildlife Service. 2013. Informal species query for federally-listed species within Sutter County.

U.S. Fish and Wildlife Service. 2016. Species list for Sutter County within the project site through IPaC Trust Resource Report on March 3, 2016 for use in preparation of Biological Resources Report.

U.S. Geological Survey. 7.5-minute Topographic Quadrangles for Nicolaus and Sutter Causeway, California.

U.S. Supreme Court. 2001. Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178. January 9, 2001.

U.S. Supreme Court. 2006. Rapanos v. United States, Nos. 04-1034 and 04-1384. June 19, 2006.

Wylie, G. and M. Cassaza. 2000a. Investigation of Giant Garter Snakes in the Natomas Basin: 1998-1999. U.S. Geological Survey-Biological Resources Div., Dixon, CA.

Zeiner, D., W. Laudenslayer, Jr. and K. Mayer. 1988. California's Wildlife, Volume I, Amphibians and Reptiles. California Department of Fish and Game. Sacramento, CA.

Zeiner, D., W. Laudenslayer, Jr., K. Mayer, and M. White. 1990a. California's Wildlife, Volume II, Birds. California Department of Fish and Game. Sacramento, CA.

Zeiner, D., W. Laudenslayer, Jr., K. Mayer, and M. White. 1990b. California's Wildlife, Volume III, Mammals. California Department of Fish and Game. Sacramento, CA.

BIOLOGICAL RESOURCES REPORT APPENDIX A
REPRESENTATIVE PHOTOGRAPHS OF MONTNA AND LEAL PROJECT SITES ON FEBRUARY 26, 2013

Photo 1. East Borrow Channel of the Sutter Bypass adjacent to the project sites

Photo 2. Ruderal vegetation and sparse riparian trees along the East Borrow Channel

Photo 3. Old DWR Pumping Plant No. 1 facility

Photo 4. DWR Pumping Plant No. 1 flap gates in East Borrow Channel

Photo 5. Project area irrigation ditch and diversion pump

Photo 6. Project area irrigation ditch and diversion pump

BIOLOGICAL RESOURCES REPORT - APPENDIX B
SPECIAL-STATUS SPECIES ASSOCIATED WITH RICE LANDS

BIOLOGICAL RESOURCES REPORT - APPENDIX B
SPECIAL-STATUS SPECIES ASSOCIATED WITH RICE LANDS

FAMILY/Common Name	Scientific Name	Protected Status[2]	Occupancy
REPTILES			
EMYDIDAE (Pond and Marsh Turtles)			
Northern Pacific pond turtle	*Actinemys marmorata marmorata*	CSC	
NATRICIDAE (live-bearing snakes)			
Giant garter snake	*Thamnophis gigas*	FT, ST	
BIRDS			
PELECANIDAE (Pelicans)			
American white pelican	*Pelecanus erythrorhynchos*	CSC	Winter
ARDEIDAE (Herons and Bitterns)			
Least bittern	*Ixobrychus exilis hesperis*	CSC	Year-round
THRESKIORNITHIDAE (Ibises and Spoonbills)			
White-faced ibis	*Plegadis chihi*	WL	
ANATIDAE (Swans, Geese, and Ducks)			
Redhead	*Aythya americana*	CSC	Year-round
Fulvous Whistling-Duck	*Dendrocygna bicolor*	CSC	Summer
Greater White-fronted Goose	*Anser albifrons*	CSC	Winter
ACCIPITRIDAE (Hawks and Harriers)			
White-tailed kite	*Elanus leucurus*	FP	
Bald eagle	*Haliaeetus leucocephalus*	SE,FP,FDL,BCC	Winter
Northern harrier	*Circus cyaneus*	CSC	Year-round
Swainson's hawk	*Buteo swainsoni*	ST, BCC	Summer
Golden eagle	*Aquila chrysaetos*	FP,WL,BCC	Year-round
GRUIDAE (Cranes)			
Lesser Sandhill crane	*Grus canadensis canadensis*	CSC	
CHARADRIIDAE (Plovers and Relatives)			
Western snowy plover	*Charadrius alexandrinus nivosus*	FT,CSC,BCC	Winter
Mountain plover	*Charadrius montanus*	CSC,BCC	Winter
SCOLOPACIDAE (Sandpipers and Relatives)			
Short-billed Dowitcher	*Limnodromus griseus*	BCC	Winter
Whimbrel	*Aphriza virgata*	BCC	Winter
Long-billed Curlew	*Numenius americanus*	WL,BCC	Winter
Marbled Godwit	*Limosa fedoa*	BCC	Winter
LARIDAE (Gulls and Terns)			
Black Tern	*Chlidonias niger*	CSC	Summer
STRIGIDAE (Typical Owls)			
Western burrowing owl	*Athene cunicularia hypugea*	CSC,BCC	Year-round
Long-eared owl	*Asio otus*	CSC	Winter

FAMILY/Common Name	Scientific Name	Protected Status[2]	Occupancy
Short-eared owl	*Asio flammeus*	CSC	Year-round
FALCONIDAE (Falcons and Caracaras)			
American peregrine falcon	*Falco peregrinus anatum*	FP,FDL,BCC	Year-round
Prairie falcon	*Falco mexicanus*	WL,BCC	Year-round
HIRUNDINIDAE (Swallows)			
Bank swallow	*Riparia riparia*	ST	Summer
LANIIDAE (Shrikes)			
Loggerhead shrike	*Lanius ludovicianus*	CSC,BCC	Year-round
San Clemente Loggerhead shrike	*Lanius ludovicianus mearnsi*	FE,CSC	
ICTERIDAE (Blackbirds, Orioles and Allies)			
Tricolored Blackbird	*Agelaius tricolor*	CSC,BCC	Year-round
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	CSC	Summer

[1] Sterling, J. and P. Buttner. 2011. Wildlife Known to Use California Ricelands. Prepared by: ICF Jones & Stokes. Prepared for: California Rice Commission.

[2] Protected Status Definitions:

Status (Federal/State)
None = No Federal or State status
FE = Federally listed endangered
FT = Federally listed threatened
FDL = Federal De-listed
BCC = Federal Bird of Conservation Concern
SE = State listed endangered
ST = State listed threatened
CSC = State species of special concern
FP = California fully protected species
WL = CDFW watch list

Status (CNPS)
List 1B – Plants rare and endemic to California
List 2 – Plants rare in California
List 3 – Plants without sufficient information
List 4 – Plants of limited distribution, a Watch List

BIOLOGICAL RESOURCES REPORT - APPENDIX C
SPECIAL-STATUS SPECIES REPORTED ON THE CNDDB, CNPS INVENTORY, AND USFWS SPECIES LIST FOR MONTNA AND LEAL/ODYSSEUS PROJECT AREAS

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
PLANTS			
Astragalus tener var. ferrisiae Ferris' milk-vetch	1B.1	Meadows and seeps, valley and foothill grassland, and subalkaline flats from 6-250 feet, msl	**Low Likelihood of Occurrence**: Closest recorded occurrence is 15 miles west from 2002 (Occ. No. 9). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Delphinium recurvatum *Recurved larkspur*	1B.2	Chenopod scrub, valley and foothill grassland, and cismontane woodland. On alkaline soils; often in valley saltbush or valley chenopod scrub. Found regionally in slightly alkaline beds of vernal pools. 10-685 feet, msl.	**Low Likelihood of Occurrence**: Closest recorded occurrence is 8 miles north from 1900 (Occ. No. 4). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Downingia pusilla Dwarf downingia	2.2	Valley/foothill grassland and vernal pools. 3 to 1,500 feet, msl.	**Low Likelihood of Occurrence:** Closest recorded occurrence is a 1999 occurrence located over 11 miles northeast of the site at Beale Air Force Base (Occ No. 95) **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Gratiola heterosepala *Boggs Lake hedge-hyssop*	SE, 1B.2	Marshes, and swamps, lake margins, and vernal pools often on clay substrates from 32-7,800 feet, mls.	**Low Likelihood of Occurrence**: Closest recorded occurrence is 21 miles southeast from 1997 (Occ. No. 3). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Hibiscus lasiocarpus var. occidentalis *Woolly rose-mallow*	1B.2	Marshes and swamps from 0-400 feet, msl.	**Moderate Likelihood of Occurrence:** Closest recorded occurrence is less than 0.25 mile west from 2009 (Occ. No. 69). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Lepidium latipes var. heckardii *Heckard's pepper-grass*	1B.2	Valley and foothill grassland and alkaline flats from 6 to 660 feet, msl.	**Low Likelihood of Occurrence:** Closest recorded occurrence is 15 miles southwest from 1902 (Occ. No. 6). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
Monardella venosa *Veiny monardella*	1B.1	Cismontane woodland and valley and foothill grassland in heavy clay soils from 20-1,50 feet, msl.	**Low Likelihood of Occurrence:** Closest recorded occurrence is 5 miles north from 1854 (Occ. No. 3). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Pseudobahia bahifolia *Hartweg's golden sunburst*	FE, SE, 1B.1	Cismontane woodland and valley and foothill grassland on clay soils, often acidic from 50-490 feet, msl.	**Low Likelihood of Occurrence:** Closest recorded occurrence is 5 miles north from 1991 (Occ. No. 10). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Trichocoronis wrightii var. wrightii Wright's trichocoronis	2	Marshes and swamps, riparian forest, meadows and seeps, vernal pools, mudflats of vernal lakes, drying river beds, alkali meadows from 16-1,430 feet, msl.	**Low Likelihood of Occurrence:** Closest recorded occurrence is a 1949 sighting located over 8 miles west-northwest of the site (Occ No. 9) **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
SPECIAL STATUS INVERTEBRATES			
Branchinecta conservatio Conservancy fairy shrimp	FE	Endemic to the grasslands of the northern two-thirds of the central valley; found in large, turbid pools. Regionally inhabits astatic pools located in swales formed by old, braided alluvium, filled by winter/ spring rains and lasting until June.	**Low Likelihood of Occurrence:** The closest occurrence of this species is No. 36 from 2012, which is 12 miles southeast of the site. **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Branchinecta lynchi Vernal pool fairy shrimp	FT	Endemic to the grasslands of the central valley, central coast mountains and south coast mountains, in astatic rain-filled pools. Regionally inhabits small, clear-water sandstone depression pools and grassed swale, earth slump or basalt-flow depression pools.	**Low Likelihood of Occurrence:** The closest occurrence of this species is 12 miles southeast of the site in 2011 (Occ. No. 790). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT	Occurrences of the VELB are primarily in the vicinity of moist valley oak woodlands associated with riparian corridors in the lower Sacramento River and upper San Joaquin River drainages (U.S. Fish and Wildlife Service, 1984). Elderberry plants are obligate hosts for the VELB, providing a source of food and broodwood.	**Low Likelihood of Occurrence:** The closest occurrence of this species is 2 miles east of the site in 1991 (Occ. No. 89). **Low Impact Potential**: No elderberry shrubs observed on project site. Current operations inhibit potential survival of shrubs through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Lepidurus packardi Vernal pool tadpole shrimp	FE	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Commonly found in grass-bottomed swales of unplowed grasslands. Some pools are mud bottomed and highly turbid.	**Low Likelihood of Occurrence:** The closest occurrence of this species is No. 33 from 1993, which is 4.5 miles northeast of the site. **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
SPECIAL STATUS FISH			
Acipenser medirostris Green sturgeon	FT CSC	Juvenile green sturgeon have been collected in the San Francisco Bay up to the lower reaches of the Sacramento and San Joaquin rivers; however, spawning locations and seasons of this species are not known	**Low Likelihood of Occurrence:** No spawning populations in the Butte Creek watershed, but may occasionally occur in Sutter Bypass due to hydrologic connection to Sacramento River
Oncorhynchus tshawytscha Sacramento River winter-run Chinook salmon	FE CE	Sacramento River, Sacramento-San Joaquin Delta, and San Francisco Bay	**Moderate Likelihood of Occurrence:** No spawning populations in the Butte Creek watershed, but juveniles may enter Sutter Bypass from Sacramento River during high flows into the Bypass.
Oncorhynchus tshawytscha Central Valley spring-run Chinook salmon	FT CT	Sacramento River, Sacramento-San Joaquin Delta, and San Francisco Bay	**High Likelihood of Occurrence:** Known to occur within Sutter Bypass.
Oncorhynchus mykiss Central Valley steelhead	FT	Sacramento and San Joaquin River systems, Sacramento-San Joaquin Delta, and San Francisco Bay	**High Likelihood of Occurrence:** Known to occur within Sutter Bypass.
Oncorhynchus tshawytscha Central Valley fall/late fall-run Chinook salmon	CSC	Sacramento River, Sacramento-San Joaquin Delta, and San Francisco Bay	**High Likelihood of Occurrence:** Known to occur within Sutter Bypass.
Thaleichthys pacificus Eulachon	FT CSC	Nearshore ocean waters except for brief spawning runs into lower reaches of natal rivers, primarily in northern California.	**Low Likelihood of Occurrence:** No recorded occurrences in Sutter Bypass. The closest occurrence of this species is No. 9 from 2006, which is 10 miles southwest of the site.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
Spirinchus thaleichthys Longfin smelt	ST	Brackish water in Sacramento-San Joaquin Delta. In the Sacramento River, documented as far upstream as the confluence of the American River.	**Low Likelihood of Occurrence:** No recorded occurrences in Sutter Bypass. The closest occurrence of this species is No. 13 from 2012, which is 10 miles southwest of the site.
Pogonichthys macrolepidotus Sacramento splittail	CSC	Slow moving river sections, dead end sloughs; endemic to Central Valley lakes and rivers. During wet years, may migrate as far upstream as Red Bluff Diversion Dam	**High Likelihood of Occurrence:** Known to occur within Sutter Bypass during some years.
SPECIAL STATUS AMPHIBIANS			
Ambystoma californiense California tiger salamander	FT ST	Needs underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	**Low Likelihood of Occurrence:** Outside of known range for species. The closest occurrence of this species (No. 627) is 16 miles southwest of the site in 1990. **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production, which would inundate underground burrows. No change in current operations with project approval.
Rana draytonii California red-legged frog	FT CSC	Found in marshes, lakes, reservoirs, ponds, slow parts of streams, and other usually permanent water in lowlands, foothill woodlands and grasslands. Require areas with extensive emergent vegetation. High value habitats are deep-water ponds with dense stands of overhanging willows and a fringe of cattails	**Low Likelihood of Occurrence:** Outside of known range for species. The closest recorded occurrence (No. 1317) from 2009 is 40 miles northwest of the projects site. **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Spea hammondii Western spadefoot	CSC	Occurs primarily in grassland habitats; can be found in valley foothill hardwood woodlands. Vernal pools are essential for breeding and egg laying.	**Low Likelihood of Occurrence:** The closest occurrence of this species is 16 miles southeast in 1993 (Occ. No. 174). **Low Impact Potential**: Current operations inhibit potential survival through prolonged inundation, draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
SPECIAL STATUS REPTILES			
Emys (=Clemmys) marmorata Northern western pond turtle	CSC	Ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Needs basking sites and suitable upland habitat (sandy banks or grassy open fields) for egg laying.	**Moderate Likelihood of Occurrence:** The closest occurrence of this species is 2 miles northeast of the site in 1996 (Occ. No. 491). Pond turtles could utilize inundated fields for occasional foraging, but not for reproduction. **Low Impact Potential**: Current operations inhibit long-term occupancy through periodic draining, cropping, and land disturbing activities associated with rice production. No change in current operations with project approval.
Thamnophis gigas Giant garter snake	FT ST	Freshwater marshes and streams. Has adapted to drainage canals and irrigation ditches.	**High Likelihood of Occurrence.** 14 occurrences of GGS reported on or near the project site. **Low Impact Potential**: GGS have been reported in project area since current winter-flooding regime was implemented. There will be no change in the depth of water, so there is no potential to flood burrows used as hibernacula.
SPECIAL STATUS BIRDS			
Agelaius tricolor Tricolored blackbird	CSC	Nesting colony requires open water, protected nesting substrate and foraging area with insect prey within a few miles of the colony.	**Moderate Likelihood of Occurrence.** The closest known occurrence of this species is one mile west of the project site in 2014 (Occ. No. 114). **Low Impact Potential**: TCBB would not be breeding during project activities (winter). Rice field would be flooded during winter reducing potential for TCBB foraging opportunities; however, these fields are currently flooded to the same extent and duration as they would be with the proposed project.
Athene cunicularia Burrowing owl	CSC	Uses burrow sites in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	**Moderate Likelihood of Occurrence.** WBO are known to occupy burrows on rice berms. However, the closest occurrence is 25 miles west in 1992 (Occ. No. 150). **Low Impact Potential**: WBO would not be breeding during project activities (winter). Rice field would be flooded during winter reducing potential for WBO foraging opportunities; however, these fields are currently flooded to the same extent and duration as they would be with the proposed project. WBO overwintering in rice berm burrows would not be adversely affected because the depth of water on the flooded fields would not change.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
Buteo swainsoni Swainson's hawk	ST	Breeds in stands with few trees in juniper-sage flats, riparian areas and in oak savannah. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Low Likelihood of Occurrence.** Swainson's hawk forage along the Sutter Bypass on a regular basis during the spring and summer. They are absent from the area during the winter inundation period of the project. **Low Impact Potential**: Flooded fields do not provide foraging habitat, and species is absent during winter period of inundation
Charadrius montanus Mountain plover	PT CSC, BCC	Winters in short grasslands, freshly plowed fields, newly sprouting grain fields and sometimes sod farms. Prefers grazed areas with burrowing rodents.	**Low Likelihood of Occurrence.** Mountain plovers are winter visitors to the Central Valley, but the closest occurrence is 10 miles west in 2001 (Occ. No. 23). Have been reported in recently disked rice fields. **Low Impact Potential**: Flooded fields do not provide foraging habitat. Project not likely to adversely affect species because no change in project operations.
Circus cyaneus Northern harrier	CSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Nests on ground near marsh edge or grassland. Feeds mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish.	**Moderate Likelihood of Occurrence.** Harriers are present year-round in Central Valley. Closest occurrence is 13 miles northeast in 2000 (Occ. No. 38). **Low Impact Potential**: Flooded fields provide foraging habitat. Project not likely to adversely affect species because no change in project operations.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	FT, SE	Found in willow-cottonwood riparian forest, but alder and box elder important in some areas. Nests in willows, cottonwoods, and alders. Along the Sacramento River, found in English walnut trees, and rarely in prune, plum, and almond orchards. Gleans insects from foliage.	**Low Likelihood of Occurrence.** Closest occurrence is 5 miles southeast in 2013 (Occ. No. 129). **Low Impact Potential**: Species absent from California during non-breeding season (October through May). Project not likely to adversely affect species because there will be no change in project operations.
Elanus leucurus White-tailed kite	FP	Rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Forage for rodents in open grasslands, meadows, marshes, and rice fields close to isolated, dense-topped trees for nesting and perching.	**High Likelihood of Occurrence.** Species could forage near or on project site. Closest recorded occurrence is 3.5 miles southeast in 1990 (Occ. No. 96). **Low Impact Potential**: Known to forage on/near rice fields for small mammals. Berms along project provide foraging habitat. Project not likely to adversely affect species because there will be no change in project operations.

Scientific Name Common Name	Status	Habitat Requirements	Likelihood of Occurrence/Impact Potential
Laterallus jamaicensis coturniculus California black rail	ST	Inhabits saltwater, brackish, and freshwater marshes (tule, cattail, bulrush, and sedge). Habitat very shallow (usually less than one inch) but with perennial water source. Highly secretive and rarely observed bird.	**Low Likelihood of Occurrence.** Closest occurrence is 5 miles north in 2006 (Occ. No. 235). **Low Impact Potential**: Most winter in Mexico and Central America, but a few are believed to over-winter in Central Valley. Project does not provide habitat for species (vegetation, water depth), and species not reported in rice field habitat (Sterling and Buttner, 2011). Project not likely to adversely affect species because no change in project operations.
Riparia riparia Bank swallow	ST	Nest in colonies in vertical cliffs, most often in lowland riverbanks, coastal bluffs, open pit mines, and roadcuts	**Low Likelihood of Occurrence.** Closest occurrence is 3 miles east in 2010 (Occ. No. 180) along the Feather River. **Low Impact Potential**: Bank swallows winter in Central and South America between September and March, and not on project site during winter when project flooding would occur. Project sites do not provide habitat for species. Project not likely to adversely affect species because no change in project operations.
SPECIAL-STATUS MAMMALS			
Lasiurus blossevillii Western red bat	CSC	Roosts in forest and woodland habitats from sea level to mixed conifer forest, but feeds over a variety of habitats including grasslands and shrublands. Roosts in trees and shrubs adjacent to streams, fields, or urban areas.	**Low Likelihood of Occurrence.** . Closest occurrence is 11 miles southwest in 1999 (Occ. No. 63). **Low Impact Potential**: Project not likely to adversely affect species because no change in project operations.
Antrozous pallidus Pallid bat	CSC	Inhabits grasslands, shrublands, woodlands, and coniferous forests in open, dry habitats that contain rocky areas for roosting. They are a year-round resident in most of their range, and hibernate in winter near their summer roost. Day roosts are usually rock crevices, tree hollows, mines, caves and a variety of human-made structures. Tree roosting occurs in conifer snags, hollows of redwoods, and cavities in oaks.	**Low Likelihood of Occurrence.** . Closest occurrence is 20 miles south in 1957 (Occ. No. 313). **Low Impact Potential**: Project not likely to adversely affect species because no change in project operations.
[a]Status (Federal/State) None = No Federal or State status FT = Federally listed threatened SE = State listed endangered CSC = California special-status species BCC = Bird of Conservation Concern FE = Federally listed endangered PT = Proposed Federal listing as threatened ST = State listed threatened FP = California fully protected species			**[b]Status (CNPS)** List 1B – Plants rare and endemic to California List 2 – Plants rare in California List 3 – Plants without sufficient information List 4 – Plants of limited distribution, a Watch List

APPENDIX B

Greenhouse Gas Emissions Calculations

This page intentionally
left blank.

Appendix B: Greenhouse Gas Emissions Calculation

Leal Family Trust and Odysseus Water Rights Application

Energy Use and GHG Emissions Methodology

May 17, 2017

Introduction

Environmental Planning Partners, Inc. (EPP) estimated the indirect greenhouse (GHG) emissions associated with the energy expected to be used to operation the six electrically-powered pumping stations associated with the proposed project. This appendix describes the methodology used to estimate annual energy usage and associated GHG emissions for the proposed project. Estimated GHG emissions for the proposed project are also presented.

Key Assumptions and Methodologies

GHG protocols categorize emissions as either direct or indirect. Direct GHG emissions are emissions from sources that are owned and controlled by the reporting entity. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

The implementation of the proposed project would generate indirect GHGs due to energy use associated with the operation of six pumping stations at Points of Diversion (PODs) #2 through #7 on waterways to the east of the Sutter Bypass. Proposed diversions at PODs #2 through #7 would occur using electric pumps ranging from 10 to 25 horsepower to divert 1,770 acre-feet per year of water onto the project site. Although the Applicants have recently been using water during the winter for rice straw decomposition, to be conservative, this analysis assumes no current winter electrical usage and calculates the GHG emissions associated with the diversion of the requested 1,770 acre-feet of water. While the operation of these six pumping stations would likely result in minor indirect GHG emissions, such as nitrous oxide (N_2O), ozone (O_3), and carbon dioxide (CO_2), but these are likely too small to account for.

Proposed energy usage under Application 31572 was calculated by scaling up the average amount of energy used by the Applicants in recent years to the proposed acreage to be used under Application 31572.

The Applicants provided energy use information based on monthly Pacific Gas and Electric (PG&E) utility bills and the efficiency of each electrical pump (in KWh/acre-foot) based on pump

tests. Because the proposed project would involve the diversion of water from September through April, energy use information in megawatt-hours (MWh) for the years 2010 through 2012 during these monthly were tabulated. The total acreage included in the energy usage data were less than the total acre proposed under Application 31572, so the next step was to scale the energy usage data up by the ratio of the proposed acreage in Application 31572 (884.6 acres) to the area recently flooded in winter (844.6 acres). This is a ratio of 1.047.

Finally, total project energy usage was converted to GHG emissions using an emission factor typically expressed as emissions per unit of activity. Emission factors from the California Emissions Estimator Calculator (CalEEMod) for CO_2, CH_4, and N_2O were used to calculate carbon dioxide equivalent (CO_2e) emissions (in pounds) for the proposed project. This amount was then divided by 2204.62, to convert the value from pounds to metric tons (the unit of measure used in emission thresholds). Below is the equation used to estimate GHG emissions:

$$AE = (AU \times EF)/C$$

Where:

AE = Annual emissions of CO_2 from Electricity (MT/year)

AU = Annual usage of electricity (MWh/year)

EF = Emission factor for electrical usage (lbs/MWh)

C= Conversion factor from lbs to metric tons (1 MT = 2,204.62 lbs)

Summary of Results

Indirect Energy Use

Below is a tabular summary of the methodology used to calculate the indirect energy use for the proposed project. The estimated energy use for the existing six pumping stations within the project site is 55.708 megawatt-hours per year (MWh/year).

Table 1	Average of 2010-2012 Indirect Energy Usage: Leal/Odysseus Water Right Application 31572			
Point of Diversion (POD)	**Acres**	**Energy Use[1] (KWh)[2]**		
		2012	**2011**	**2010**
POD #2	155.4	1018	9394	8667
POD #3	149.7	824	8121	9071
POD #4	156.2	0	5379	7284
POD #5	186.7	6747	7486	16610
POD #6	137.8	18848	27023	25058
POD #7	58.8	3264	2203	2623
Total Acreage[3]	*844.6*			
Total Historic Seasonal Energy Use (KWh)		***30,701***	***59,606***	***69,313***
Average Historic Seasonal Energy Use (KWh)		***53,207***		
Total Estimated Seasonal Energy Use under Application 31572[4] (KWh)		***55,708***		
Total Estimated Seasonal Energy Use (MWh)[5]		***55.708***		

Notes:
1 - Energy use information was based on utility bills from September through April for the years 2010 through 2012 provided by applicant.
2 - KWh = Kilowatt-hour
3 - Acreage listed is based on utility bill information. Actual total acreage based on proposed project description is 884.6 acres.
4 - Calculated by multiplying by acreage scaling factor of 1.047.
5 - MWh = Megawatt-hour

GHG Emissions

As shown in the emission estimate in Table 2, the operation-related emissions from the proposed project are estimated to result in 16.18 metric tons of CO_2e (MT CO_2e/yr). This calculation is based on the equation provided above and the tabular summary shown below.

Table 2	Estimated Indirect GHG Emissions: Leal Water Right Application 31572			
Greenhouse Gas	**Energy Usage (AE) (MWh/year)(1)**	**Emission Factors (EF) (lbs/MWh) (2)**	**Conversion Factor (C) (lbs/ton)**	**Annual GHG Emissions (metric tons of CO_2e)**
CO_2	55.708	641	2204.62	16.18
CH_4	55.708	0.029	2204.62	0.00073
N_20(3)	55.708	0.00617	2204.62	0.00016
Total				**16.18**

Notes:
1 - Electricity data was estimated based on the average energy use from 2010 through 2012. It assumes the energy use for the winter diversion season from September 1st through March 30th.
2 - CalEEMod. Appendix D. Default Data Tables. September 2016. Table 1.2 Electrical Utility Emission Factors of GHGs

Data Sources

California Climate Action Registry General Reporting Protocol, Version 3.1. January 2009. Table C2, E2-E3. Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

California Emissions Estimator Model (CalEEMod). September 2016. Appendix D. Default Data Tables. Accessed on May 17, 2017 at: http://www.aqmd.gov/docs/default-source/caleemod/upgrades/2016.3/05_appendix-d2016-3-1.pdf?sfvrsn=2

Intergovernmental Panel on Climate Change (IPCC): IPCC Guidelines for National Greenhouse Gas Inventories, 2006.

Leal 2010-2012 Power Usage Summary.pdf compiled from PG&E Records

PG&E Greenhouse Gas Emission Factors: Guidance for PG&E Customers. April 2013. Available at: http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

United States Environmental Protection Agency. 2010. Emission Factors Information. Available at: http://www.epa.gov/ttn/chief/efpac/ abefpac.html