# Environmental Constraints Analysis

Department of Water Resources

Knights Landing Flood Risk Reduction Feasibility Study

*Knights Landing, Yolo County, California*
July 8, 2019

# Contents



# Figures

## Tables



## Appendices

# Acronyms and Abbreviations

| | |
|---|---|
| APE | Area of Potential Effects |
| BFE | base flood evaluation |
| BMP | Best Management Practice |
| Cal Fire | California Department of Forestry and Fire Protection |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CNDDB | California Natural Diversity Database |
| CNPS | California Native Plant Society |
| County | Yolo County |
| CVFPP | Central Valley Flood Protection Plan |
| CWA | Clean Water Act |
| DWR | Department of Water Resources |
| EIR | Environmental Impact Report |
| ESA | Endangered Species Act |
| iPaC | Information Planning and Consultation |
| KLRC | Knights Landing Ridge Cut |
| MND | Mitigated Negative Declaration |
| MOU | Memorandum of Understanding |
| NAHC | California Native American Heritage Commission |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resource Conservation Service |
| NULE | Non-Urban Levee Evaluation |
| proposed project | Knights Landing Flood Risk Reduction Feasibility Study |
| quad | quadrangle |
| RWQCB | Regional Water Quality Control Board |
| SHPO | State Historic Preservation Officer |
| SPFC | State Plan of Flood Control |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |

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# 1 Introduction

Yolo County (County) is initiating the Knights Landing Flood Risk Reduction Feasibility Study (proposed project). Yolo County is the lead agency for the feasibility study. The County is proposing to study the feasibility of providing flood damage reduction for the census-designated area of Knights Landing.

The Feasibility Study identifies preferred structural and non-structural elements, multi-benefits, and constraints. The Feasibility Study also compares implementation costs and schedules and identifies local funding requirements to assess options which will reduce the flood risk to the Knights Landing Levee Basin while sustaining agriculture and the regional economy, providing safe access to the river, improving the riverine habitat viability, and regional levee maintenance governance.

## 1.1 Purpose and Scope of a Feasibility Study

During the planning phase of a proposed project, a feasibility study is prepared to provide a description of the existing conditions and associated deficiencies, as well as an evaluation of alternative solutions to correct identified problems. A feasibility study report typically includes a framing of the feasibility study objectives, a discussion of the project area and background, an identification of problems and opportunities, and defining potential project constraints. Constraints are restrictions that limit the planning process, such as resource constraints (i.e. biological, cultural, etc.); legal and policy constraints (i.e. laws, applicable policies, regulations, etc.); and permit requirements. The purpose of including a constraints analysis within the feasibility study is to assist with the identification of key environmental issues that should be given due consideration during the planning and design phase of the project.

The analysis of constraints is intended to facilitate the project planning process, assist with the evaluation of various alternatives, define a preferred project, and assess potential permitting and mitigation requirements. This environmental constraints analysis focuses on the six structural alternatives described in Section 1.5.1 since these alternatives have been developed to the point that a useful evaluation of environmental constraints is warranted and will be informative for planning purposes. Specifically, the environmental constraints analysis identifies potential constraints based on the anticipated presence or absence of environmental resources; describes the consistency and/or compliance of each alternative with existing policies; and identifies potential environmental mitigation costs for each alternative site. This report also provides basic permit information.

The California Environmental Quality Act (CEQA) Guidelines Section 15262 states that a project involving only feasibility or planning studies for possible future actions which an agency, board, or commission has not approved, adopted, or funded does not require the preparation of an Environmental Impact Report or a Negative Declaration. Section 15262 of the CEQA Guidelines does not apply to the adoption of a plan that will have a legally binding effect on later activities. Therefore, no documentation under CEQA has been prepared for the Feasibility Study. In addition, the ecosystem concepts and the multi-benefit concepts identified in the Feasibility Study and summarized in this report

are presented solely for planning purposes at this time. Their inclusion herein does not commit the County to any specific future actions and has no legally binding effect. Furthermore, these concepts have not been developed to the point to allow for a useful evaluation of environmental constraints, thus this report does not describe the potential environmental constraints related to the ecosystem and multi-benefit concepts.

## 1.2 Project Area Location and Information

The proposed project is located in Knights Landing, a census-designated place in Yolo County, California. **Figure 1-1** below provides an overview of the project area. Knights Landing is on the Sacramento River in the northeastern portion of Yolo County, and is located northwesterly of the northwest end of the Yolo Bypass. It is located at the confluence of the Knights Landing Ridge Cut (Ridge Cut), the Colusa Basin Drain, and the Sacramento River Channel (**Figure 1-1**). The project study area encompasses the Knights Landing Levee System (KLLS) which consists of three levee segments with a total length of approximately 15.2 miles (**Figure 1-2**):

- The first levee segment is Yolo County Service Area 6 (S6YC) of the Sacramento River right bank above Fremont Weir, comprised of 6.0 miles of levees maintained by Yolo County along the Yolo County portion of the Sacramento River Right Bank from State Route (SR) 113 to the Sutter County line (County Service Area 6 (CSA-6), Yolo County).
- The second levee segment is the Knights Landing Ridge Cut, (KNT2) maintained by Knights Landing Ridge Drainage District and includes 6.6 miles of levees along the Knights Landing Ridge Cut, Unit 2, Left Bank of the Colusa Basin Drainage Canal to Wallace Weir.
- The third levee segment is the Yolo Bypass West Levee, (YBW1) maintained by the California Department of Water Resources (DWR) and includes 2.6 miles of levees miles along the Yolo Bypass West Levee, Unit 1 (DWR), from Fremont Weir to Wallace Weir.

The population of Knights Landing was 995 people in the year 2010 based on United States census survey data (U.S. Census Bureau 2019). In 2017, the median household income in the community was $38,068. As this median household income is less than 80% of the state average of California, Knights Landing is designated as a “disadvantaged community” (DAC).

According to the Yolo County General Plan Land Use Map, predominant land uses in Knights Landing include agricultural intensive, low density residential, medium density residential, general commercial, local commercial, heavy industrial, and public/quasi-public. Land within the project area immediately surrounding Knights Landing to the north, west, and south are designated for agricultural intensive purposes (Yolo County 2019).

## Figure 1-1. Knights Landing Project Area

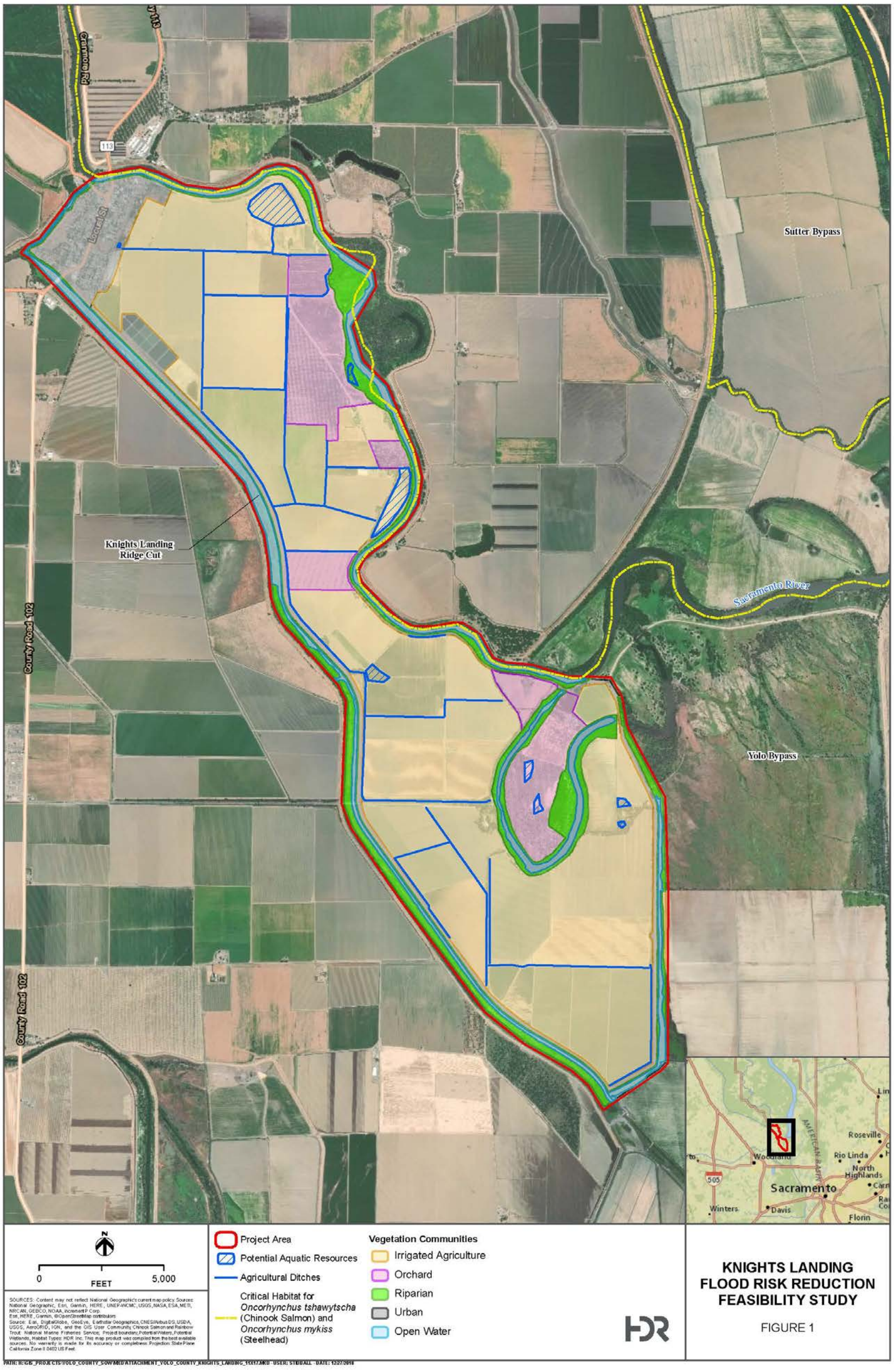

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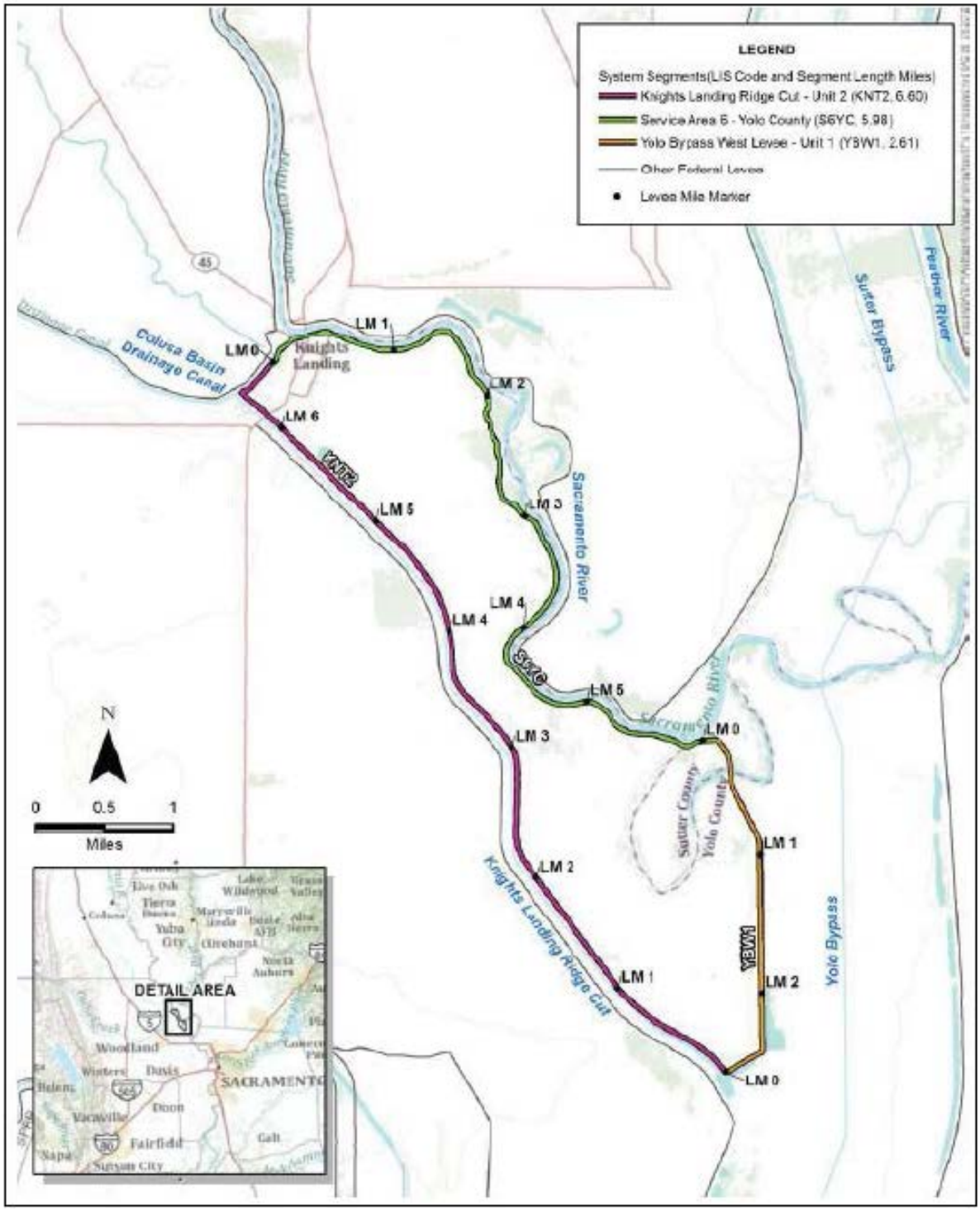
**Figure 1-2. Knights Landing Levee System Location Map (Source: USACE PI Report, 2012)**



## 1.3 Objectives of the Proposed Project

The objectives of the proposed project are to:

- Reduce the risks of flooding to life, property, and critical infrastructure
- Improve flood system resiliency and facilitate adaptation to future climate variability
- If feasible, attain a 100-year level of flood protection for the community of Knights Landing in accordance with FEMA's guidelines pursuant to Code of Federal Regulations (CFR) Section 65.10.
- Increase and improve the quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats
- Contribute to the recovery and sustainability of native species populations and overall biotic community diversity
- Promote multi-benefit projects/provide recreational benefits
- Improve operations and maintenance
- Improve Institutional support

## 1.4 Need for the Proposed Project

The proposed project is located in the Central Valley of California which faces significant flood risk. According to the Department of Water Resources (DWR), "approximately 1 million Californians live and work in the floodplains of the valley, which contain approximately $80 billion worth of infrastructure, buildings, homes, and prime agricultural land" (DWR 2018). As a result, a major flood in the Central Valley could result in devastating loses, both financially and otherwise (DWR 2018). Therefore, the proposed project is being studied to address the need for flood protection in this high flood risk region of California.

Knights Landing is located in the northern part of the Lower Sacramento/Delta North (LSDN) Regional Flood Management Plan (RFMP) area. Many Levee Maintaining Agencies (LMAs) in the noted RFMP area face infrastructural, funding, O&M, institutional, emergency response, and climate change issues that threaten the success of the existing flood management systems. Furthermore, perimeter levee conditions have rendered the levees insufficient to ensure future protection of the community and fall short of the target 100-year level of flood protection. In 2010, FEMA reported that the levees protecting the community of Knights Landing against catastrophic flooding could fail.

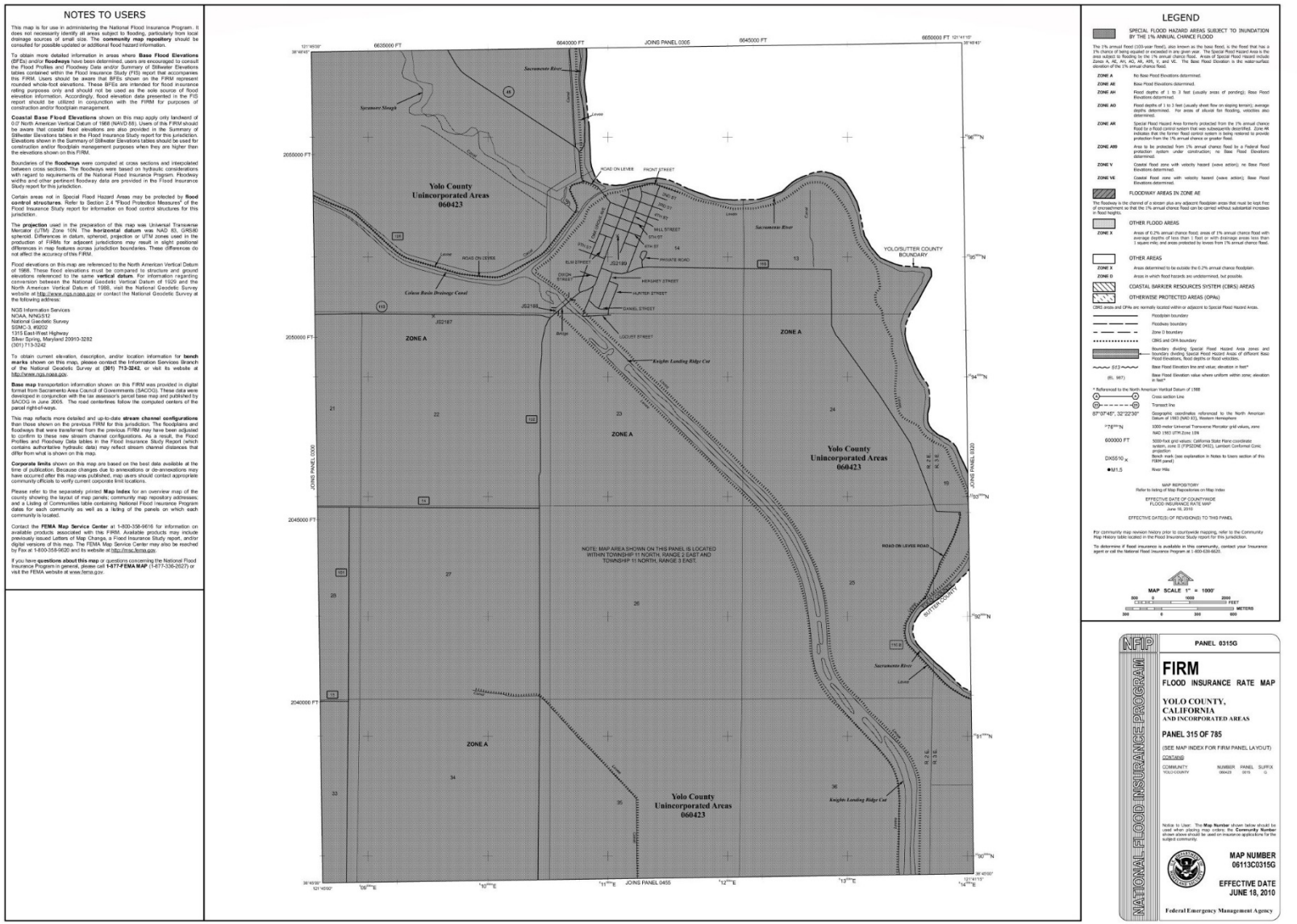
In 2010, Knights Landing and the project area were remapped by FEMA as Zone A on a Flood Insurance Rate Map (FIRM), meaning they are in the identified 100-year floodplain and those living within the zone must have flood insurance (see **Figure 1-3**). Knights Landing was placed into a Levee Flood Protection Zone, mandating strict requirements for building in flood zones and purchasing flood insurance. These building requirements mandate that the lowest floor elevation for living areas must be "at or above the Base Flood Elevation (BFE)", which could range from 3 to 12 feet above ground.

Therefore, the proposed project is needed to provide increased flood protection for Knights Landing and would help meet DWR's Central Valley Flood Protection Plan (CVFPP) Conservation Strategy goals. The goals of the CVFPP Conservation Strategy include: improved flood risk management, the promotion of multi-benefit projects, increased operational and regulatory efficiency, and the promotion and restoration of ecosystem function in the Central Valley (DWR 2016). Specifically, the proposed project is needed because:

1. Knights Landing is threatened from flooding from the Sacramento River to the east, the Colusa Basin Drain to the northwest, Sycamore Slough to the north/northwest, and Knights Landing Ridge Cut to the west.

2. Previous investigations by DWR, through the Non-Urban Levee Evaluation (NULE) program, showed that levees protecting Knights Landing suffer from underseepage, through seepage, and stability issues.

## Figure 1-3. Knights Landing Project Area County Flood Insurance Rate Map (FIRM)



# 1.5 Alternatives

## 1.5.1 Structural Alternatives

Based on the goals and objectives of the proposed project to improve flood risk management, enhance habitat restoration, provide recreational benefits, and support agricultural sustainability in Knights Landing, a wide array of alternatives were evaluated. Structural, nonstructural, and ecosystem alternatives were formulated and screened. The structural alternatives consist of levee fix-in-place elements with different cross-levee alignment options and generally met the criteria established in the Feasibility Study. The six structural alternative alignments that are carried forward in the Feasibility Study are summarized below (see **Figures 1-4** through **1-9**).

For each of the six alternatives, the regulatory setting and regulatory consistency analysis are provided for each resource area (**Appendix A**). An analysis of environmental resources, which includes the existing conditions, such as the anticipated presence or absence of environmental resources, and the key environmental constraints, is provided in **Appendix B**.

### Alternative 1

Alternative 1 includes the following –

- 5,500 feet of new cross levee from the right bank of Sacramento River to left bank of Knights Landing Ridge Cut
- 4,400 feet of non-levee embankment on the north-west and west sides of the ponds
- Right Bank of Sacramento River
    - 240 feet of drained stability berm
    - 2,623 feet of cutoff wall
- Left Bank of Knights Landing Ridge Cut
    - 4,825 feet of drained stability berm and waterside rock slope protection for erosion repair

**Figure 1-4** shows the features of Alternative 1.

### Alternative 3

Alternative 3 includes the following –

- 6,800 feet of new cross levee
- Right Bank of Sacramento River
    - 290 feet of combination berm and ditch fill
    - 1,011 feet of drained stability berm
    - 2,623 feet of cutoff wall on the right bank of Sacramento River

- Left Bank of Knights Landing Ridge Cut
    - 4,825 feet of drained stability berm and waterside rock slope protection for erosion repair

**Figure 1-5** shows the features of Alternative 3.

## Alternative 6

Alternative 6 includes the following –

- 2,400 feet of new cross levee from the right bank of Sacramento River to left bank of Knights Landing Ridge Cut
- Right Bank of Sacramento River
    - 1,199 feet of combination berm and ditch fill,
    - 1,011 feet of drained stability berm, and
    - 2,623 feet of cutoff wall.
- Mid-Valley Site repairs
    - 793 feet of cutoff wall at Site 9,
    - 878 feet of cutoff wall at Site 10, and
    - 2,400 feet of cutoff wall and 3,157 feet of combination seepage-stability berm at Site 11.
- Left Bank of the Knights Landing Ridge Cut levee
    - 4,825 feet of drained stability berm and
    - 14,715 feet of waterside rock slope protection for erosion repair.
- Right Bank of Sacramento River
    - Approximately 12,000 feet of combination seepage-stability berm,
    - Approximately 1,500 feet of drained stability berm,
    - Approximately 5,500 feet of waterside rock slope protection for erosion repair,
    - Approximately 5,500 feet of Freeboard/geometry repairs.

**Figure 1-6** shows the features of Alternative 6.

## Alternative 11

Alternative 11 does not include a cross levee but corresponds to repairing the entire levee system of approximately 80,257 feet of existing levee surrounding the Knights Landing Basin. This includes –

- 33,175 feet of levee along Knights Landing Ridge Cut,
- 30,533 feet of levee along the Sacramento River,

- 2,743 feet along the Colusa Basin Drainage Canal, and
- 13,805 feet along the Yolo Bypass.

The following remediations are proposed on the right bank of Sacramento River protecting the community of Knights Landing –

- 1,199 feet of combination berm and ditch fill,
- 1,011 feet of drained stability berm, and
- 2,623 feet of cutoff wall.

Mid-Valley Site repairs include the following –

- 793 feet of cutoff wall at Site 9,
- 878 feet of cutoff wall at Site 10, and
- 2,400 feet of cutoff wall and 3,157 feet of combination seepage-stability berm at Site 11.

The following remediations are proposed for the left bank of Knights Landing Ridge Cut –

- 12,315 feet of drained stability berm and
- 20,000 feet for waterside rock slope protection for erosion repair.

Similar to Alternative 6, NULE Phase 1 identified combination seepage-stability berm, drained stability berm, waterside rock slope protection and freeboard/geometry repairs as a percentage of the levee segment. However, actual locations of these repairs were not available at this level of study and as a result, these percentages were applied to the lengths of the levee that were not covered by the NULE Phase 2 study.

The following remediations are proposed for the right bank of Sacramento River –

- Approximately 15,000 feet of combination seepage-stability berm,
- Approximately 1,800 feet of drained stability berm,
- Approximately 9,150 feet of waterside rock slope protection for erosion repair,
- Approximately 9,320 feet of Freeboard/geometry repairs.

The following remediations are proposed for the Yolo Bypass levee segment –

- combination seepage-stability berm for approximately 70% of the levee,
- a drained stability berm for approximately 10% of the levee,
- waterside rock slope protection for erosion repair for approximately 30% of the segment
- freeboard repairs for a portion segment based on the 1955/57 WSE and a six-foot freeboard requirement for bypass levees
    - However, additional freeboard deficiencies were identified along the Sacramento River for the 100-year WSE and as a result, repair lengths were increased accordingly.

As a result, the following remediations were proposed for the left bank of Sacramento River –

- Approximately 9,600 feet of combination seepage-stability berm,
- Approximately 1,400 feet of drained stability berm,
- Approximately 13,805 feet of waterside rock slope protection for erosion repair,
- Approximately 13,805 feet of Freeboard/geometry repairs.

**Figure 1-7** shows the features of Alternative 11.

## Alternative 12

Alternative 12 includes the following –

- 6,800 feet of new cross levee from the right bank of Sacramento River to left bank of Knights Landing Ridge Cut
- Right Bank of Sacramento River
  - 290 feet of combination berm and ditch fill
  - 1,011 feet of drained stability berm
  - 2,623 feet of cutoff wall on the right bank of Sacramento River
- Left Bank of Knights Landing Ridge Cut
  - 4,825 feet of drained stability berm and waterside rock slope protection for erosion repair
- Mid-Valley Site repairs
  - 793 feet of cutoff wall at Site 9,
  - 878 feet of cutoff wall at Site 10, and
  - 2,400 feet of cutoff wall and 3,157 feet of combination seepage-stability berm at Site 11.

**Figure 1-8** shows the features of Alternative 12.

## Alternative 13

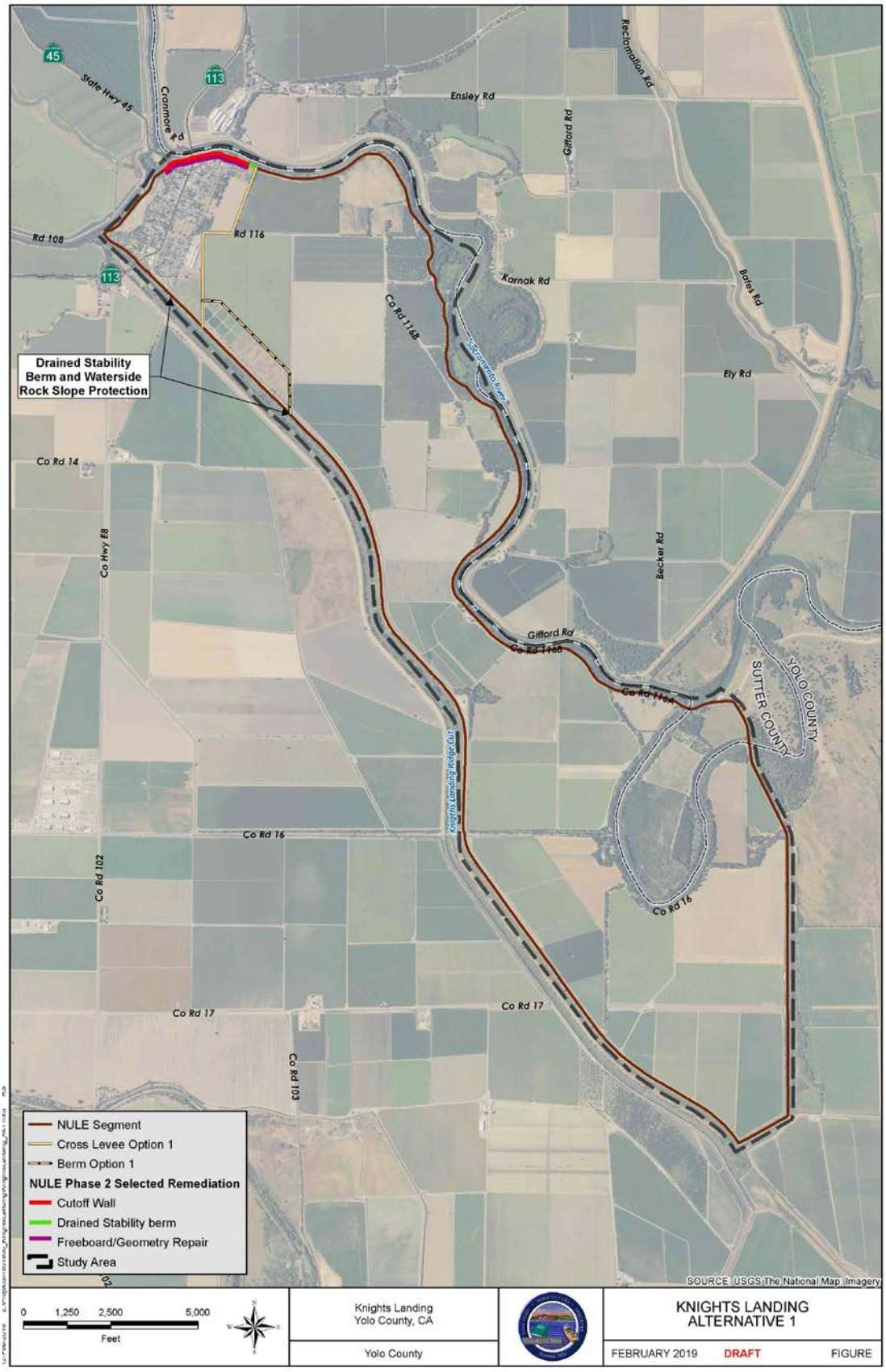
Alternative 13 includes the following –

- 5,500 feet of new cross levee from the right bank of Sacramento River to left bank of Knights Landing Ridge Cut
- 4,400 feet of non-levee embankment on the north-west and west sides of the ponds
- Right Bank of Sacramento River
  - 240 feet of drained stability berm
  - 2,623 feet of cutoff wall

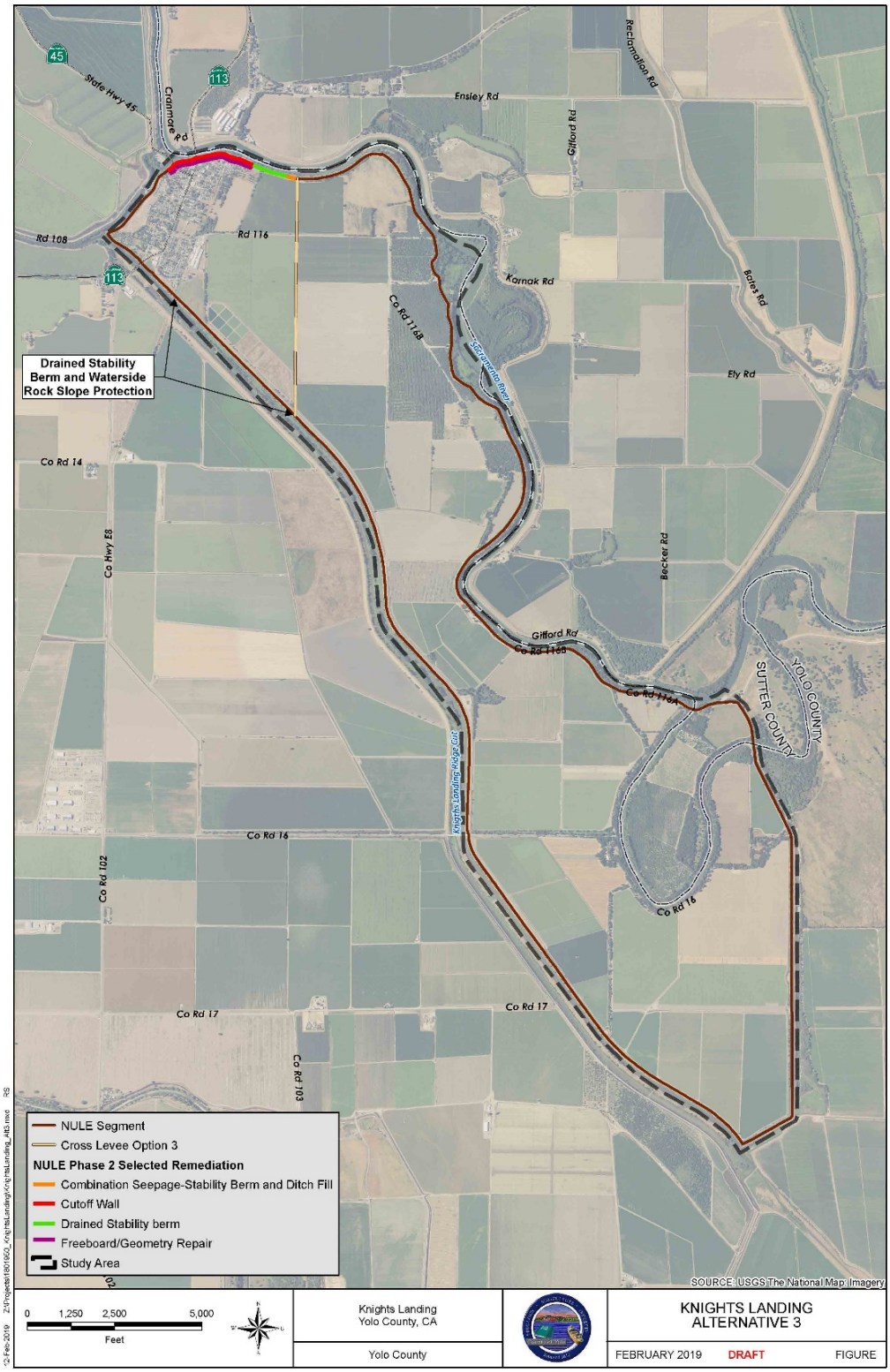
- Left Bank of Knights Landing Ridge Cut
  - 4,825 feet of drained stability berm and waterside rock slope protection for erosion repair
- Mid-Valley Site repairs
  - 793 feet of cutoff wall at Site 9,
  - 878 feet of cutoff wall at Site 10, and
  - 2,400 feet of cutoff wall and 3,157 feet of combination seepage-stability berm at Site 11.

**Figure 1-9** shows the features of Alternative 13.

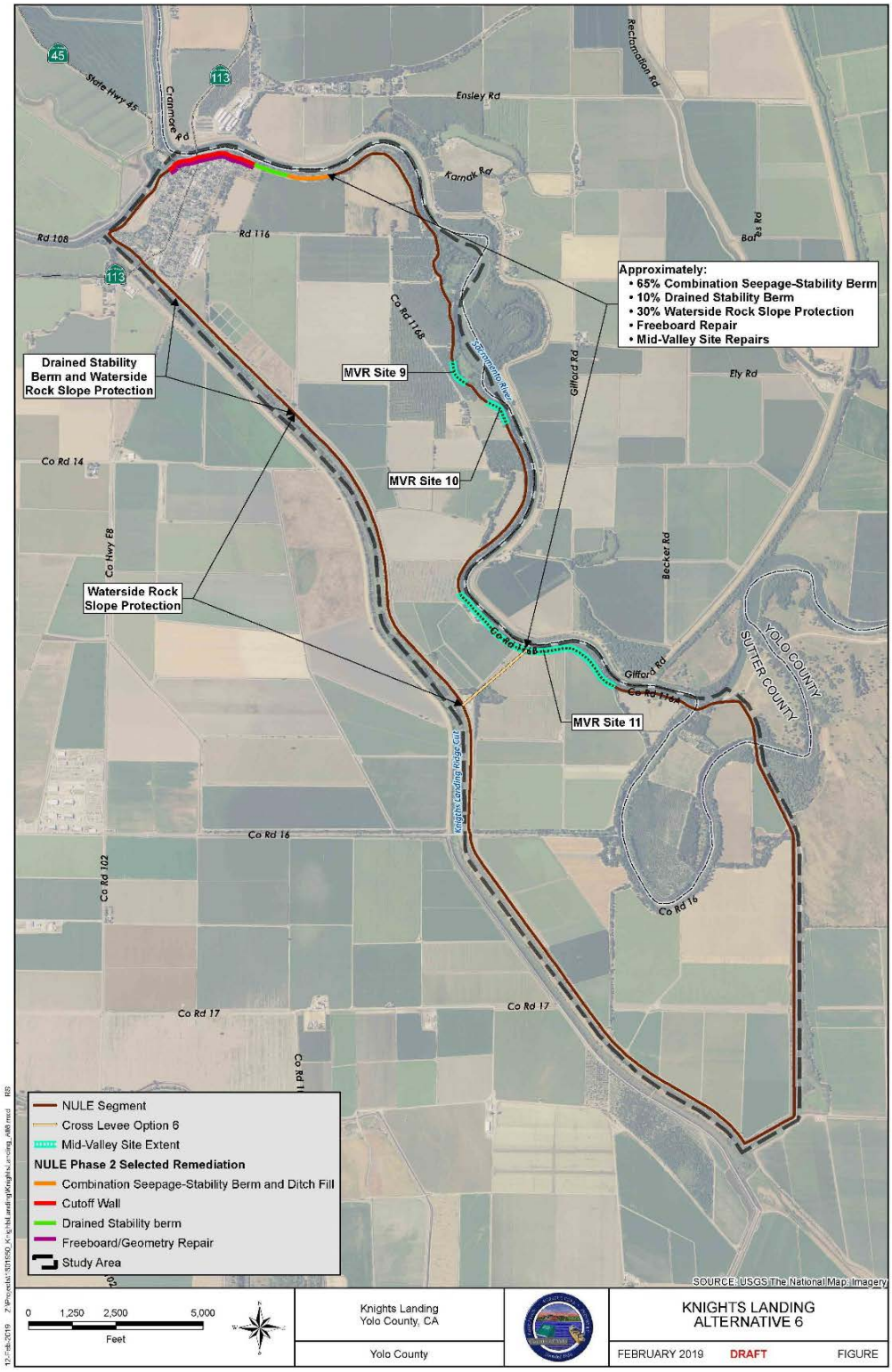
## Figure 1-4. Knights Landing Proposed Alternative 1



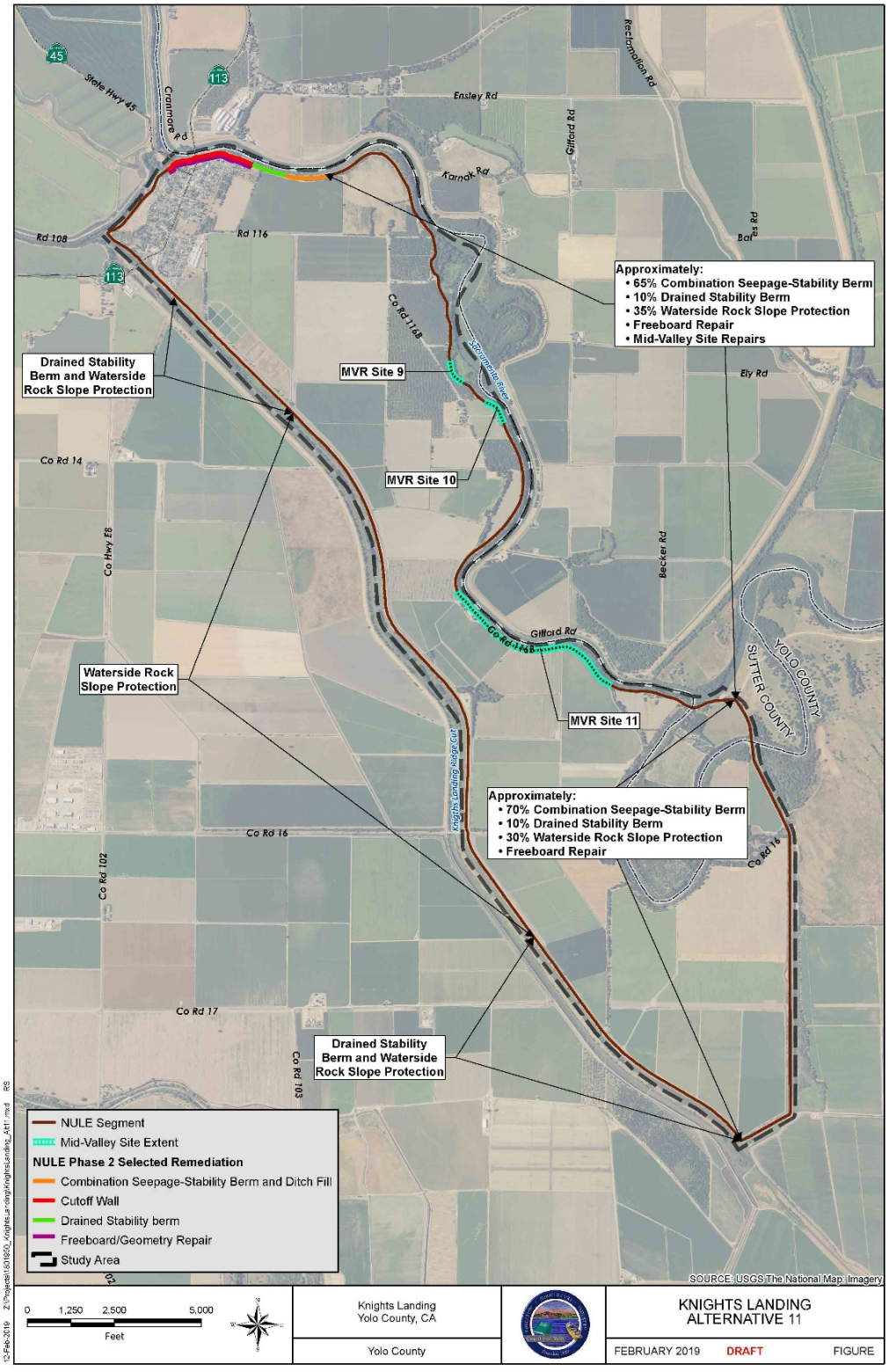
## Figure 1-5. Knights Landing Proposed Alternative 3



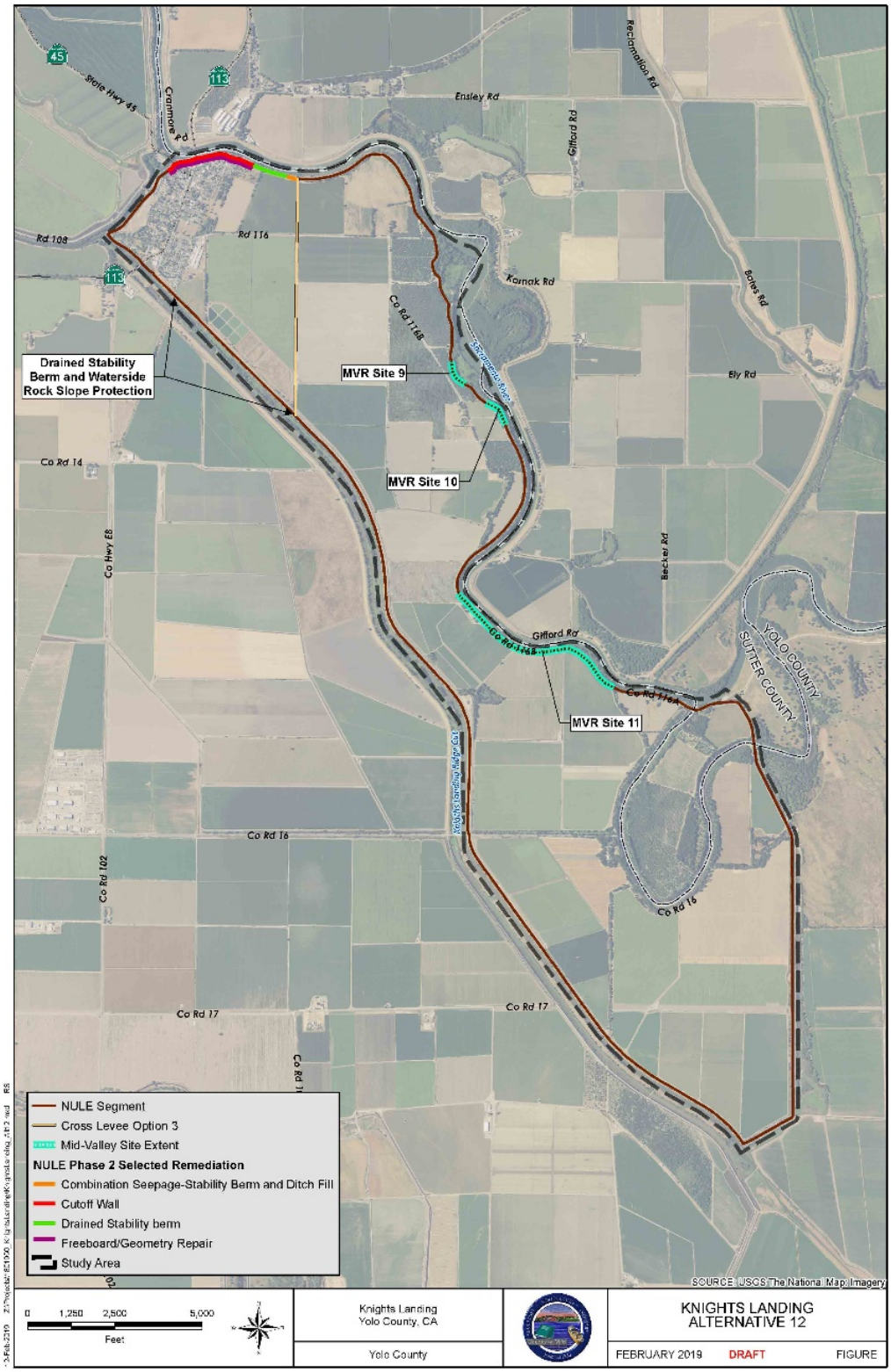
## Figure 1-6. Knights Landing Proposed Alternative 6



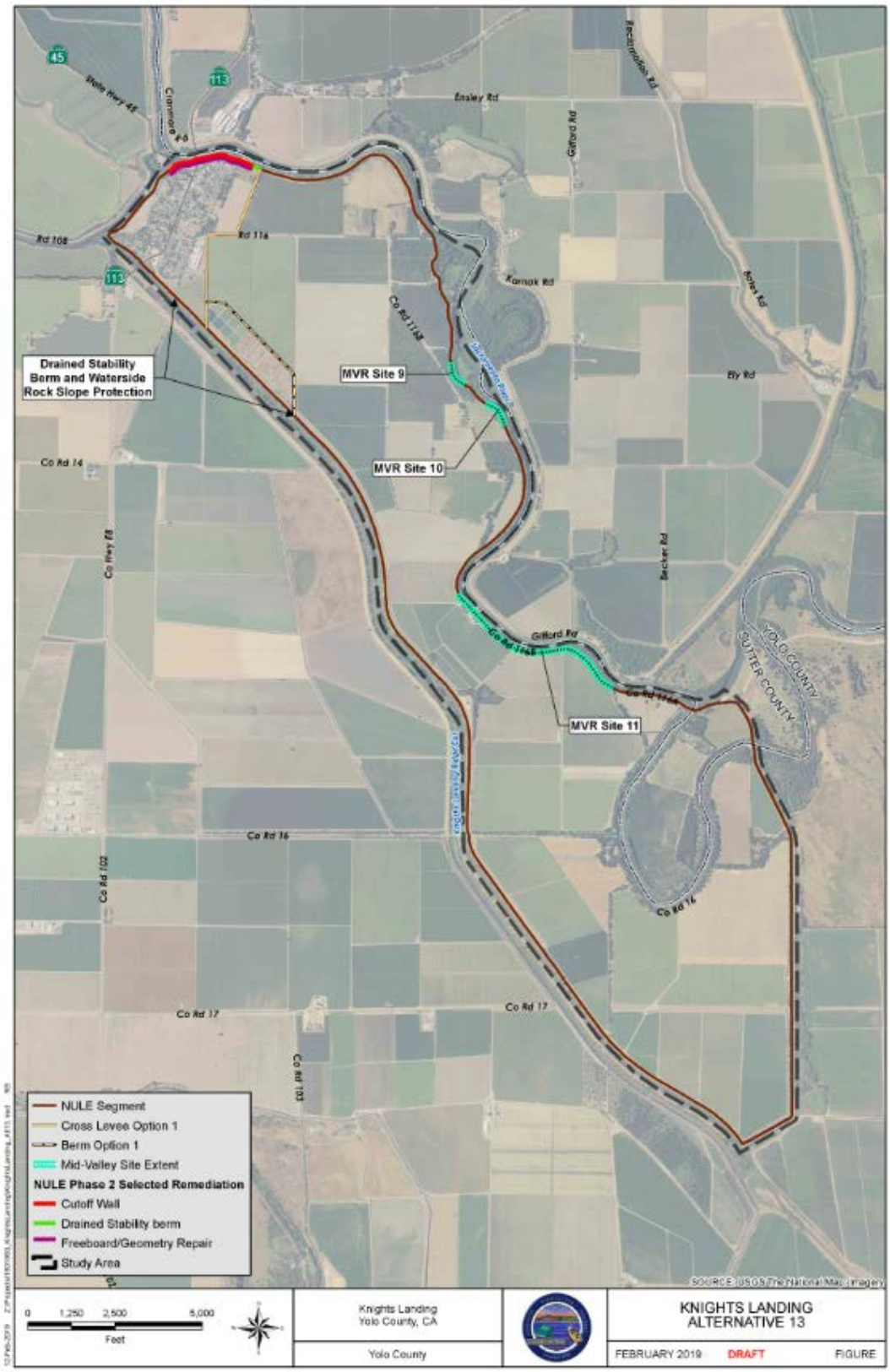
## Figure 1-7. Knights Landing Proposed Alternative 11



## Figure 1-8. Knights Landing Proposed Alternative 12



## Figure 1-9. Knights Landing Proposed Alternative 13



### 1.5.2 Ecosystem and Multi-Benefit Concepts

The ecosystem and multi-benefit concepts identified in the Feasibility Study and Knights Landing Multi-Benefit Opportunities Technical Memo (Yolo County 2019) have been developed to a conceptual level and they do not meet the definition of a "project" as defined by CEQA (California Public Resources Code [PRC], Division 13, Section 21000 et seq.). The CEQA Guidelines define a project as the whole of an action, which has a potential for resulting in either the direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment (California Code of Regulations [CCR], Chapter 14, Section 15378). As mentioned previously, the CEQA Guidelines Section 15262 further states that a project involving only feasibility or planning studies for possible future actions which an agency, board, or commission has not approved, adopted, or funded does not required the preparation of an Environmental Impact Report or a Negative Declaration. Section 15262 does not apply to the adoption of a plan that will have a legally binding effect on later activities. Therefore, the ecosystem and multi-benefit concepts are presented solely for planning purposes. These concepts have not been developed to the point to allow for a useful evaluation of environmental constraints, thus this report does not describe the potential environmental constraints related to the ecosystem and multi-benefit concepts.

Three ecosystem concepts that are implementable in connection with the flood risk reduction alternatives identified above include the Grays Bend Riparian Enhancement Concept, the Portuguese Bend Enhancement Concept, and the Knights Landing Ridge Cut Enhancement Concept. These three ecosystem concepts are described below. In addition, recreational opportunities that are implementable in connection with the flood risk reduction alternatives identified above are also described below.

#### Grays Bend Riparian Enhancement Concept

The Grays Bend project area sits at the confluence of the Sacramento River, Yolo Bypass, and Sutter Bypass, and encompasses an entire oxbow feature, which was historically the alignment of the mainstem of the Sacramento River. The oxbow channel forms the county line between Yolo and Sutter counties with the oxbow area located within Sutter County. The property is privately owned and direct landowner engagement will need to be initiated if this concept is considered for integration with any of the flood improvement alternatives evaluated in this study.

The objective of this concept is to improve the quality and quantity of shaded riverine aquatic (SRA) habitat along the left bank of the oxbow channel by widening both the area of inundated riparian habitat and expanding the width of the riparian fringe forest. At the conceptual design level, this would be accomplished by creating a narrow inset floodplain bench and laying bank the banks, as well as widening the riparian corridor through active planting with native riparian species.

The width of riparian enhancements is estimated to be approximately 100 feet from the existing left edge of bank (except for one wider area adjacent to the existing forested patch in order to connect with this area), and the enhancement footprint encompasses approximately 35 acres. The target species for this enhancement concept are birds dependent on healthy riparian habitat including western yellow-billed cuckoo, least Bell's vireo, and tricolored black bird, as well as other native species such as giant garter

snake and western pond turtle. The length of riparian enhancements would be refined based on a more detailed evaluation and landowner interest.

The excavated soil could be used as a source material for construction of one of the cross levees being contemplated within the Knights Landing basin. Also, the habitat creation would potentially offset any riparian habitat impacts that may occur due to levee repairs along the Sacramento River.

### Portuguese Bend Enhancement Concept

The Portuguese Bend area is located southeast of the Knights Landing community within a wide area of the Sacramento River. The area includes Mary Lake, which is an oxbow feature that is intermittently inundated by high flows within the Sacramento River. This area is located entirely within the floodplain between the existing levees of the Sacramento River and includes lands on both the west side and east side of the river. The lands on the west side of the river are in Yolo County and the lands on the east side are in Sutter County. The property is privately owned.

The objective of the restoration concept is to improve connectivity to existing riverside off-channel lands on both sides of the river in order to create a larger area of more frequently inundated floodplain habitat to benefit salmonids. In addition, active riparian restoration of poorly vegetated areas on the west bank of the river would enhance riparian habitat conditions through this corridor and provide additional shaded riverine aquatic habitat.

Targeted excavation would connect low-lying areas to the river so that they inundate earlier and more frequently. Restoration would consist of targeted excavation in five areas comprising approximately 25 acres. Riparian restoration would occur in two areas comprising approximately 28 acres. Increasing the area of inundation through targeted excavation is also expected to enhance the ability of this area to contribute to localized groundwater recharge.

The excavated soil could be used as a source material for construction of any of the cross levees being contemplated in this study. Also, the habitat creation would potentially offset any riparian habitat impacts that may occur due to levee repairs along the Sacramento River.

### Knights Landing Ridge Cut Enhancement Concept

The Knights Landing Ridge Cut (KLRC) was constructed in 1930 by the US Army Corps of Engineers (USACE) and the State of California to transport agricultural drainage water from the Colusa Basin Drain into the Yolo Bypass. Maintained by the Knights Landing Ridge Drainage District, the KLRC extends approximately 6 miles southeast from its confluence with the Colusa Basin Drain near the western edge of the unincorporated community of Knights Landing to the recently reconstructed Wallace Weir. The levees on both sides of the KLRC provide flood protection for the community of Knights Landing and for the surrounding agricultural lands to the northeast and southwest.

The KLRC includes two parallel channels that were excavated to provide the material necessary to construct the adjacent levees. A linear mid-channel island was formed during construction (due to dredger arm length constraints) that extends along the length of the KLRC. Within the upper portion of the KLRC, much of the mid-channel island is

densely vegetated whereas in the lower portion, much of the island is regularly mowed with only very narrow strips of shrubby vegetation along the island's edges. The vegetation along the levee toes is relatively sparse. The relatively dense vegetation growth on the upper portion of the island has likely reduced the channel's original conveyance capacity.

In addition, the island has eroded in some areas resulting in the formation of narrow cross channels that divert flows directly toward the levees, resulting in some scouring of the levee toe. Over time, this scouring could degrade the levee integrity.

The concept includes excavating the mid-channel island within the KLRC to increase the channels capacity, to reduce cross channel erosion, and to provide a material source to construct a cross levee. Some of the excavated material would also be used to reinforce both of the KLRC levee toes and to provide a base for planting riparian vegetation, which would aid in stabilizing the levees. Although the riparian vegetation would somewhat reduce the additional conveyance capacity that would be achieved with channel excavation, it would provide the ancillary benefit of helping to achieve the State's objectives of restoring species habitat and ecosystem function. Specific species that could benefit include giant garter snake, valley elderberry longhorn beetle, tricolored blackbird, Swainson's hawk, western yellow-billed cuckoo, and least Bell's vireo.

The concept includes several assumptions, the primary of which is that the material excavated out of the KLRC would be suitable for cross levee construction. Additional analysis will be necessary to verify this assumption. Also, the island is assumed to be excavated along its entire length down to its lowest point and a two-step bank is assumed to be constructed on each side of the channel using available cut material. Using simplified geometry to estimate the cross sectional cut/fill areas for ease of calculation, the total estimated remaining volume of material available for construction of a cross levee would be approximately 1,680,000 cubic yards.

The riparian enhancement along the levee toes is proposed to be implemented in a two-step design that is based on the existing hydrology, which showed stage variation of only approximately 4 feet for the period of available data (December 2017 – December 2018). The elevations of the two steps were chosen based on this hydrology (roughly 22.5 feet and 20 feet) – the lower elevation step would be inundated year-round and the higher step would be an intermittently inundated feature, with vegetation planting palettes chosen to match the hydrology and target wildlife species. An additional design consideration includes the placement of woody material from trees removed from the excavated island along the restored levee banks to provide cover and habitat complexity.

### Recreational Opportunities

- **Sacramento River Promenade** - The development of a promenade on the Sacramento River would represent a substantial recreational amenity for the community that would be directly connected to alternatives evaluated in the Feasibility Study. Therefore, the integration of this promenade should be considered in any levee improvement planning and/or design along the Sacramento River between State Route 113 and Railroad Street.

- **Colusa Basin Drain Levee Recreational Improvements** - The development of the recreational improvements along the Colusa Basin Drain east levee would represent a substantial recreational amenity for the community that would be directly connected to alternatives evaluated in the Feasibility Study. Therefore, the integration of these improvements should be considered in any levee improvement planning and/or design along the Colusa Basin Drain from Reed Street to State Route 113.

- **New Cross Levee Loop Trail** - The development of the recreational improvements along a new cross levee would represent a substantial recreational amenity for the community that would be directly connected to alternatives evaluated in the Feasibility Study. Therefore, the integration of these improvements should be considered in any cross-levee improvement planning and/or design.

# 2 Research Methods

## 2.1 Environmental Constraints Analysis Methodology

A desktop analysis was performed in order to determine potential environmental constraints associated with the implementation of each of the six alternatives. Criteria from Appendix G of the California Environmental Quality Act (CEQA) Guidelines was used as a framework to determine potentially significant impacts on different resource areas, and was also used as a means to determine if CEQA documentation would be required for any of the alternatives. The resource areas evaluated include the following:

- Agriculture and Forestry Resources
- Air Quality and GHG Emissions
- Biological Resources
- Cultural and Tribal Cultural Resources
- Geology, Soils, and Mineral Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Public Services and Recreation
- Traffic and Transportation
- Utilities and Service Systems
- Energy

The results of that analysis are provided in **Appendix B** of this report, and a summary of potential environmental constraints is provided in **Section 3.2**. A regulatory consistency analysis was also performed for the proposed project to determine the alternatives' conformance to relevant federal, state, and local regulations under each of the evaluated

resource areas **(Appendix A).** Primary data sources used during the desktop analysis include the following:

- Yolo County General Plan and Final Environmental Impact Report (EIR)
- California Department of Conservation Farmland Mapping and Monitoring Program
- California Department of Conservation Williamson Act Maps
- California Department of Forestry and Fire Protection (Cal Fire) Hazard Severity Zone Maps
- California Department of Transportation Scenic Highway Maps
- California State Water Resources Control Board GeoTracker Database
- DTSC EnviroStor Database
- Yolo-Solano Air Quality Management District
- US Fish and Wildlife Service Critical Habitat Maps
- California Energy Commission
- Yolo County Climate Action Plan

In addition to the Environmental Constraints and the Regulatory Consistency analyses, separate in-depth Biological Resources and Cultural Resources Analyses were conducted to support the environmental constraints analysis, as described in further detail below. The Biological Resources Analysis is provided in **Appendix C** and the Cultural Resources Analysis is located in **Appendix D**.

## 2.2 Biological Resources Analysis Methodology

The Biological Resources Analysis is provided in **Appendix C**. The methodology for the Biological Resources Analysis is described below.

### 2.2.1 Desktop Review

A desktop review was undertaken to assess potential biological constraints in the Knights Landing project area (**Appendix C, Figure 1**), which included two steps to collect data on special-status species, vegetation communities, sensitive communities, protected lands, and federally-protected aquatic resources with the potential to occur in the project area. First, preliminary database searches were performed to identify aquatic resources and special-status species with the potential to occur in the project area. Second, a preliminary review of recent aerial imagery and land use maps was conducted to collect site-specific data regarding habitat suitability for special-status species, and to see if any protected lands overlap with the project area.

Database searches were performed on the following websites:

- U.S. Fish and Wildlife Service's (USFWS) Information Planning and Consultation (IPaC) System (2018a);
- USFWS Critical Habitat Portal (2018b);

- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) in BIOS 5 (2018);
- California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (2018);
- USFWS National Wetland Inventory (2018c); and,
- U.S. Geological Survey (USGS) topographical map.

A query of the USFWS's IPaC system was performed to identify federally listed species that may occur in or adjacent to the project area. A review of the USFWS's Critical Habitat portal was also conducted to identify designated critical habitat units that fall within the project area. A query of the CNDDB provided a list of processed and unprocessed special-status species occurrences within the Knights Landing US Geological Survey 7.5 minute quadrangle (quad), as well as all adjacent quads. Additionally, the CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned quads. Finally, USFWS National Wetland Inventory data and USGS topographical maps were used to aid in the digitization of vegetation communities and potential aquatic resources within the project area.

A search of the USFWS's National Wetlands Inventory was performed for the project area to identify aquatic resources that could be affected by the proposed activities. In addition, a query of the USFWS's IPaC system was performed to identify federally listed species that may occur in or adjacent to the project area. A query of the CNDDB provided a list of processed and unprocessed special-status species occurrences within the Knights Landing and Grays Bend California US Geological Survey 7.5 minute quadrangles (quads), as well as all adjacent quads. Lastly, the CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned quads. The raw data returned from the database queries is provided in **Appendix C, Attachment A**. In addition to the database queries, a review of Land Ownership layers in CNDDB BIOS was conducted to locate protected lands, including wildlife refuges and conservation easements. The Yolo County HCP (ICF 2018) was also reviewed for consistency regarding vegetation communities identified in the project area, as well as for relevant resources and special status species.

### 2.2.2 Reconnaissance Survey

A reconnaissance level survey was conducted on July 20, 2018, to verify the results of the desktop review. HDR biologists drove on publically accessible roads throughout the project area in order to record existing vegetation communities, aquatic resources, and species observed. All portions of the project area were able to be directly observed except the southeast portion, which was inaccessible due to an absence of public roads and was, therefore, delineated using only aerial photointerpretation compared to ground-truthed vegetation communities.

## 2.3 Cultural Resources Analysis Methodology

A cultural resources records search was requested from the Northwest Information Center of the California Historical Resources Information System located at Sonoma State University. The records search included California's database of previous studies

and previously recorded sensitive sites within the project area and within a one-quarter mile radius.

A desktop investigation of the project area was also conducted by qualified archaeologists. As a result of the desktop investigation, a draft Area of Potential Effects (APE) map for cultural resources in and surrounding the project area was established. The APE map and summary of the results of the records search and desktop investigation are provided in a technical memorandum located in **Appendix D**. The technical memorandum includes technical data review and discussion of cultural resources and potential sensitivity. The findings of the technical memorandum have been incorporated into **Section 3.2**.

# 3 Results

## 3.1 Regulatory Setting and Consistency

### Agricultural Resources

All six alternatives have the potential to disturb landed designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Potential during construction activities (DOC 2018). This has the potential to conflict with the Farmland Mapping and Monitoring Program and Yolo County General Plan Agriculture and Economic Development Element. The proposed project would also potentially conflict with the Williamson Act Program. According to the Department of Conservation Yolo County Williamson Act FY 2010/11 Map, the Williamson Act Prime Agricultural Land is located within the proposed project area (DOC 2012) and ground disturbing activities or work within these areas has the potential to disturb a property under a Williamson Act Contract.

### Biological Resources

The proposed project could potentially conflict with biological resource regulations. Based on a preliminary review of biological resources databases and a site reconnaissance, the project area appears to contain suitable habitat for several special-status species. In addition, sensitive communities including various aquatic resources are present in the project area. Proposed project activities have the potential to impact any of the biological resources listed in **Appendix C, Table 1**, should they be present in the vicinity of the proposed work area. Prior to project implementation, consultation with resource agencies and acquisition of permits may be necessary.

### Cultural Resources

Based on a review of the records search results, historic map review, and the site reconnaissance provided in **Appendix D**, three prehistoric archaeological sites and two historic archaeological sites intersecting the Project footprint. An additional five prehistoric sites were identified within 0.25 mile. All of the archaeological sites are unevaluated for the NRHP and CRHR. Proposed project activities have the potential to impact these cultural resources, should they be identified within, or potentially in the vicinity of, a proposed work area. Any newly discovered archaeological site(s) which

cannot be avoided by the proposed project would also require evaluation for eligibility to the CRHR and/or NRHP. If eligible, additional mitigation could be required if significant impacts/adverse effects could not be avoided.

### Air Quality, GHG Emissions, and Noise

During construction, the six alternatives would require the use of construction vehicles and equipment on a temporary basis. Significant air quality impacts could result from particulate matter generated during construction activities, such as dust and equipment exhaust on a short-term basis. The proposed project would also generate GHG emissions during the operation of construction vehicles and equipment. The proposed project would adhere to Best Management Practices (BMP) in an effort to minimize air quality and GHG emissions impacts, but there is potential that the proposed project would not conform to the Clean Air Act and relevant GHG regulations.

The proposed project would generate increased noise conditions during proposed project construction activities. With noise sensitive receptors in close proximity (schools, residents, etc.), there is a potential that the proposed project would not adhere to noise thresholds outlined in the Yolo County General Plan.

### Other Resources

Based on the Regulatory Consistency Analysis provided in **Appendix A**. The proposed project would conform to all federal, state and local regulations under aesthetics; geology, soils and seismicity; hazards and hazardous materials; hydrology and water quality; land use and planning; public services and utilities; recreation; traffic and transportation; and energy. In many cases, regulatory compliance is contingent upon implementation of appropriate BMPs and proper permitting, such as those required to protect water quality. Potential required permits and approvals are provided in **Table 4-1.**

## 3.2 Summary of Potential Environmental Constraints

### Resources with No Impacts

Based on the Existing Conditions and Environmental Constraints Analysis, environmental constraints would not occur under the following resources:

- Aesthetics
- Energy
- Land Use and Planning
- Mineral Resources
- Public Services and Recreation

**Table 3-1** presents a summary of potential environmental constraints by alternative. Only the resource areas with potential constraints are included in **Table 3-1**. Highlighted cells indicate a greater potential for impacts based on the location of the alternative or proposed project activities. The full analysis is provided in **Appendix B,** Existing Conditions and Environmental Constraints.

## Table 3-1. Summary of Potential Environmental Constraints by Alternative

| Potential Environmental Constraints | Alternative | | | | | |
|---|---|---|---|---|---|---|
| **Agriculture and Forestry Resources** | **1** | **3** | **6** | **11** | **12** | **13** |
| Would the project result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Is the project located on a Williamson Act Contract property, or would it disturb a property under the Williamson Act Contract? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Air Quality and GHG Emissions** | | | | | | |
| Would project result in substantial emissions? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the project expose sensitive receptors to substantial pollutant concentrations? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the project generate GHG emissions either directly or indirectly? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Biological Resources** | | | | | | |
| Is the Project located adjacent to terrestrial or aquatic habitat areas for state or federally listed endangered, threatened, or candidate species? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project 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 Game or U.S. Fish and Wildlife Service? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project 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? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Cultural and Tribal Resources** | | | | | | |
| Do known historical, archaeological, or tribal sites or resources occur in the Project Area? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Does the Project require excavations or ground disturbance that could inadvertently impact known or unknown cultural, historical, or archaeological resources? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project disturb human remains, including those encountered outside of dedicated cemeteries? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Geology and Soils** | | | | | | |
| Would the project require excavations, grading, or other ground disturbing activities capable of causing erosion or loss of topsoil? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Hazards and Hazardous Materials** | | | | | | |
| Does the Project require the use or routine transport of hazardous materials? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| Potential Environmental Constraints | Alternative | | | | | |
|---|---|---|---|---|---|---|
| **Hydrology and Water Quality** | | | | | | |
| Would the project alter the drainage pattern of the site or area in a manner which would result in substantial erosion or siltation? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project alter the drainage pattern of the site or area or result in an increase in surface runoff in a manner which would result in flooding on- or off-site? | ✓ | ✓ | ✓ | | ✓ | ✓ |
| **Noise** | | | | | | |
| Would the project generate noise in excess of thresholds outlined in the county noise ordinance or general plan? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Would the Project generate excessive ground borne vibration or ground borne noise levels? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Traffic and Transportation** | | | | | | |
| Would the Project result in disruptions to traffic or the circulatory system? | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Utilities and Service Systems** | | | | | | |
| Would the Project require or result in the relocation or construction of new or expanded water, or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects? | ✓ | | | | | ✓ |

As shown in **Table 3-1** above, each alternative would result in impacts on aesthetics, agriculture and forestry resources; air quality and GHG emissions; biological resources; cultural resources; geology and soils; hazards and hazardous materials; hydrology and water quality; noise, traffic and transportation, and utilities and service systems. Given their locations and the scope of construction work, Alternatives 6 and 11 cross more lands designated as Prime Farmland and Farmland of Statewide Importance, and have a larger project footprint and more extensive construction scope of work, and therefore have a greater potential to impact such resources. All six alternatives include work in and around the Knights Landing area and therefore would have the same level of impact to sensitive receptors such as schools and residents. Based on these results, Alternative 6 has the greatest potential for impacts across resource areas, followed by Alternative 11, 3 and 12, and 1 and 13, in that respective order.

# 4 Environmental Documentation, Permits and Approvals

## 4.1 California Environmental Quality Act

Based on the results of the environmental constraints analysis, it is likely that the proposed alternatives would result in a potential impact on the environment and therefore, compliance with CEQA would be required. CEQA requires that all state and local government agencies consider the environmental consequences of projects they propose to carry out, or over which they have discretionary authority, before implementing or approving those projects. As specified in Section 15367 of the State

CEQA Guidelines, the public agency that has the principal responsibility for carrying out or approving a project, as defined above and as described in more detail below, is the lead agency for purposes of CEQA. As specified in Section 15064(a) of the state CEQA Guidelines, if there is substantial evidence (such as the results of an Initial Study (IS)) that a project, either individually or cumulatively, could have a significant effect on the environment that cannot effectively be mitigated to a less-than-significant level, the lead agency must prepare an EIR. The lead agency may instead prepare an IS if it determined that there is no substantial evidence that the project could cause a significant impact to the environment. The lead agency may prepare a Mitigated Negative Declaration (MND), if in the course of the IS analysis, the agency recognizes that the project could have a significant impact to the environment but that implementing specific mitigation measures would reduce any such impacts to a less-than-significant level (state CEQA Guidelines, Section 15064[f]).

## 4.2 National Environmental Policy Act

Based on the results of the Environmental Constraints Analysis (ECA), it is likely that the project would require compliance with federal regulations, such as the Clean Water Act, Section 404; National Historic Preservation Act, Section 106; and Endangered Species Act (ESA), Section 7, as described in **Section 4.3, Permits**, below. As a result of seeking these federal permits and consultations, compliance with the National Environmental Policy Act (NEPA) could also be triggered. In addition, all of the Knights Landing Levee System levees are part of the SPFC and thus are considered state/federal facilities, therefore any modifications to the levees would also trigger the need for NEPA compliance as well as a Rivers and Harbors Act, Section 408 approval. The level of NEPA documentation that could be required for the proposed project would likely be determined during the permitting process.

## 4.3 Permits and Approvals

Several Federal, state, and local permits and/or authorizations are anticipated for the proposed project. **Table 4-1** summarizes the potential permits and approvals that may be associated with the proposed project. The regulations and ordinances listed below represent a preliminary assessment of permitting requirements, which would be refined through subsequent project design and preparation of a detailed project description.

All of the proposed alternatives would directly and indirectly affect sensitive natural resources, including waters of the U.S. All potential waters of the U.S., including wetlands, identified within the study area may be regulated by the U.S. Army Corps of Engineers (USACE) through section 404 of the Clean Water Act (CWA) and by the Regional Water Quality Control Board (RWQCB) as waters of the State through Section 401. All ecological systems associated with drainages (i.e. potential waters of the U.S.), and drainage features with bed and bank topography may also be regulated by Sections 1600-1616 of the California Fish and Game Code. In conjunction with the USACE Section 404 permit, impacts on wetlands and waters would likely require a Section 401 Water Quality Certification or Waste Discharge Requirement from RWQCB and CDFW Section 1602 Streambed Alteration Agreement. Also, for all alternatives, the proposed project has the potential to affect more than 1.0 acre of soil, triggering the requirement of

a National Pollutant Discharge Elimination System (NPDES) General Permit from the RWQCB.

The proposed project has the potential to adversely affect special-status species. Direct and/or indirect impact to federal and state listed species and their habitat would require formal consultation with the USFWS (Biological Opinion/Take Statement) and CDFW (2081 Incidental Take Permit) to determine the levels of take.

### Table 4-1. Potential Environmental Permits and Approvals

| Agency | Type of Permit or Approval | Regulated Activity |
|---|---|---|
| ***Federal*** | | |
| U.S. Army Corps of Engineers | Clean Water Act, Section 404 Permit | Discharges of dredged or fill material into waters of the U.S., including wetlands |
| State Historic Preservation Officer (SHPO) | National Historic Preservation Act, Section 106 Consultation | Consultation and coordination regarding potential effects on properties listed in, or eligible for listing in the National Register of Historic Places |
| U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) | Endangered Species Act (ESA), Section 7 Consultation | Section 7 Consultation |
| ***State*** | | |
| California Department of Fish and Wildlife (CDFW) | California ESA, California Fish and Game Code, Section 2081 Consultation | Consultation and take authorization |
| CDFW | California Fish and Game Code, Section 1602 | Streambed Alteration Agreement |
| California Native American Heritage Commission (NAHC) | NAHC Consultation | Consultation and coordination regarding potential effects on Native American burials or artifacts |
| ***Local*** | | |
| Regional Water Quality Control Board (RWQCB) | CWA, Section 402 | Section 402 National Pollutant Discharge Elimination System (NPDES) Construction General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities,<br><br>Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters |
| RWQCB | CWA, Section 401 | Section 401 Water Quality Certification for discharge of dredged or fill material into Waters of the U.S. and State |
| Air Pollution Control District | Authority to Construct/ Permit to Operate | Certification that construction emissions will meet all applicable requirements and will not interfere with air quality standards<br><br>Certification that equipment complies with applicable rules and regulations |

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# Appendix A. Regulatory Consistency Analysis

# Regulatory Consistency Analysis

## Introduction

The Regulatory Consistency Analysis provides an overview of the federal, state and local regulations, policies and plans applicable to the proposed project and includes a discussion of whether proposed project activities would conflict with these regulations, policies and plans. **Table B-1** includes a summary of potential consistency conflicts by regulatory area.

**Table B-1. Regulatory Consistency Table**

| Regulatory Area | Potential Consistency Conflict? Yes/No (Y/N) |
|---|---|
| Aesthetics | N |
| Agricultural Resources | Y |
| Air Quality | Y |
| Biological Resources | Y |
| Cultural Resources | Y |
| Energy | N |
| Geology and Soils | N |
| Hazards and Hazardous Materials | N |
| Hydrology and Water Quality | N |
| Land Use and Planning | N |
| Noise | Y |
| Public Services and Utilities | N |
| Recreation | N |
| Traffic and Transportation | N |

The sections below describe the relevant regulatory setting and regulatory consistency analysis for each resource area.

## Aesthetics

**State**

***California Scenic Highway Program***. California's Scenic Highway Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from change, which would diminish the aesthetic value of lands adjacent to highways (Caltrans 2018). The state laws governing the Scenic Highway Program are found in the Streets and Highways Code (Section 260, et seq.).

**Local**

***Yolo County General Plan*.** According to the Yolo County General Plan Conservation and Open Space Element, goals and policies strive to preserve and enhance Yolo County's wide variety of natural resources, including agricultural areas, open space, and recreational resources (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**No conflict.** The six alternatives would not conflict with the California Scenic Highway Program. There are no officially designated state or county scenic highways in Yolo County. The only eligible state scenic highway in the county is located outside of the project area.

The proposed project would conform to policies outlined in the Yolo County General Plan. The project area is located in rural Yolo County and is primarily dominated by lands under agricultural use. Proposed project activities would be consistent with the current uses and visual quality of the project area, and would not impact visual resources in Yolo County.

## Agricultural Resources

### State

***Farmland Mapping and Monitoring Program*.** The California Department of Conservation, Division of Land Resource Protection works with landowners, local governments, and researchers to conserve the state's farmland and open space, and maintains a statewide inventory of farmlands. These lands are mapped as part of the Farmland Mapping and Monitoring Program (FMMP), which is based on a classification system that rates agricultural land according to soil quality and irrigation status. Agricultural lands are divided and mapped into the following eight categories:

- *Prime Farmland*—Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.
- *Farmland of Statewide Importance*—Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.
- *Unique Farmland*—Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years before the mapping date.
- *Farmland of Local Importance*—Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- *Grazing Land*—Land on which the existing vegetation is suited to the grazing of livestock.
- *Urban and Built-up Land*—Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel.
- *Other Land*—Land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural

land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
- *Water*—Perennial water bodies with an extent of at least 40 acres.

***Williamson Act Program.*** The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive reduced property tax assessments. Williamson Act categories include:

- Williamson Act – Non-Prime Agricultural Land: Land which is enrolled under California Land Conservation Act contract and does not meet any of the criteria for classification as Prime Agricultural Land.
- Williamson Act – Farmland Security Zone: Enrolled parcels containing either Prime or Non-Prime agricultural land restricted by a 20 year contract pursuant to Government Code Section 51296.

**Local**

***Yolo County General Plan.*** The Agriculture and Economic Development Element of the Yolo County General Plan includes goals and policies geared towards the preservation of agricultural lands during economic growth and improvement of the County's productive capabilities (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**Potential conflict.** The alternatives would potentially conflict with the Farmland Mapping and Monitoring Program, Williamson Act Program and the Yolo County General Plan Agriculture and Economic Development Element. The project area includes Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Potential, and Williamson Act Contract properties and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2012; DOC 2016). To the extent possible, these areas would be avoided and BMPs would be employed to reduce impacts on agricultural lands.

## Air Quality

**Federal**

**Clean Air Act**. The Clean Air Act (CAA) was first enacted in 1963 and has since been amended (1965, 1967, 1970, 1977, and 1990). Under the CAA, the U.S. Environmental Protection Agency (USEPA) developed the National Ambient Air Quality Standards (NAAQS), or numerical concentration-based standards, for six criteria pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for O3 - measured as either volatile organic compounds (VOCs) or total oxides of nitrogen (NOx), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur oxides (SOx), respirable particulate matter (including PM10 and PM2.5), and lead (Pb).

USEPA classifies the air quality in an Air Quality Control Region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the

NAAQS. Areas within each AQCR are therefore designated as either “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment. The CAA also mandates that each state implement a State Implementation Plan (SIP) for local areas not meeting those standards, and the SIP must include pollution control measures outlining how the standards will be met.

**State**

**California Clean Air Act.** The CAA gives the authority to states to establish air quality rules and regulations. Air quality in California is governed by the California Clean Air Act (CCAA). The State of California has adopted the NAAQS and promulgated additional California Ambient Air Quality Standards (CAAQS) for criteria pollutants. The CAAQS are more stringent than the Federal primary standards. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date.

In California, the USEPA has delegated the authority for ensuring compliance with the NAAQS to the California Air Resources Board (CARB). CARB has delegated responsibility for implementation of the CAA and CCAA to local air pollution control agencies.

**Greenhouse Gas Regulation.** California has adopted statewide legislation addressing various aspects of climate change and mitigation for greenhouse gas (GHG) emissions. This legislation establishes a broad framework for meeting the state’s long-term GHG reduction goals. The Governor of California has also issued several orders related to the state’s evolving climate change policy. Of particular importance is the Global Warming Solutions Act of 2006, also commonly referred to as Assembly Bill (AB) 32, which establishes a statewide GHG reduction goal of achieving 1990 emissions levels by 2020.

**Local**

***Yolo-Solano Air Quality Management District (AQMD).*** The project area is located within the jurisdictional boundaries of the Yolo-Solano AQMD and is subject to its rules and regulations. The Yolo-Solano AQMD is responsible for implementing and enforcing State and Federal air quality regulations within Yolo County.

***Yolo County General Plan.*** The Conservation and Open Space Element of the Yolo County General Plan includes goals and policies intended for the conservation, protection, and enhancements of the County’s air quality, including the minimization of air pollutant emissions (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**Potential conflict**. The proposed project would require the use of construction vehicles and equipment on a temporary basis during construction. Air quality impacts could result from particulate matter generated during construction activities, such as dust and equipment exhaust. Operation of construction vehicles and equipment could generate GHG emissions on a short

term, intermittent basis. The proposed project would implement BMPs during construction in an effort to minimize air quality and GHG impacts, but there is potential that the Project would not conform to CAA, GHG regulations and the Yolo-Solano AQMD's rules and regulations.

## Biological Resources

**Federal**

**Endangered Species Act of 1973.** The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) enforce the provisions stipulated within the Federal Endangered Species Act of 1973 (hereafter, "FESA," 16 United States Code [USC] §1531 et seq.). Threatened and Endangered species on the Federal list (50 Code of Federal Regulations [CFR] § 17.11 and 17.12) are protected from take, defined as direct or indirect harm or harassment, unless a Section 10 permit is granted to an entity other than a Federal agency, or a Biological Opinion with incidental take provisions is rendered to a Federal lead agency via a Section 7 consultation. Pursuant to the requirements of FESA, an agency reviewing a Proposed Project within its jurisdiction must determine whether any federally listed or proposed species may be present in the study area and determine whether the Proposed Project is likely to jeopardize the continued existence of the species, or result in the adverse modification or destruction of habitat for said species. Under FESA, habitat loss is considered to be an impact to a species, thus related impacts to these species or their habitats would be considered significant and would require mitigation.

**Wetlands and Other Waters of the U.S**. Any person, firm, or agency planning to perform work that involves the discharge of dredged or fill material into "waters of the U.S.", must first obtain authorization from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (33 USC §1344). Permits, licenses, variances, or similar authorizations may also be required by other Federal, State, and local statutes. Waters of the U.S. are defined as: all waters used in interstate or foreign commerce; all interstate waters including interstate wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent and ephemeral streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, where the use, degradation, or destruction of which could affect interstate commerce; impoundments of these waters; tributaries of these waters; or wetlands adjacent to these waters (33 CFR Part 328). With non-tidal waters, in the absence of adjacent wetlands, the extent of USACE jurisdiction extends to the ordinary high water mark (OHWM) – the line on the shore established by fluctuations of water and indicated by a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, or the presence of litter and debris. Wetlands are defined as: "… those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions".

In addition, the Regional Water Quality Control Board (RWQCB) may require a State Water Quality Certification (CWA, Section 401 permit) before other permits are issued.

In California, the USEPA has delegated the authority for ensuring compliance with the NAAQS to the California Air Resources Board (CARB). CARB has delegated responsibility for implementation of the CAA and CCAA to local air pollution control agencies.

**State**

**California Endangered Species Act (CESA).** The California Endangered Species Act (CESA) is similar to the FESA in that it contains a process for listing species and regulating potential impacts to listed species. Section 2081 of the CESA authorizes the California Department of Fish and Wildlife (CDFW) to enter into a memorandum of agreement for take of listed species for scientific, educational or management purposes.

CDFW also requires notification prior to commencement, and may require a Streambed Alteration Agreement, pursuant to California Fish and Game Code (Subsections 1601-1603), if a proposed project would result in the alteration or degradation of a stream, river, or lake in California.

**Local**

***Yolo County Habitat Conservation Plan.*** The Yolo County HCP is a comprehensive, county-wide plan that identifies 12 sensitive species and the natural communities and agricultural land they use as habitat, as well as providing a streamlined permitting process to address any potential effects to these sensitive species. As the entire project area is within Yolo County, the project would fall under the guidance of this document. It is anticipated that the proposed project activities would comply with the conditions set forth in the HCP.

***Yolo County General Plan*****.** The Conservation and Open Space Element of the Yolo County General Plan includes goals and policies intended for the conservation and protection of the County's ecosystem, habitats, and special status species (Yolo County 2009).

**CONSISTENCY ANALYSIS**

**Potential conflict.** Based on a preliminary review of biological resources databases and a site reconnaissance, the project area appears to contain suitable habitat for several special-status species; and includes aquatic resources in the form of agricultural ditches. Proposed project activities have the potential to impact biological resources listed in **Appendix C Table 1**, should they be present in the vicinity of the proposed work area. Prior to project implementation, consultation with resource agencies and acquisition of permits may be necessary.

## Cultural Resources

### Federal

**Section 106 of the National Historic Preservation Act (NHPA).** Section 106 of the National Historic Preservation Act (NHPA) requires that, before beginning any undertaking, a federal agency must take into account the potential for effects on historic properties and offer the Advisory Council on Historic Preservation (ACHP) and other interested parties an opportunity to comment on the Proposed Project. Specific regulations regarding compliance with Section 106 state that, although the tasks necessary to comply with Section 106 may be delegated to others, the federal agency is ultimately responsible for ensuring that the Section 106 process is completed. Upon initiation of the Section 106 process, the lead federal agency is required to invite the appropriate State Historic Preservation Office (SHPO) or appropriate Tribal Historic Preservation Office (required only if the undertaking would occur on land owned by a federally recognized Indian tribe) to participate in the process.

Section 106 also requires federal agencies, or those they fund or permit, to consider the effects of their actions on properties that are determined eligible for listing or are listed in the National Register of Historic Places (NRHP). To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (archaeological, historical, architectural, and traditional cultural properties) must be inventoried and evaluated for the NRHP. To be listed in the NRHP, a property must be at least 50 years old (or be of exceptional historic significance if less than 50 years old) and meet one or more of the NRHP criteria. To qualify for listing, a historic property must represent a significant theme or pattern in history, architecture, archaeology, engineering, or culture at the local, state, or national level, and must meet specific significance criteria.

### State

**California Office of Historic Preservation.** The State of California implements the NHPA through its statewide comprehensive cultural resource preservation programs. The California Office of Historic Preservation (OHP), an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the State's jurisdiction.

The California Native American Heritage Commission (NAHC) identifies and catalogs cultural resources (i.e., places of special religious or social significance to Native Americans, and known graves and cemeteries of Native Americans on private lands) in California. The NAHC is charged with preserving and ensuring accessibility of sacred sites and burials, the disposition of Native American human remains and burial items, maintain an inventory of Native American sacred sites located on public lands, and review current administrative and statutory protections related to these sacred sites.

### Local

***Yolo County General Plan.*** The Conservation and Open Space Element of the Yolo General Plan includes goals and policies intended to conserve and protect cultural and historical resources (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**Potential conflict.** Based on a review of the records search results, historic map review, and the site reconnaissance provided in **Appendix D**, the project area does not contain resources listed on the NRHP. However, 34 previously recorded archeological and built environment resources were identified within the project footprint and an additional 12 were recorded within 0.25 mile of the project area. Proposed project activities have the potential to impact these cultural resources, should they be identified within, or potentially in the vicinity of, a proposed work area. Any newly discovered archaeological site which cannot be avoided by the proposed project must be evaluated for eligibility to the CRHR and/or NRHP. If eligible, additional mitigation may be required if significant impacts/adverse effects cannot be avoided.

## Energy

### State

***Senate Bill 350.*** SB 350 (Chapter 547, Statutes of 2015) was signed into law in September 2015. SB 350 establishes tiered increases to the Renewables Portfolio Standard of 40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. The former target was 33 percent by 2020. SB 350 also set a new goal to double the electricity and natural gas savings for existing buildings through energy efficiency and conservation measures.

#### CONSISTENCY ANALYSIS

**No conflict.** The six alternatives would conform to Senate Bill 350. The proposed project would use limited amounts of energy during construction during the operation of construction equipment. Regular energy usage would not be required during operation of the proposed project.

## Geology and Soils

### State

**Alquist-Priolo Earthquake Fault Zoning Act.** California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 et seq.) is intended to reduce risks to life and property from surface fault rupture during earthquakes. Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment.

**Seismic Hazards Mapping Act.** Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other seismic hazards, including strong ground shaking, liquefaction, and seismically induced landslides, and cities and counties are required to regulate development within mapped seismic hazard zones.

**Local**

***Yolo County General Plan*.** The Yolo County General Plan Safety Element identifies goals and policies relating to Geologic and Seismic hazards in Yolo County (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**No conflict.** The project area is in a region of California characterized as having relatively low seismic activity. No Alquist-Priolo Earthquake Fault Zones and no Seismic Hazard Zones are identified within the County. Therefore, the proposed project would conform to the Alquist-Priolo Earthquake Fault Zoning Act and Seismic Hazards Mapping Act. The proposed project would adhere to grading and erosion control measures during ground disturbing activities and would not conflict with local regulations and policies.

## Hazards and Hazardous Materials

**State**

**California Environmental Protection Agency (Cal/EPA) and the State Office of Emergency Services.** The California Environmental Protection Agency (Cal/EPA) and the State Office of Emergency Services establish rules governing the use of hazardous substances. The SWRCB has primary responsibility to protect water quality and supply. The Cal/EPA was created to better coordinate state environmental programs, reduce administrative duplication, and address the greatest environmental and health risks. The agency also unifies the California's environmental authority under a single Cabinet-level agency. The Secretary for Environmental Protection oversees the following agencies: CARB, Integrated Waste Management Board, Department of Pesticide Regulation, SWRCB, Department of Toxic Substances Control (DTSC), and the Office of Environmental Health Hazard Assessment.

**Hazardous Waste Control Law.** California requirements and statutory responsibilities are outlined in the statute implemented by the California DTSC in Health and Safety Code, Division 20, Chapter 6.5, Hazardous Waste Control Law. Regulations adopted from the Statute are found in Title 22 of the California Code of Regulations. The Hazardous Waste Control Law is similar to RCRA in that it regulates the identification, generation, transportation, storage, and disposal of materials deemed hazardous by the State.

**Local**

***Yolo County General Plan.*** The Safety Element of the Yolo County General Plan addresses a range of natural and human-caused hazards that may pose a risk to life and property, and includes goals and policies intended to protect residents and land from hazards and hazardous materials (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**No conflict.** The proposed project would conform to federal, state and local hazardous waste regulations. Construction vehicles and equipment containing grease and oils would be utilized during the construction phase. Implementation of spill prevention measures to address the accidental or inadvertent release of oil, grease, or fuel into adjacent waterways would further help minimize potential construction-related water quality impacts. No hazardous materials would be used during operations and no hazardous waste would be generated.

## Hydrology and Water Quality

### Federal

**The Clean Water Act: Section 401—Water Quality Certification.** Section 401 of the CWA requires that an applicant pursuing a federal permit to conduct an activity that may result in a discharge of a pollutant obtain a Water Quality Certification. A Water Quality Certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the U.S. Water Quality Certifications are issued by one of the nine geographically separated Regional Water Quality Control Boards (Regional Boards) in California. Under the CWA, the relevant Regional Board must issue a Section 401 Water Quality Certification for a project to be permitted under CWA Section 404.

**The Clean Water Act: Section 402—NPDES Permit Program.** NPDES Permit Program: CWA Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the U.S. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is delegated with the responsibility of protecting the quality of surface and ground waters of the state in Proposed Project area.

**The Clean Water Act: Section 404—Dredge/Fill Permitting.** The discharge of dredged or fill material into waters of the U.S. is subject to permitting specified under Title IV (Permits and Licenses) of the CWA and specifically under Section 404 (Discharges of Dredge or Fill Material) of the CWA. Section 404 of the CWA regulates placement of fill materials into the waters of the U.S. Section 404 permits are administered by the USACE.

### State

**Porter-Cologne Act.** The Porter-Cologne Act authorizes the state to implement the provisions of the CWA and establishes a regulatory program to protect the water quality and beneficial uses of waters of the state. The act requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the state's waters to file a report of waste discharge with the appropriate Regional Board.

### Local

***Yolo County General Plan*.** The Conservation Element of the Yolo County General Plan includes goals and policies intended for the protection of the County's water resources (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**No conflict.** All proposed alternatives, at a minimum would involve work along the Sacramento River and Knights Landing Ridge Cut. However, the proposed project would conform to all federal, state and local water quality, waste discharge, and reporting requirements. Further, the proposed project would obtain all necessary permits issued under CWA, including Section 401, Section 404, and NPDES permitting, and would implement a project SWPPP and grading and erosion control BMPs, as required, to reduce water quality impacts.

## Land Use and Planning

**Local**

***Yolo County General Plan*.** Land use designations for the County are outlined in the General Plan Land Use and Community Character Element (Yolo County 2009). Zoning classifications, allowed uses, and development standards are outlined in the Yolo County General Plan Amendment 2014-01 Zoning Code (Yolo County 2014).

**CONSISTENCY ANALYSIS**

**No conflict**. Land use zoning would not change or be impacted by the implementation of the six alternatives. The proposed project would not require the development of new roads or structures that have the potential to divide an established community and would adhere to the land use designations in the Yolo County General Plan.

## Noise

**Local**

***Yolo County General Plan*.** The Health and Safety Element of the Yolo County General Plan includes goals and policies that seek to reduce community exposure to excessive noise levels through the establishment of noise level standards for a variety of land uses (Yolo County 2009). Noise standards specific to construction are included in the Noise section of the Health and Safety Element (Yolo County 2009).

**CONSISTENCY ANALYSIS**

**Potential conflict.** The alternatives would generate altered noise conditions only during project construction activities. With noise sensitive receptors in close proximity (schools, residents, etc.), there is a potential that the proposed project would temporarily not adhere to noise constraints outlined in the Yolo County General Plan.

## Public Services and Utilities

**Local**

***Yolo County General Plan***. The Yolo County General Plan Public Facilities and Services Element includes goals and policies intended to address the following public services and facilities: sewer and septic systems, stormwater and drainage, community parks, law enforcement, fire and emergency medical services, schools, library services, dependent care, solid waste and recycling, sources of energy, utilities and communication technology, and general government services (Yolo County, 2009).

**CONSISTENCY ANALYSIS**

**No conflict**. The proposed project would not result in an increase in population that could result in an increased demand on public services, levels of service or service ratios. Therefore, the alternatives would adhere to public service guidelines outlined in the Yolo County General Plan.

## Recreation

### Local

***Yolo County General Plan*.** The Conservation and Open Space and Recreation Element of the Yolo County General Plan includes goals and policies intended to govern the preservation of open space and the maintenance, expansion, and creation of recreational resources and amenities to maintain a high quality of life for the County's citizens (Yolo County 2009).

#### CONSISTENCY ANALYSIS

**No conflict**. The six alternatives would adhere to recreation guidelines outlined in the Yolo County General Plan. The proposed project would not permanently disturb recreational facilities and the proposed project would not result in increased population growth resulting in the need for additional recreational facilities.

## Traffic and Transportation

### Local

***Yolo County General Plan***. The Circulation Element of the Yolo County General Plan provides the framework for decisions concerning the countywide transportation system, and includes goals and policies intended to provide an efficient multi-modal road and highway system that meets the needs of its users (Yolo County, 2009).

#### CONSISTENCY ANALYSIS

**No conflict.** During construction, the proposed project would involve work within roadways and highways which would result in temporary disruptions to traffic and the circulation system. Prior to construction activities, a traffic management plan and a traffic safety plan would be developed in coordination with Yolo County. Upon completion of construction, vehicle traffic would return to pre-construction levels. Therefore, the six alternatives would adhere to traffic guidelines outlined in the Yolo County General Plan.

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# Appendix B. Existing Conditions and Environmental Constraints

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
|---|---|---|---|---|---|---|---|
| Impact Criteria and Existing Conditions | | | | | | | |
| **Aesthetics** | | | | | | | |
| **Existing Conditions:**<br>There are no officially designated state or county highways in Yolo County. The only eligible state scenic highway in the county is located along the western portion of State Route 16 in Yolo County (Caltrans 2018). The project area is located in rural Yolo County and is primarily dominated by lands under agricultural use. According to the Yolo County General Plan, the County is largely defined by its rural agricultural setting Yolo County 2009). According to the Yolo County General Plan Conservation and Open Space Element, the County is home to a wide variety of natural resources, including agricultural areas, open space, and recreational resources (Yolo County 2009). The County is also home to 1,975.5 acres of county parks and recreation areas, as well as a variety of National, State and County Historic areas that contribute to the scenic beauty and quality of life. | | | | | | | |
| Would the project create a substantial source of light or glare? | No. The proposed project does not include any permanent stationary sources of light. Light would be associated with the operation of construction vehicles and equipment. However, use of construction vehicles and equipment would occur on a temporary basis, primarily during daylight hours and would not substantially impact surrounding communities. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Is the Project located near a scenic highway? | No. There are no officially designated state or county highways in Yolo County. The only eligible state scenic highway in the county is located in western Yolo county along State Route 16, which is outside of the project area. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project interfere with public views in the area? | No. Under Alternative 1, the new cross levee would be approximately 5-6 feet in height and 40-70 feet wide. The cross levee would be consistent with the visual character of the area and would not substantially affect public views given that the project area is predominantly agricultural. Additionally, construction equipment would be used on a temporary basis and would be staged when not in use. | Same as Alternative 1 | Same as Alternative 1 | No. Alternative 11 does not include a cross levee or large permanent structures that have the potential to obstruct public views. Construction equipment would be used on a temporary basis and would be staged when not in use. | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project damage scenic resources? | No. The proposed project involves levee improvement and the implementation of ancillary flood control features. These activities would be consistent with the current uses and visual quality of the project area, and would not impact visual resources in Yolo County. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Agriculture and Forestry Resources** | | | | | | | |
| **Existing Conditions:**<br>According to the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP), Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the project area includes Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential (DOC 2016). According to the Department of Conservation Yolo County Williamson Act FY 2010/2011 Map, Williamson Act Prime Agricultural Land is located within the project area (DOC 2012). According to the Yolo County General Plan Land Use Map, the proposed project is not located in areas designated for forest land (Yolo County 2009). | | | | | | | |
| Would the project result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance? | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016).<br><br>Alternative 1 would potentially convert less land designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential compared to Alterantives 3, 6, 11, 12, and 13 | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016). | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016).<br><br>Alternative 6 would potentially convert more land designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential compared to Alterantives 1, 3, 12, and 13 | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016).<br><br>Alternative 11 would potentially convert more land designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential compared to Alterantives 1, 3, 6, 12, and 13 | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016). | Yes. According the DOC FMMP, Knights Landing is designated as Urban and Built-Up Land and the Sacramento River is designated as Other Land. Outside of these areas, the proposed project includes a large amount of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Potential, and has the potential to disturb or convert such land uses during construction and ground disturbing activities (DOC 2016). | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alternatives 6 and 11 would have a greater potential for impacts compared to Alternatives 1, 3, 12, and 13. |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
|---|---|---|---|---|---|---|---|
| Is the project located on a Williamson Act Contract property, or would it disturb a property under the Williamson Act Contract? | Yes. According to the Department of Conservation Yolo County Williamson Act FY 2010/2011 Map, Williamson Act Prime Agricultural Land is located within the project area (DOC 2012). Ground disturbing activities or work within these areas has the potential to disturb a property under a Williamson Act Contract. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |
| Would the Project result in the loss of forest land or conversion of forest land to non-forest use? | No, the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. According to the Yolo County General Plan Land Use Map, the proposed project is not located in areas designated for forest land (Yolo County 2009). | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Air Quality and GHG Emissions** | | | | | | | |
| **Existing Conditions:**<br>The project area is located within the jurisdictional boundaries of the Yolo-Solano Air Quality Managemtn District (AQMD) and is subject to rules and regulations developed by the Yolo-Solano AQMD. The Yolo-Solano AQMD is responsible for implementing and enforcing State and Federal air quality regulations within Yolo County. Under the Federal NAAQS, the air quality within the Yolo-Solano AQMD has been characterized by the USEPA as unclassified/attainment for all criteria pollutants. However, under the State CAAQS, California Air Resources Board (CARB) has designated the Yolo-Solano AWMD as a nonattainment area for PM10 (CARB 2016). The proposed project is located in Sacramento Valley Air Basin (SVAB). The SVAB is a broad, flat valley bounded by the Coastal Range to the west, the Sierra Nevada to the east, the Cascade Range to the north, and the San Joaquin Valley Air Basin to the south. The SVAB consists of 13 counties and is split into two planning sections based on the degree of pollutant transport and the level of emissions. Yolo County belongs to the Northern Sacramento Valley Air Basin.<br><br><u>Sensitive Receptors</u><br>Three schools, Knights School, Sci Tech KL, and Grafton School are located in Knights Landing. No hospitals or other sensitive receptors are located in Knights Landing | | | | | | | |
| Would project result in substantial emissions? | Yes. The proposed project would not create emissions post construction and no new stationary emissions sources are proposed. However, during construction the project would require the use of construction vehicles and equipment on a temporary basis. Significant air quality impacts could result from particulate matter generated during construction activities, such as dust and equipment exhaust. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 includes an increased constuction scope of work, which would result in more construction emissions due to the larger extent. | Same as Alternative 1. However, Alternative 11 includes an increased constuction scope of work, which would result in more construction emissions due to the larger extent. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alternatives 6 and 11 would have a greater potential for impacts. |
| Would the project create objectionable odors? | No. The proposed project involves implementation of flood protection and remediation measures and does not involve activities that involve the long term creation of objectionable odors during construction or post construction. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1. | None |
| Would the project expose sensitive receptors to substantial pollutant concentrations? | Yes. Three schools and multiple residences are located in the project area. No hospitals or other sensitive receptor groups are located in Knights Landing. Operation of construction vehicles and equipment could result in increased emissions on a short term basis and impacts on sensitive receptors would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |
| Would the project generate GHG emissions either directly or indirectly? | Yes. Operation of construction vehicles and equipment could generate GHG emissions on a short term, intermittent basis. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 includes an increased constuction scope of work, which would result in more construction emissions due to the larger extent. | Same as Alternative 1. However, Alternative 11 includes an increased constuction scope of work, which would result in more construction emissions due to the larger extent. | Same as Alternative 1 | Same as Alternative 1 | Alternative 1, 3, 6, 11, 12, 13<br><br>Alternatives 6 and 11 would have a greater potential for impacts. |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
|---|---|---|---|---|---|---|---|
| **Biological Resources** | | | | | | | |
| **Existing Conditions:** See Appendix C, Biological Resources Analysis, for existing conditions and detailed analysis. | | | | | | | |
| Is the Project located adjacent to terrestrial or aquatic habitat areas for state or federally listed endangered, threatened, or candidate species? | Yes. Database query results returned a large number of special-status species with a potential to occur in the vicinity of the project area (Appendix C, Attachment A). Through review of these results, many species were determined to not have the potential to occur in the project area due to absence of suitable habitat or the project area being located outside of known species ranges. Appendix C Table 1 provides a description of the special-status species that have the potential to occur in each of the delineated vegetation communities. A few of the species included in this table are associated with riparian habitat located immediately adjacent to the project area along the levee of the Sacramento River. Project work may require vegetation removal which could impact associated special-status species, should they be present, and these species should be considered when consulting with the appropriate agencies. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 would require more levee remediation and associated vegetation removal. As a result, Alternative 6 would have a greater potential for impacts compared to Alternatives 1, 3, 12, and 13. | Same as Alternative 1. However, Alternative 11 would require more levee remediation and associated vegetation removal. As a result, Alternative 11 would have a greater potential for impacts compared to Alternatives 1, 3, 6, 12, and 13. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alternatives 6 and 11 would have a higher potential for impacts. |
| Would the Project 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 Game or U.S. Fish and Wildlife Service? | Yes. There are no USFWS designated critical habitat units that intersect the project area (USFWS 2018b). However, the Sacramento River immediately adjacent to the project area is designated critical habitat for both chinook salmon (Oncorhynchus tshawytscha) and steelhead (Oncorhynchus mykiss). As no in-river work is planned for this project, no effect to critical habitat units is anticipated.<br><br>However, Appendix C Table 1 provides a description of the special-status species that have the potential to occur in each of the delineated vegetation communities. A few of the species included in this table are associated with riparian habitat located immediately adjacent to the project area along the levee of the Sacramento River. Project work may require vegetation removal which could impact associated special-status species, should they be present, and these species should be considered when consulting with the appropriate agencies. Other communities in the project area that provide suitable habitat for special-status species include irrigated agriculture, orchard, urban and various aquatic resources. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 would require more levee remediation and associated vegetation removal. As a result, Alternative 6 would have a greater potential for impacts compared to Alternatives 1, 3, 12, and 13. | Same as Alternative 1. However, Alternative 11 would require more levee remediation and associated vegetation removal. As a result, Alternative 11 would have a greater potential for impacts compared to Alternatives 1, 3, 6, 12, and 13. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Would the Project 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 Game or US Fish and Wildlife Service? | Yes. Aquatic resources in the project area could be considered sensitive communities due to their unique hydrophytic vegetation and ability to support special-status species. These areas include agricultural ditches and other potential aquatic resources that were not mapped during the site surveys. It is recommended that a formal delineation of aquatic resource be completed prior to any work in order to determine the level of impact on sensitive communities. Additionally, project work may require removal of riparian vegetation. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 would require more levee remediation and associated vegetation removal. As a result, Alternative 6 would have a greater potential for impacts compared to Alternatives 1, 3, 12, and 13. | Same as Alternative 1. However, Alternative 11 would require more levee remediation and associated vegetation removal. As a result, Alternative 11 would have a greater potential for impacts compared to Alternatives 1, 3, 6, 12, and 13. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Does the project 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. The Yolo County Habitat Conservation Plan (HCP) covers the project area, however it is anticipated that the proposed project activities would comply with the conditions set forth in the HCP. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| Would the Project 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? | Yes. There are no protected areas or conservation easements in the project area. However, the Sutter Bypass and Yolo Bypass are located adjacent to the northeastern and southeastern portions (respectively) of the project area. These bypass channels funnel Sacramento River flood waters away from urban areas. When not flooded, these areas are used largely for agricultural purposes and function as well-established wildlife corridors. The Fremont Weir portion of the Yolo Bypass, immediately adjacent to the southeastern end of the project area, is owned by CDFW and is designated as a wildlife area. Additionally, the Sacramento River and Knights Landing Ridge Cut provide movement corridors for native resident and migratory fish species. Although substantial interference with movement is unlikely to result from project activities,the construction of new levees may act as barriers. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 would require more levee remediation. As a result, Alternative 6 would have a greater potential for impacts compared to Alternatives 1, 3, 12, and 13. | Same as Alternative 1. However, Alternative 11 would require more levee remediation. As a result, Alternative 11 would have a greater potential for impacts compared to Alternatives 1, 3, 6, 12, and 13. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | Yes. Agricultural ditches and various other aquatic resources were mapped in the project area. These features have the potential to fall under state or federal jurisdiction, however a formal aquatic resources delineation would need to be conducted to verify the jurisdiction of these features. Several agriculture ditches and potential seasonal wetlands were identified throughout the project area. | Same as Alternative 1 | Same as Alternative 1. However, Alternative 6 would have a higher potential for impacts on wetlands compared to Alternatives 1, 3, 12, and 13 given that Alternative 6 would disturb a greater footprint as a result of levee remediation and cross levee construction. | Same as Alternative 1. However, Alternatives 11 would have a higher potential for impacts on wetlands compared to Alternatives 1, 3, 6, 12, and 13 given that Alternative 11 would disturb a greater footprint as a result of the scope of levee remediation. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| **Cultural and Tribal Cultural Resources** | | | | | | | |
| **Existing Conditions:** Existing Conditions: See Appendix D, Cultural Resources Analysis, for existing conditions and detailed analysis. | | | | | | | |
| Do known historical, archaeological, or tribal sites or resources occur in the Project Area? | Yes. A records search identified 34 previously recorded archaeological and built environment resources within the Project footprint and an additional 12 recorded resources within 0.25 mile. Most of the previously recorded structures are in and around Knights Landing. 54 previous investigations have been conducted, most of which were archaeological and/or historical field investigations. None of the previously recorded resources have been determined eligible for listing on the NRHP or CRHR. | Same as Alternative 1 | Same as Alternative 1. However, Alterantive 6 has a larger footprint of levee remediation and construction impacts and therefore, has the potential to impact known cultural resources to a greater extent. | Same as Alternative 1. However, Alterantive 11 has a larger footprint of levee remediation and construction impacts and therefore, has the potential to impact known cultural resources to a greater extent. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Does the Project require excavations or ground disturbance that could inadvertently impact known or unknown cultural, historical, or archaeological resources? | Yes. Construction of the proposed project would require ground disturbance, excavations, implementation of fill, compaction, and use of heavy equipment. These activities have the potential to result in impacts to the cultural resources listed in Appendix D, should the resources be identified within, or potentially in the vicinity of, a proposed work area. Any newly discovered archaeological site which cannot be avoided by the proposed project must be evaluated for eligibility to the CRHR and/or NRHP. If eligible, additional mitigation may be required if significant impacts/adverse effects cannot be avoided. | Same as Alternative 1 | Same as Alternative 1. However, Alterantive 6 has a larger footprint of levee remediation and construction impacts and therefore, has the potential to impact known or unknown cultural resources to a greater extent. | Same as Alternative 1. However, Alterantive 11 has a larger footprint of levee remediation and construction impacts and therefore, has the potential to impact known or unknown cultural resources to a greater extent. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Would the project disturb human remains, including those encountered outside of dedicated cemeteries? | Yes. No human remains, were identified by the cultural resources analysis. However, cemeteries and burial sites were identified. In the event that human remains are inadvertently discovered outside of dedicated cemeteries, work would stop immediately and the County Coroner would be contacted for consultation. | Same as Alternative 1 | Same as Alternative 1. However, Alterantive 6 has a larger footprint of levee remediation and construction impacts, which therefore would increase the possibility of encountering human remains. | Same as Alternative 1. However, Alterantive 11 has a larger footprint of levee remediation and construction impacts, which therefore would increase the possibility of encountering human remains. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| **Energy** | | | | | | | |
| **Existing Conditions:**<br>Pacific Gas and Electric (PG&E) provides energy services to rural Yolo County. The following is a breakdown of PG&E's primary energy sources (Yolo County Climate Action Plan):<br>• Non-emitting nuclear generation (22 percent)<br>• Large hydroelectric facilities (16 percent)<br>• Eligible renewable resources, such as wind, geothermal, biomass, solar and small hydro (14 percent).<br>• Natural gas/other (39 percent)<br>• Coal (8 percent).<br>According to the California Energy Commission Yolo County consumed 1749 GWh of energy in 2017 (California Energy Commission 2016). | | | | | | | |
| Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy, or wasteful use of energy resources, during project construction or operation? | No. The proposed project would use limited amounts of energy during construction through the operation of construction equipment. Regular energy usage would not be required once construction is completed. PG&E would have the capacity to support the project's energy needs. Therefore, impacts on energy resources would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | No. The proposed project would comply with state and local plans for renewable energy and energy efficiency. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Geology, Soils and Mineral Resources** | | | | | | | |
| **Existing Conditions:**<br>According to the Yolo County General Plan and EIR, the project area is in a region of California characterized by generally flat to gently sloping alluvial plains made up of quaternary alluvium and basin deposits (Yolo County 2009). No Alquist-Priolo Earthquake Fault Zones and no Seismic Hazard Zones are identified within the County. Soils in the project area consist of a range of poorly to well drained clays to sandy loams (Yolo County 2009). No Mineral Resource Zones (MRZ) exist in the project area, however several gas fields are located in or near the project area (Yolo County 2009). | | | | | | | |
| Would the project require excavations, grading, or other ground disturbing activities capable of causing erosion or loss of topsoil? | Yes. The proposed project would require ground disturbance, excavations, implementation of fill, compaction, and use of heavy construction equipment. These, and other activties with the potential to result in erosion and loss of topsoil include constuction of a cuttoff wall, stability berms, rock slope protection and freeboard repair. The proposed project would adhere to erosion and grading control ordinances within Yolo County and therefore, impacts would not be substantial. Alternative 1 would also include the construction of a cross levee and pond embankments. | Same as Alternative 1. Alternative 3 would also include berm and ditch fill on the right bank of the Sacramento River. | Same as alternative 3. Alternative 6 would also include mid-valley repairs and improvements to the right bank of the Sacramento River. | Same as alternative 6, except there is no construction of a cross levee and the scope of the construction improvements covers the entire Knights Landing Levee System. | Same as alternative 3. Alternative 12 would also include mid-valley repairs and improvements to the right bank of the Sacramento River. | Same as alternative 1. Alternative 13 would also include mid-valley repairs and improvements to the right bank of the Sacramento River. | Alternatives 1, 3, 6, 11, 12, 13 |
| Is the Project located in a seismically active area? | No. According to the Yolo County General Plan and EIR, the project area is in a region of California characterized as having relatively low seismic activity (Yolo County 2009). No Alquist-Priolo Earthquake Fault Zones and no Seismic Hazard Zones are identified within the County. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Are new permanent structures proposed that could expose people to seismic related hazards such as landslides, liquefaction, ground failure, strong seismic ground shaking? | No. The project area is in a region of California characterized as having relatively low seismic activity. Although the proposed project would involve the construction of levee repairs and improvements, no impacts would occur because seismic hazards are lacking in the project area (Yolo County 2009). | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Is the Project located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | No. The project area is not located on a geologic unit or soil(s) that are unstable, or that would become unstable as a result of the proposed project, thereby resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. According to the Yolo County General Plan and EIR, much of the County's land surface is comprised of soils that would require special design considerations due to shrink-swell potentials (Yolo County 2009), however, these considerations would be factored into the project design. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| Are mineral resources present in the project area? | No. No mineral resources are present in the project area, however several gas fields exist in or near the project area (Yolo County 2009+A45). | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Do known paleontological resources exist in the Project Area? | Yes. According to the University of California Museum of Paleontology at Berkeley and the 2016 PaleoDatabase, paleontological resources are known to exist in Yolo County (Bureau of Reclamation 2017). If paleontological resources were identified in the project area during construction, the proposed project would follow policies outlined in the Yolo County General Plan Conservation Element and the Society of Vertebrate Paleontology's standard procedures for the assessment and mitigation of adverse impacts on paleontological resources. With these measures in place, impacts on paleontological resources would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Hazards and Hazardous Materials** | | | | | | | |
| **Existing Conditions:**<br>According to Cal/EPA, the provisions in Government Code Section 65962.5 are commonly referred to as the "Cortese List." A site's presence on the list has bearing on the local permitting process. The Cortese list, which includes the resources listed below, was reviewed for references to the project area and vicinity:<br>• List of Hazardous Waste and Substances sites from the DTSC EnviroStor database;<br>• List of Leaking Underground Storage Tank Sites from the SWRCB GeoTracker database;<br>• List of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit;<br>• List of "active" Cease and Desist Orders and Cleanup and Abatement Orders from SWRCB; and<br>• List of hazardous waste facilities subject to corrective action identified by DTSC.<br><br>According to the DTSC (No Suggestions) Database, no potentially hazardous sites were identified in or near the project area. | | | | | | | |
| Be located on a site which is included on a list of hazardous materials sites compiles pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | No. Two of the LUST cases are closed and the one clean up site is listed as open. However, the project would not effect LUST or clean-up sites located near Knights Landing in the project area. Therefore, substantial impacts from being located on a hazardous materials site are not anticipated, | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | No. Implementation of the proposed project is anticipated to include advanced construction traffic planning and development of a traffic safety plan, which would ensure the continuation of emergency response services during construction activities. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Does the Project require the use or routine transport of hazardous materials? | Yes. Construction vehicles and equipment containing grease and oils would be utilized during the construction phase. Implementation of spill prevention measures to address the accidental or inadvertent release of oil, grease, or fuel into adjacent waterways would further help minimize potential construction-related water quality impacts. Impacts would not be substantial with the implementation of BMPs. | Same as Alternative 1 | Same as Alternative 1. However, Alterantive 6 has a larger footprint of levee remediation and construction impacts, which would increase the use of oil, grease, and fuel. | Same as Alternative 1. However, Alterantive 11 has a larger footprint of levee remediation and construction impacts, which would increase the use of oil, grease, and fuel. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | Yes. The proposed project is located approximately 0.3 miles north of Grafton School. Operation of construction vehicles and equipment in the vicinity of Grafton School, although temporary, could expose sensitive receptors to emissions. To the extent possible, emissions would be controlled and contained through the implementation of BMPs. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | No. No airports are located in the project area. The Sacramento Airport is located 9 miles from Knights Landing. As a result, no impact from project activities near airports would occur. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the Project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | No. According to the Cal Fire Fire Hazard Severity Zone Map for Yolo County, the proposed project is located in an area zoned for moderate fire hazard severity in a Local Responsibility Area. High, High and Moderate fire hazard severity. However, it is unlikely that the proposed project would lead to a significant risk of loss, injury or death involving wildland fires. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Hydrology and Water Quality** | | | | | | | |
| **Existing Conditions:**<br>According to FEMA floodplain maps, the project area is located in the 100 year flood zone. The County is subject to flooding problems due to its poorly drained valley floor.<br><br><u>Groundwater</u><br>The project area is located in the Sacramento Valley Groundwater Basin, a large basin which covers over 5,900 square miles and 10 counties. This basin is divided into several smaller subbasins, and the County overlies portions of the Colusa Subbasin.<br><br><u>Surface Water</u><br>The majority of the County is considered part of the Sacramento River Hydrologic Region. The Sacramento River is the only major naturally occurring water body in the County, running north to south through the eastern portion of the County. Other waterbodies in the project area include Knights Landing Ridge Cut, the Colusa Basin Drain, and several | | | | | | | |
| Would the project alter the drainage pattern of the site or area in a manner which would result in substantial erosion or siltation? | Yes. Construction activities associated with the proposed project could potentially cause or result in erosion and/or sedimentation. Erosion of onsite soils can lead to increased levels of suspended sediments and turbidity in receiving waters, and could potentially impact water quality and result in a violation of water quality standards during construction. Impacts would be temporary and increased erosion and sedimentation is not anticipated once construction is completed.<br><br>Alterantive 1 includes a cross levee, which is intended to provide flood damage reduction for Knights Landing but may alter drainage in the project area, however not likely to the point that would result in substantial erosion. | Same as Alternative 1 | Same as Alternative 1. Alternative 6 has a larger footprint of levee remediation and construction impacts along the Sacramento River and Knights Landing Ridge Cut which would increase the potential for erosion and sedimentation during construction. | Same as Alternative 1. Alternative 11 has a larger footprint of levee remediation and construction impacts along the Sacramento River and Knights Landing Ridge Cut which would increase the potential for erosion and sedimentation during construction. However, Alternative 11 does not include a cross levee. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13<br><br>Alterantives 6 and 11 would have a higher potential for impacts. |
| Would the project alter the drainage pattern of the site or area or result in an increase in surface runoff in a manner which would result in flooding on- or off-site? | Yes. Cross levees may alter the drainage pattern of the area; however the project is intended to provide flood damage reduction and would therefore result in beneficial impacts on flooding. | Same as Alternative 1 | Same as Alternative 1 | No. Project activities are not anticipated to alter drainage of the area, and no cross levee is to be constructed under this alternative. | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 12, 13 |
| Would the project conform to water quality standards and waste discharge requirements? | Yes. During construction, the proposed project has the potential to result in erosion, which could lead to increased levels of suspended sediments and turbidity in receiving waters. However, the proposed project would conform to water quality standards during construction through the implementation of BMPs, such as grading and erosion control measures, as well as the implementation of a project SWPPP to reduce polluted storm water runoff. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Is the Project located within a 100-year flood hazard area? | Yes. According to FEMA floodplain maps, the project area is located within the 100-year flood zone. However, flood risks in the project area are not considered a restraint to project implementation, as the purpose of the proposed project is to provide flood damage reduction. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project require the use of groundwater or hinder groundwater recharge? | No. The proposed project would not require the use of groundwater and would not involve the implementation of impervious surfaces to the extent that groundwater recharge would be hindered. Therefore, impacts on groundwater would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff? | No. Construction, ground disturbing activities and work along the Sacramento River and Knights Landing Ridge Cut have the potential to contribute to increased runoff on a temporary basis. However, the proposed project would include a Stormwater Pollution Prevention Plan (SWPPP) and would not exceed the capacity of existing or planned storm water drainage or provide substantial additional sources of polluted runoff. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Land Use and Planning** | | | | | | | |
| **Existing Conditions:**<br>According Yolo County General Plan Land Use Map, predominant land uses in Knights Landing include agricultural, residential, commercial, industrial, and public and quasi-public land uses (Yolo County 2009). The majority of land uses in the project area and Yolo County are agricultural. | | | | | | | |
| Is the proposed action consistent with the predominant character of the existing built or natural landscape? | Yes. Residential and agricultural zonings are predominant in the project area (Yolo County 2009). Flood improvement measures under the proposed project are consistent with these zonings and would not preclude current land uses. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Is the proposed action permitted under zoning regulations? | Yes. Residential and agricultural zonings are predominant in the project area (Yolo County 2009). Flood improvement measures under the proposed project are consistent with these zonings and would not preclude current land uses. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the Project physically divide an established community? | No. the proposed project would not require the development of new roads or structures that have the potential to divide an established community. The cross levee alignment would also not divide the established community of Knights Landing. Therefore no impact would occur. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Noise** | | | | | | | |
| **Existing Conditions:**<br>Land uses typically considered sensitive to noise include hospitals, parks, churches, schools, libraries, and other uses where low interior noise levels are essential. Sensitive receptors in Knights Landing include residential areas, schools, libraries and churches. Noise standards specific to construction are included in the Yolo County General Plan Noise Element. The Yolo County General Plan states that for residential sensitive receptors, noise levels should be kept below 75 dB (Yolo County 2009). | | | | | | | |
| Would the project generate noise in excess of thresholds outlined in the county noise ordinance or general plan? | Yes. Sensitive receptors in Knights Landing include residential areas, schools, libraries, and churches. The proposed project has the potential to generate noise in excess of local thresholds during the operation of construction vehicles and equipment. Construction activities would primarily consist of excavation, fill and compaction, and the use of heavy equipment which would not substantially increase noise levels. However, cut-off wall construction along the right bank of the Sacramento River in areas adjacent to developed Knights Landing would generate higher noise levels than typical excavation, fill, and compaction activities. Generally, construction activities would not occur in the direct vicinity of sensitive resources. Construction would occur on a temporary and intermittent basis and thus, noise levels would return to pre-construction levels once construction is completed. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |
| Would the Project generate excessive ground borne vibration or ground borne noise levels? | Yes. Operation of construction equipment and ground disturbing activities, would result in ground borne vibration and ground borne noise. However, ground borne noise and vibration impacts would occur on a short term, intermittent basis and would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
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| **Public Services and Recreation** | | | | | | | |
| **Existing Conditions:**<br>Police services in the unincorporated areas of the County, which include the project area, are provided by the Yolo County Sheriff's Department. The Sheriff's Department is responsible for law enforcement patrol services. Fire protection services in the project area are provided by the Yolo Fire Protection District, which also provides emergency medical services, rescue, and hazardous materials response services to the eastern portion of the unincorporated County. Knights Landing River Access Park is the only recreational area in the project area. | | | | | | | |
| Would the project result in an increase in response times for public services such as police and fire protection? | No. The proposed project would not result in an increase in population that could result in an increased demand on public services or response times. Further, the proposed project would not interfere with emergency routes and would implement a traffic safety plan. As a result there would be no impact on public services response times. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection, police protection, schools, parks, other public facilities? | No. The proposed project would not result in an increase in population that could result in an increased demand on public services, levels of service or service ratios. As it relates to emergency response times, the proposed project would not interfere with emergency routes and would implement a traffic safety plan. As a result there would be no impact on public services. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project damage parks or other public facilities? | No. Knights Landing River Access Park is the only recreational area in the project area. Given that Knights Landing River Access Park is located along the Sacramento River, remediation along these areas would have the potential to temporarily disrupt this facility. Impacts would be on a short-term basis and would not be substantial. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | No. The proposed project does not include recreational facilities and would not require expansion of recreational facilities. Further, the proposed project would not result in increased population growth resulting in the need for additional recreational facilities. Therefore, there would be no impact. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | No. The proposed project would not result in increased population growth resulting in the increased use of parks and recreational facilities. Therefore, there would be no impact. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| **Traffic and Transportation** | | | | | | | |
| **Existing Conditions:**<br>According to the Yolo County General Plan, the roadway network within the unincorporated parts of the County is rural in character and mainly serves small communities and agriculture uses (Yolo County 2009). Interstates 5, 80, and 505 and State Route 16 are the primary transportation corridors extending through the County. Other County arterials and a network of local public and private roads make up the remainder of the roadway system. | | | | | | | |
| Would the proposed action result in a substantial increase in traffic above present levels? | No. The proposed project has the potential to temporarily increase the volume of traffic present on local roads and highways during construction. However, upon completion of construction, traffic would return to pre-project conditions. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadways, bicycle lanes and pedestrian paths? | No. The proposed project would conform to relevant plans, ordinances and policies addressing the circulation system. Construction vehicles and equipment would utilize local roads and highways on a temporary basis. Construction equipment would be staged to the extent possible when not in use. Prior to proposed project activities, a Traffic Management Plan would be developed in coordination with Yolo County and Knights Landing. Additionally, implementation of the proposed project is anticipated to include advanced construction traffic planning and development of a traffic safety plan, which would ensure the continuation of emergency response services during construction activities. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
|---|---|---|---|---|---|---|---|
| Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)? | No. The proposed project involves the construction of levee improvements. These activities would be consistent with the current uses and would not create traffic or transportation hazards due to a geometric design feature. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project result in inadequate emergency access? | No. Implementation of the proposed project is anticipated to include advanced construction traffic planning and development of a traffic safety plan, which would ensure the continuation of emergency response services during construction activities. The proposed project would adhere to the traffic safety plan and would not interfere with emergency access routes. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project result in disruptions to traffic or the circulation system? | Yes. The proposed project would involve work within roadways and highways which would result in temporary disruptions to traffic and the circulation system. Roads, highways and lanes through which the alignment passes could be blocked on a temporary basis. Construction equipment would be staged to the extent possible when not in use. Prior to proposed project activities, a Traffic Management Plan would be developed in coordination with Yolo County and Knights Landing. Additionally, implementation of the proposed project is anticipated to include advanced construction traffic planning and development of a traffic safety plan, which would ensure the continuation of emergency response services during construction activities. However, temporary disruptions to traffic would still occur. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Alternatives 1, 3, 6, 11, 12, 13 |
| **Utilities and Service Systems** | | | | | | | |
| **Existing Conditions:**<br>Water service in the project area is supplied from groundwater and surface water. There are a variety of municipal wastewater systems that currently serve the cities and towns of Yolo County. West Sacramento is connected to the Sacramento Regional Wastewater System. The cities of Davis, Winters, and Woodland utilize secondary treatment systems. Most unincorporated areas of the county utilize wells and septic systems (Yolo County 2009).<br>There are two public facilities for solid waste and recycling and one solid waste facility that is not open for public use. The County does not provide curbside collection services, but has executed franchise agreements to serve most communities and businesses in the unincorporated area through contracting with Waste Management of Woodland and Davis Waste Removal for waste and recycling hauling services. Communities close to Davis are served by Davis Waste Removal, and the remaining communities in the unincorporated county are served by Waste Management of Woodland (Yolo County 2009). | | | | | | | |
| Would the proposed Project connect to an existing public/private water supply? | No. The proposed project would not require connection to an existing public or private water supply. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | No. The proposed project would not generate wastewater that would need to be treated by a local wastewater treatment provider. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? | Yes. Limited amounts of water would be used during construction; however no water would be required post construction. Therefore, no impacts on water supply would result from the proposed project. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | Yes. The proposed project would generate limited amounts of solid waste during construction. No solid waste would be generated once construction is completed. The proposed project would comply with federal, state and local regulations on solid waste. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |

| Traffic and Transportation | Alternative 1<br>Impact Analysis | Alternative 3<br>Impact Analysis | Alternative 6<br>Impact Analysis | Alternative 11<br>Impact Analysis | Alternative 12<br>Impact Analysis | Alternative 13<br>Impact Analysis | Alternatives with Potential for Environmental Constraints |
|---|---|---|---|---|---|---|---|
| Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure? | No. Limited amounts of solid waste such as construction debris, municipal waste and green waste would be generated during construction. Solid waste would not be generated once construction is completed. The proposed project would not generate waste in excess of state or local standards and could be accommodated by local infrastructure. | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | Same as Alternative 1 | None |
| Would the Project require or result in the relocation or construction of new or expanded water, or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects? | Yes. The proposed project would not increase demand for solid waste disposal, water service, wastewater treatment, electric power, natural gas or telecommunications facilities, and would not require service by local utility providers. However, overhead utility lines are present along surface streets and highways in the project area, and there is potential that unseen underground utility infrastructure exists in the project area. Additionally, improvements to the treatment pond embankments would be constructed, however this is not expected to cause significant environmental effects because the facilities are already in existance and are only being improved upon. | Same as Alternative 1. However, no improvements to treatment pond embankments will be constructed. | Same as Alternative 3. | Same as Alternative 3. | Same as Alternative 3. | Same as Alternative 1 | Alternatives 1, 13 |

# Appendix C. Biological Resources Analysis

# Memo

| | |
|---|---|
| Date: | Friday, August 24, 2018 |
| Project: | Knights Landing Flood Risk Reduction Feasibility Study |
| To: | Yolo County |
| From: | Summer Pardo, Senior Biologist (HDR) |
| Reviewed: | Jafar Faghih, Project Manager (HDR) |
| Subject: | Knights Landing – Biological Constraints Analysis |

## Introduction

This memo presents a preliminary look at potential biological constraints for the proposed Knights Landing Flood Risk Reduction Feasibility Study project. Potential constraints are described below.

## Methodology

**Desktop Review**

A desktop review was undertaken to assess potential biological constraints in the project area (**Figure 1**), which included two steps to collect data on special-status species, vegetation communities, sensitive communities, protected lands, and federally-protected aquatic resources with the potential to occur in the project area. First, preliminary database searches were performed to identify aquatic resources and special-status species with the potential to occur in the project area. Second, a preliminary review of recent aerial imagery, land use maps, and the Yolo County Habitat Conservation Plan (HCP; ICF 2018) was conducted to collect site-specific data regarding habitat suitability for special-status species, and to view the location of any protected lands that overlap with the project area.

Database searches were performed on the following websites:

- U.S. Fish and Wildlife Service's (USFWS) Information Planning and Conservation (IPaC) System (2018a);
- USFWS Critical Habitat Portal (2018b);
- USFWS National Wetland Inventory (2018c);
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) in BIOS 5 (2018);
- California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (2018); and,
- U.S. Geological Survey (USGS) topographical map.

A search of the USFWS's National Wetlands Inventory was performed for the project area to identify aquatic resources that could be affected by the proposed activities. In addition, a query of the USFWS's IPaC system was performed to identify federally listed species that may occur in or adjacent to the project area. A query of the CNDDB provided a list of processed and unprocessed special-status species occurrences within the Knights Landing and Grays Bend California US

Geological Survey 7.5 minute quadrangles (quads), as well as all adjacent quads. Lastly, the CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned quads. The raw data returned from the database queries is provided in Attachment A. In addition to the database queries, a review of Land Ownership layers in CNDDB BIOS was conducted to locate protected lands, including wildlife refuges and conservation easements. The Yolo County HCP (ICF 2018) was also reviewed for consistency regarding vegetation communities identified in the project area, as well as for relevant resources and special status species.

### Reconnaissance Surveys

A site visit was conducted on July 20, 2018, to verify the results of the desktop review. HDR biologists drove on publically accessible roads throughout the project area in order to record existing vegetation communities, aquatic resources, and species observed. All portions of the project area were able to be directly observed except the southeast portion, which was inaccessible due to an absence of public roads and was, therefore, delineated using only aerial photointerpretation compared to ground-truthed vegetation communities. The results of the site visit are discussed below.

## Results

The desktop and field reviews identified five vegetation communities occurring in the project area, including irrigated agriculture, orchard, riparian, urban, and open water. Agricultural ditches and potential aquatic resources were also recorded in the project area. These resources are described in detail below, and shown on **Figure 1**. The review of the project area also identified special status species with a potential to occur in identified vegetation communities. Please refer to **Table 1** for a summary of these special status species and their associated vegetation communities. Several special-status species included in the database query results were ruled out due to absence of suitable habitat or the project area being located outside of known species ranges. These species are not included in **Table 1**; but can be referenced in **Attachment A**. Additionally, USFWS designated Critical Habitat units, conservation easements, and other protected areas are located in or adjacent to the project area and described in greater detail below.

### Vegetation Communities

#### IRRIGATED AGRICULTURE

Irrigated agriculture in the project area includes field and row crops. These are dryland crops that are irrigated throughout the growing season and can often have multiple harvests during the year. Crops observed during the July 2018 site visit include corn (*Zea mays*), alfalfa (*Medicago sativa*), sunflowers (*Helianthus* sp.), tomatoes (*Solanum* sp.), and peppers (*Capsicum* sp.). Irrigated agriculture is found throughout the project area and is considered the dominant cover type.

#### ORCHARD

Orchard crops consist of various tree grown agriculture products. All orchards observed during the July 2018 field visit consisted of English walnut (*Juglans regia*). Not all orchards were directly observed during the site visit, thus, it is possible that other nut and fruit crops are also grown in the project area.

#### RIPARIAN

Riparian community in the project area consists of multilayered woodlands with a tree overstory and a diverse shrub layer. During the July 2018 field visit, it was observed that this vegetation community

typically consists of an overstory of cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), Northern California black walnut (*Juglands hindsii*), willow (*Salix* sp.). The understory is composed of California grape (*Vitis californica*), Himalayan blackberry (*Rubus armeniacus*), poison oak (*Toxicodendron diversilobum*), elderberry (*Sambucus* sp.), and a variety of herbaceous species. Riparian communtiies are found adjacent to the Sacramento River, and along many of the sloughs, canals, and ponds throughout the project area. The riparian community along the Sacramento River is a well-developed woodland corridor; whereas the riparian communities along Knights Landing Ridge Cut and other agricultural canals are less developed and characterized as more of a willow scrub type.

#### URBAN

Urban areas mapped in the project area are limited to the dense residential portion of Knight's Landing and consist of paved or developed areas. Urban cover is also associated with scattered paved roads and rural residences throughout the project area, however, these were not mapped in detail on **Figure 1**. Vegetation present is either planted and manicured or consists of nonnative herbaceous species growing in and around paved and developed features.

#### OPEN WATER

Open water consists of major waterways characterized as permanent water features that have little-to-no vegetation present. Areas of open water include the Sacramento River along the north and east of the project area, the Knights Landing Ridge Cut on the west and south of the project area, and the "Old River" oxbow in the southeast portion of the project area.

#### AGRICULTURAL DITCHES

Agricultural ditches are narrow, freshwater, linear features that can be either channelized natural features or anthropologically created. These features are typically unvegetated or support emergent, hydrophytic plants that are adapted to regular inundation. Agricultural ditches have the potential to fall under state or federal jurisdiction, however a formal wetland delineation would need to be conducted to verify the jurisdiction of these features. These features are found throughout the project area, typically bordering or bisecting agricultural fields and orchards.

#### AQUATIC RESOURCES

Aquatic resources mapped in the project area are areas that were identified as having the potential to be categorized as wetlands, including areas prone to seasonal flooding or topographic depressions. These features are typically seasonally pooled or saturated areas fed by precipitation or flooding from adjacent rivers, and can be either natural or anthropologically created. Aquatic resources typically consist of hydrophytic plants that are adapted to regular inundation, and have the potential to fall under state and/or federal jurisdiction; however, a formal wetland delineation would need to occur to verify jurisdiction. Aquatic resources shown on **Figure 1** were identified by a combination of aerial review, National Wetlands Inventory, and field verification.

### Wildlife Observed

Wildlife observed during the July 20, 2018 site visit included black-tailed deer (*Odocoileus hemionus columbianus*), California ground squirrel (*Spermophilus beecheyi*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and peacock (*Pavo* sp.). No special-status species were observed during the site visit; however, special-status species were determined to have the potential to occur in the project area (**Table 1**) and are discussed in more detail below.

**Special Status Species**

Database query results returned a large number of special status species with a potential to occur in the vicinity of the project area (**Attachment A**). Through review of these results many species were determined to not have the potential to occur in the project area due to absence of suitable habitat or the project area being located outside of known species ranges. Table 1 provides a description of the special status species that have the potential to occur in each of the delineated vegetation communities. Any potential project related effects to these species or their habitats would require compliance with the California Environmental Quality Act as well as permits/authorizations from the appropriate state or federal agency; as a result, a site-specific biological resources assessment would need to be conducted prior to project implementation to assess impacts on special-status species and their habitats.

One aquatic species, the giant garter snake, is included in **Table 1** despite no known populations of this species occurring in the vicinity of the project area (CDFW 2018). Although this species is not expected to occur in the project area, it is included here due to the likelihood of the species needing to be addressed in any future consultation with USFWS. In addition, the Yolo HCP habitat model maps the project area as potential movement and overwintering habitat.

**Critical Habitat**

There are two USFWS designated Critical Habitat Units that intersect the project area. The portion of the Sacramento River that is adjacent to the project area is designated as critical habitat for the Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*; Unit V08) as well as the California Central Valley steelhead (*Oncorhynchus mykiss irideus*; Unit V01). These are shown on **Figure 1**. Consultation with USFWS would need to be conducted should work need to be conducted in or adjacent to these areas.

**Sensitive Habitats and Aquatic Resources**

Sensitive habitats included are those that are of special concern to resource agencies or those that are protected under various state or federal regulations. Aquatic resources provide a variety of functions for plants and wildlife. Aquatic resources provide habitat, foraging, cover, migration, and movement corridors for both special-status and common species. In addition to habitat functions, these features provide physical conveyance of surface water flows capable of handling large stormwater events.

Several aquatic resources and vegetation communities in the project area would be considered sensitive communities due to their unique hydrophytic vegetation and ability to support special-status species. These areas include the following communities: riparian, agricultural ditches, open water, and other potential aquatic resources. It is recommended that a formal delineation of aquatic resource be completed prior to any work in order to determine the level of impact to sensitive communities. Consultation and permitting through the appropriate agencies would need to occur where appropriate.

**Table 1.** Special Status Species with the Potential to Occur in the Project Area

| Scientific Name | Common Name | Federal Listing[1] | State Listing[2]/CRPR[3] | Vegetation Community Description |
|---|---|---|---|---|
| *Plants* | | | | |
| *Hibiscus lasiocarpos* var. *occidentalis* | woolly rose-mallow | -- | 1B.2 | Potential aquatic resources, agricultural ditches, riparian, open water |
| *Invertebrates* | | | | |
| *Desmocerus californicus dimorphus* | valley elderberry longhorn beetle | FT | -- | throughout the project area wherever elderberry host plant occurs, but most likely to occur in riparian areas |
| *Fishes* | | | | |
| *Acipenser medirostris* | green sturgeon | FT | SSC | open water (Sacramento River) |
| *Acipenser transmontanus* | white sturgeon | -- | SSC | open water (Sacramento River) |
| *Entosphenus tridentatus* | Pacific lamprey | -- | SSC | open water |
| *Lampetra ayresii* | river lamprey | -- | SSC | open water |
| *Lavinia exilicauda* | Sacramento hitch | -- | SSC | open water (Sacramento River) |
| *Mylopharodon conocephalus* | hardhead | -- | SSC | open water (Sacramento River) |

[1] FT = Federally Threatened, FE = Federally Endangered
[2] SSC = Species of Special Concern, ST = State Threatened, SE = State Endangered, FP = Fully Protected
[3] CRPR (California Rare Plant Ranking); 1B.2 = Moderately rare, threatened, or endangered in CA and elsewhere

| Scientific Name | Common Name | Federal Listing[1] | State Listing[2]/CRPR[3] | Vegetation Community Description |
|---|---|---|---|---|
| *Oncorhynchus mykiss irideus* | steelhead - Central Valley DPS | FT | -- | open water (Sacramento River) |
| *Oncorhynchus mykiss irideus* | steelhead - Central California Coast DPS | FT | -- | open water (Sacramento River) |
| *Oncorhynchus tshawytscha* | Chinook salmon - Central Valley spring-run ESU | FT | ST | open water (Sacramento River) |
| *Oncorhynchus tshawytscha* | Chinook salmon - Sacramento River winter-run ESU | FE | SE | open water (Sacramento River) |
| *Oncorhynchus tshawytscha* | Chinook salmon - Central Valley fall / late fall-run ESU | -- | SSC | open water (Sacramento River) |
| *Pogonichthys macrolepidotus* | Sacramento splittail | -- | SSC | open water |
| *Reptiles* | | | | |
| *Emys marmorata* | western pond turtle | -- | SSC | open water, agricultural ditches |
| *Thamnophis gigas* | giant garter snake | FT | ST | open water, agricultural ditches, adjacent uplands |
| *Birds* | | | | |
| *Agelaius tricolor* | tricolored blackbird | -- | ST/SSC | potential aquatic resources, agricultural ditches |
| *Athene cunicularia* | burrowing owl | -- | SSC | irrigated agriculture, urban |

| Scientific Name | Common Name | Federal Listing[1] | State Listing[2]/CRPR[3] | Vegetation Community Description |
|---|---|---|---|---|
| *Buteo swainsoni* | Swainson's hawk | -- | ST | foraging: orchard, irrigated agriculture<br>nesting: riparian and other large trees throughout project area |
| *Circus cyaneus* | northern harrier | -- | SSC | foraging: irrigated agriculture, orchard |
| *Coccyzus americanus occidentalis* | western yellow-billed cuckoo | FT | SE | riparian |
| *Elanus leucurus* | white-tailed kite | -- | FP | foraging: orchard, irrigated agriculture, riparian, open water<br>nesting: throughout |
| *Icteria virens* | yellow breasted chat | -- | SSC | riparian |
| *Lanius ludovicianus* | loggerhead shrike | -- | SSC | irrigated agriculture |
| *Melospiza melodia* | song sparrow (Modesto population) | -- | SSC | riparian |
| *Riparia riparia* | bank swallow | -- | ST | riparian |
| *Setophaga petechia* | yellow warbler | -- | SSC | potential aquatic resources, riparian |
| *Vireo bellii pusillus* | least Bell's vireo | FE | SE/SSC | riparian |
| *Mammals* | | | | |
| *Antrozous pallidus* | pallid bat | -- | SSC | orchard, urban |
| *Lasiurus blossevillii* | western red bat | -- | SSC | riparian |

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**Protected Areas, Conservation Easements, and Wildlife Movement Corridors**
There are no protected lands or conservation easements in the project area. However, the Sutter Bypass and Yolo Bypass are located adjacent to the southeastern portion of the project area. These bypass channels funnel Sacramento River flood waters away from urban areas. When not flooded, these areas are used largely for agricultural purposes and function as a well-established wildlife corridor. The Fremont Weir portion of the Yolo Bypass, immediately adjacent to the southeastern end of the project area, is owned by CDFW and is designated as a wildlife area. Additionally, the Sacramento River and Knights Landing Ridge Cut provide movement corridors for native resident and migratory fish species.

**Local Ordinances**
There are no county or local ordinances that affect this project area.

## Yolo HCP

The Yolo County HCP (ICF 2018) is a comprehensive, county-wide plan that identifies 12 sensitive species and the natural communities and agricultural land they use as habitat, as well as providing a streamlined permitting process to address any potential effects to these sensitive species. As the entire project area is within Yolo County, the project would fall under the guidance of this document. The 12 species that are included in the HCP are:

- Valley elderberry longhorn beetle
- California tiger salamander
- Western pond turtle
- Giant garter snake
- Swainson's hawk
- White-tailed kite
- Western yellow-billed cuckoo
- Western burrowing owl
- Least Bell's vireo
- Bank swallow
- Tricolored blackbird
- And palmate-bracted bird's beak

Of these 12 species identified in the HCP, two species were determined to have no potential to occur in the project area. These included the California tiger salamander and the palmate-bracted bird's beak. The remaining 10 species all have the potential to occur somewhere in the project area and are shown in Table 1.

The HCP identifies the natural communities of the Knights Landing area as consisting alfalfa, field crops, grain/hay crops, pasture, and deciduous fruits and nut orchards, as well as small amounts of riparian areas and lacustrine and riverine features, and urban areas. Overall, the desktop review and site visit aligned with vegetation mapping presented in the HCP, with the exception of a few minor changes.

## Conclusion

The findings in this memo represent a preliminary, high-level review of potential biological constraints in the project area and should not be considered final and all-encompassing. Based on this cursory look at biological resources, the project area appears to support suitable habitat for several special-status species; and includes various sensitive communities, aquatic resources, and designated critical habitat. Proposed project activities have the potential to impact any of the aforementioned biological resources, should they be present in the vicinity of the proposed work area. Prior to project implementation, consultation with the agencies and acquisition of permits may be necessary.

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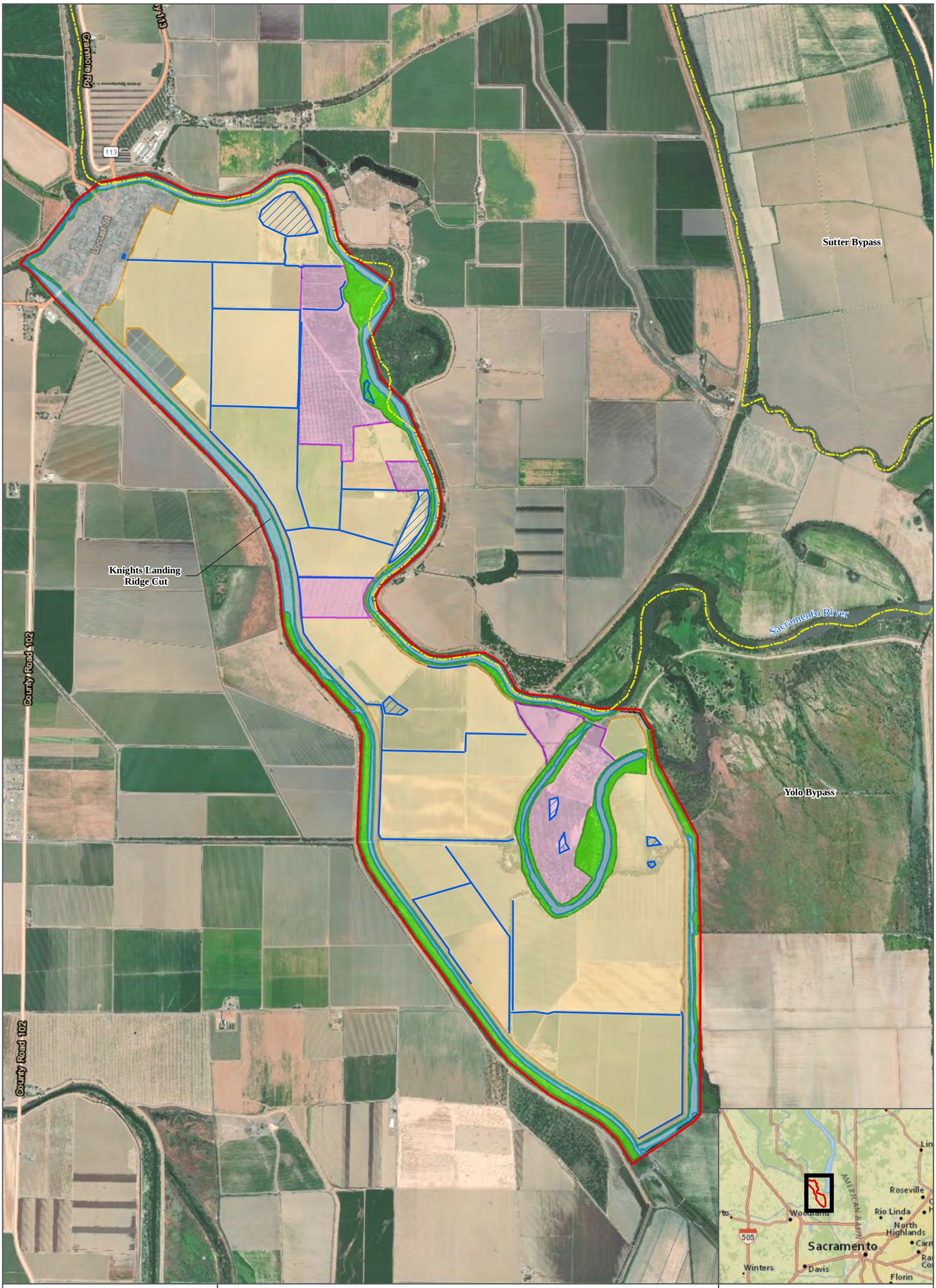


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- Project Area
- Potential Aquatic Resources
- Agricultural Ditches
- Critical Habitat for *Oncorhynchus tshawytscha* (Chinook Salmon) and *Oncorhynchus mykiss* (Steelhead)

**Vegetation Communities**

- Irrigated Agriculture
- Orchard
- Riparian
- Urban
- Open Water

# KNIGHTS LANDING FLOOD RISK REDUCTION FEASIBILITY STUDY

FIGURE 1

PATH: H:\GIS_PROJECTS\YOLO_COUNTY_SOW\MXD\ATTACHMENT_YOLO_COUNTY_KNIGHTS_LANDING_11X17.MXD - USER: STIDBALL - DATE: 12/27/2018

# Attachment A. Database Results

CNDDB Query
12 Quads, centered on Knights Landing and Grays Bend

| SNAME | COUNT | CNAME | ELMCODE | FEDLIST | CALLIST | GRANK | SRANK | RPLANTRANK | CDFWSTATUS |
|---|---|---|---|---|---|---|---|---|---|
| *Agelaius tricolor* | 29 | tricolored blackbird | ABPBXB0020 | None | Candidate Endangered | G2G3 | S1S2 | | SSC |
| *Ambystoma californiense* | 1 | California tiger salamander | AAAAA01180 | Threatened | Threatened | G2G3 | S2S3 | | WL |
| *Anthicus antiochensis* | 1 | Antioch Dunes anthicid beetle | IICOL49020 | None | None | G1 | S1 | | |
| *Anthicus sacramento* | 1 | Sacramento anthicid beetle | IICOL49010 | None | None | G1 | S1 | | |
| *Antrozous pallidus* | 2 | pallid bat | AMACC10010 | None | None | G5 | S3 | | SSC |
| *Archoplites interruptus* | 1 | Sacramento perch | AFCQB07010 | None | None | G2G3 | S1 | | SSC |
| *Ardea alba* | 3 | great egret | ABNGA04040 | None | None | G5 | S4 | | |
| *Ardea herodias* | 2 | great blue heron | ABNGA04010 | None | None | G5 | S4 | | |
| *Astragalus tener var. ferrisiae* | 2 | Ferris' milk-vetch | PDFAB0F8R3 | None | None | G2T1 | S1 | 1B.1 | |
| *Astragalus tener var. tener* | 3 | alkali milk-vetch | PDFAB0F8R1 | None | None | G2T2 | S2 | 1B.2 | |
| *Athene cunicularia* | 35 | burrowing owl | ABNSB10010 | None | None | G4 | S3 | | SSC |
| *Atriplex cordulata var. cordulata* | 1 | heartscale | PDCHE040B0 | None | None | G3T2 | S2 | 1B.2 | |
| *Atriplex depressa* | 5 | brittlescale | PDCHE042L0 | None | None | G2 | S2 | 1B.2 | |
| *Bombus crotchii* | 2 | Crotch bumble bee | IIHYM24480 | None | None | G3G4 | S1S2 | | |
| *Bombus occidentalis* | 2 | western bumble bee | IIHYM24250 | None | None | G2G3 | S1 | | |
| *Branchinecta lynchi* | 2 | vernal pool fairy shrimp | ICBRA03030 | Threatened | None | G3 | S3 | | |
| *Buteo swainsoni* | 487 | Swainson's hawk | ABNKC19070 | None | Threatened | G5 | S3 | | |
| *Centromadia parryi ssp. parryi* | 1 | pappose tarplant | PDAST4R0P2 | None | None | G3T2 | S2 | 1B.2 | |
| *Charadrius alexandrinus nivosus* | 2 | western snowy plover | ABNNB03031 | Threatened | None | G3T3 | S2S3 | | SSC |
| *Charadrius montanus* | 8 | mountain plover | ABNNB03100 | None | None | G3 | S2S3 | | SSC |
| *Chloropyron palmatum* | 3 | palmate-bracted salty bird's-beak | PDSCR0J0J0 | Endangered | Endangered | G1 | S1 | 1B.1 | |
| *Cicindela hirticollis abrupta* | 5 | Sacramento Valley tiger beetle | IICOL02106 | None | None | G5TH | SH | | |
| *Circus cyaneus* | 1 | northern harrier | ABNKC11010 | None | None | G5 | S3 | | SSC |
| *Coastal and Valley Freshwater Marsh* | 1 | Coastal and Valley Freshwater Marsh | CTT52410CA | None | None | G3 | S2.1 | | |
| *Coccyzus americanus occidentalis* | 7 | western yellow-billed cuckoo | ABNRB02022 | Threatened | Endangered | G5T2T3 | S1 | | |
| *Desmocerus californicus dimorphus* | 18 | valley elderberry longhorn beetle | IICOL48011 | Threatened | None | G3T2 | S2 | | |
| *Egretta thula* | 1 | snowy egret | ABNGA06030 | None | None | G5 | S4 | | |
| *Elanus leucurus* | 6 | white-tailed kite | ABNKC06010 | None | None | G5 | S3S4 | | FP |
| *Elderberry Savanna* | 1 | Elderberry Savanna | CTT63440CA | None | None | G2 | S2.1 | | |
| *Emys marmorata* | 4 | western pond turtle | ARAAD02030 | None | None | G3G4 | S3 | | SSC |
| *Extriplex joaquinana* | 7 | San Joaquin spearscale | PDCHE041F3 | None | None | G2 | S2 | 1B.2 | |
| *Falco columbarius* | 1 | merlin | ABNKD06030 | None | None | G5 | S3S4 | | WL |
| *Great Valley Cottonwood Riparian Forest* | 1 | Great Valley Cottonwood Riparian Forest | CTT61410CA | None | None | G2 | S2.1 | | |
| *Great Valley Mixed Riparian Forest* | 6 | Great Valley Mixed Riparian Forest | CTT61420CA | None | None | G2 | S2.2 | | |
| *Hibiscus lasiocarpos var. occidentalis* | 6 | woolly rose-mallow | PDMAL0H0R3 | None | None | G5T3 | S3 | 1B.2 | |
| *Lasionycteris noctivagans* | 2 | silver-haired bat | AMACC02010 | None | None | G5 | S3S4 | | |
| *Lasiurus blossevillii* | 1 | western red bat | AMACC05060 | None | None | G5 | S3 | | SSC |
| *Lasiurus cinereus* | 4 | hoary bat | AMACC05030 | None | None | G5 | S4 | | |
| *Laterallus jamaicensis coturniculus* | 1 | California black rail | ABNME03041 | None | Threatened | G3G4T1 | S1 | | FP |
| *Lepidium latipes var. heckardii* | 4 | Heckard's pepper-grass | PDBRA1M0K1 | None | None | G4T1 | S1 | 1B.2 | |
| *Lepidurus packardi* | 7 | vernal pool tadpole shrimp | ICBRA10010 | Endangered | None | G4 | S3S4 | | |
| *Linderiella occidentalis* | 5 | California linderiella | ICBRA06010 | None | None | G2G3 | S2S3 | | |
| *Melospiza melodia* | 3 | song sparrow ("Modesto" population) | ABPBXA3010 | None | None | G5 | S3? | | SSC |
| *Myrmosula pacifica* | 1 | Antioch multilid wasp | IIHYM15010 | None | None | GH | SH | | |
| *Nycticorax nycticorax* | 2 | black-crowned night heron | ABNGA11010 | None | None | G5 | S4 | | |
| *Oncorhynchus mykiss irideus pop. 11* | 5 | steelhead - Central Valley DPS | AFCHA0209K | Threatened | None | G5T2Q | S2 | | |
| *Oncorhynchus tshawytscha pop. 6* | 2 | chinook salmon - Central Valley spring-run ESU | AFCHA0205A | Threatened | Threatened | G5 | S1 | | |
| *Oncorhynchus tshawytscha pop. 7* | 1 | chinook salmon - Sacramento River winter-run ESU | AFCHA0205B | Endangered | Endangered | G5 | S1 | | |
| *Plegadis chihi* | 1 | white-faced ibis | ABNGE02020 | None | None | G5 | S3S4 | | WL |
| *Pogonichthys macrolepidotus* | 1 | Sacramento splittail | AFCJB34020 | None | None | GNR | S3 | | SSC |

CNDDB Query
12 Quads, centered on Knights Landing and Grays Bend

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Progne subis* | 1 | purple martin | ABPAU01010 | None | None | G5 | S3 | | SSC |
| *Puccinellia simplex* | 11 | California alkali grass | PMPOA53110 | None | None | G3 | S2 | 1B.2 | |
| *Riparia riparia* | 24 | bank swallow | ABPAU08010 | None | Threatened | G5 | S2 | | |
| *Sagittaria sanfordii* | 1 | Sanford's arrowhead | PMALI040Q0 | None | None | G3 | S3 | 1B.2 | |
| *Spirinchus thaleichthys* | 2 | longfin smelt | AFCHB03010 | Candidate | Threatened | G5 | S1 | | SSC |
| *Symphyotrichum lentum* | 1 | Suisun Marsh aster | PDASTE8470 | None | None | G2 | S2 | 1B.2 | |
| *Taxidea taxus* | 3 | American badger | AMAJF04010 | None | None | G5 | S3 | | SSC |
| *Thaleichthys pacificus* | 1 | eulachon | AFCHB04010 | Threatened | None | G5 | S3 | | |
| *Thamnophis gigas* | 152 | giant gartersnake | ARADB36150 | Threatened | Threatened | G2 | S2 | | |
| *Trichocoronis wrightii var. wrightii* | 1 | Wright's trichocoronis | PDAST9F031 | None | None | G4T3 | S1 | 2B.1 | |
| *Trifolium hydrophilum* | 1 | saline clover | PDFAB400R5 | None | None | G2 | S2 | 1B.2 | |
| *Valley Oak Woodland* | 1 | Valley Oak Woodland | CTT71130CA | None | None | G3 | S2.1 | | |
| *Vireo bellii pusillus* | 2 | least Bell's vireo | ABPBW01114 | Endangered | Endangered | G5T2 | S2 | | |

CNPS California Native Plant Society

# Plant List

## Inventory of Rare and Endangered Plants

**16** matches found. *Click on scientific name for details*

**Search Criteria**

Found in Quads 3812176, 3812166, 3812167, 3812177, 3812187, 3812186, 3812185, 3812175, 3812165, 3812155 3812156 and 3812157;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

| Scientific Name | Common Name | Family | Lifeform | Blooming Period | CA Rare Plant Rank | State Rank | Global Rank |
|---|---|---|---|---|---|---|---|
| Astragalus pauperculus | depauperate milk-vetch | Fabaceae | annual herb | Mar-Jun | 4.3 | S4 | G4 |
| Astragalus tener var. ferrisiae | Ferris' milk-vetch | Fabaceae | annual herb | Apr-May | 1B.1 | S1 | G2T1 |
| Astragalus tener var. tener | alkali milk-vetch | Fabaceae | annual herb | Mar-Jun | 1B.2 | S2 | G2T2 |
| Atriplex cordulata var. cordulata | heartscale | Chenopodiaceae | annual herb | Apr-Oct | 1B.2 | S2 | G3T2 |
| Atriplex depressa | brittlescale | Chenopodiaceae | annual herb | Apr-Oct | 1B.2 | S2 | G2 |
| Centromadia parryi ssp. rudis | Parry's rough tarplant | Asteraceae | annual herb | May-Oct | 4.2 | S3 | G3T3 |
| Chloropyron palmatum | palmate-bracted bird's-beak | Orobanchaceae | annual herb (hemiparasitic) | May-Oct | 1B.1 | S1 | G1 |
| Extriplex joaquinana | San Joaquin spearscale | Chenopodiaceae | annual herb | Apr-Oct | 1B.2 | S2 | G2 |
| Hibiscus lasiocarpos var. occidentalis | woolly rose-mallow | Malvaceae | perennial rhizomatous herb (emergent) | Jun-Sep | 1B.2 | S3 | G5T3 |
| Lepidium latipes var. heckardii | Heckard's pepper-grass | Brassicaceae | annual herb | Mar-May | 1B.2 | S1 | G4T1 |
| Lessingia hololeuca | woolly-headed lessingia | Asteraceae | annual herb | Jun-Oct | 3 | S3? | G3? |
| Puccinellia simplex | California alkali grass | Poaceae | annual herb | Mar-May | 1B.2 | S2 | G3 |
| Sagittaria sanfordii | Sanford's arrowhead | Alismataceae | perennial rhizomatous herb (emergent) | May-Oct(Nov) | 1B.2 | S3 | G3 |
| Symphyotrichum lentum | Suisun Marsh aster | Asteraceae | perennial rhizomatous herb | (Apr)May-Nov | 1B.2 | S2 | G2 |
| Trichocoronis wrightii var. wrightii | Wright's trichocoronis | Asteraceae | annual herb | May-Sep | 2B.1 | S1 | G4T3 |
| Trifolium hydrophilum | saline clover | Fabaceae | annual herb | Apr-Jun | 1B.2 | S2 | G2 |

**Suggested Citation**

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rareplants@cnps.org

**IPaC** **U.S. Fish & Wildlife Service**

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.



## Location

Sutter and Yolo counties, California


## Local offices

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

San Francisco Bay-Delta Fish And Wildlife

(916) 930-5603
(916) 930-5654

650 Capitol Mall
Suite 8-300
Sacramento, CA 95814

http://kim_squires@fws.gov

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.



1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Birds

| NAME | STATUS |
|---|---|

Western Snowy Plover Charadrius alexandrinus nivosus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/8035

Yellow-billed Cuckoo Coccyzus americanus — Threatened
There is **proposed** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/3911

# Reptiles

| NAME | STATUS |
|---|---|
| Giant Garter Snake Thamnophis gigas<br>No critical habitat has been designated for this species.<br>https://ecos.fws.gov/ecp/species/4482 | Threatened |

# Amphibians

| NAME | STATUS |
|---|---|
| California Red-legged Frog Rana draytonii<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/2891 | Threatened |
| California Tiger Salamander Ambystoma californiense<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/2076 | Threatened |

# Fishes

| NAME | STATUS |
|---|---|
| Delta Smelt Hypomesus transpacificus<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/321 | Threatened |

# Insects

| NAME | STATUS |
|---|---|
| Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/7850 | Threatened |

# Crustaceans

| NAME | STATUS |
|---|---|
| Vernal Pool Fairy Shrimp Branchinecta lynchi<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/498 | Threatened |
| Vernal Pool Tadpole Shrimp Lepidurus packardi<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/2246 | Endangered |

# Flowering Plants

| NAME | STATUS |
|---|---|
| Palmate-bracted Bird's Beak Cordylanthus palmatus<br>No critical habitat has been designated for this species.<br>https://ecos.fws.gov/ecp/species/1616 | Endangered |

# Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/

conservation-measures.php

- Nationwide conservation measures for birds
  http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.



| NAME | BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.) |
|---|---|
| Bald Eagle Haliaeetus leucocephalus<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.<br>https://ecos.fws.gov/ecp/species/1626 | Breeds Jan 1 to Aug 31 |
| Black Turnstone Arenaria melanocephala<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Song Sparrow Melospiza melodia — Breeds Feb 20 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Spotted Towhee Pipilo maculatus clementae — Breeds Apr 15 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/4243

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Whimbrel Numenius phaeopus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9483

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow-billed Magpie Pica nuttalli — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9726



# Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

**Probability of Presence (■)**

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

**Breeding Season** (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

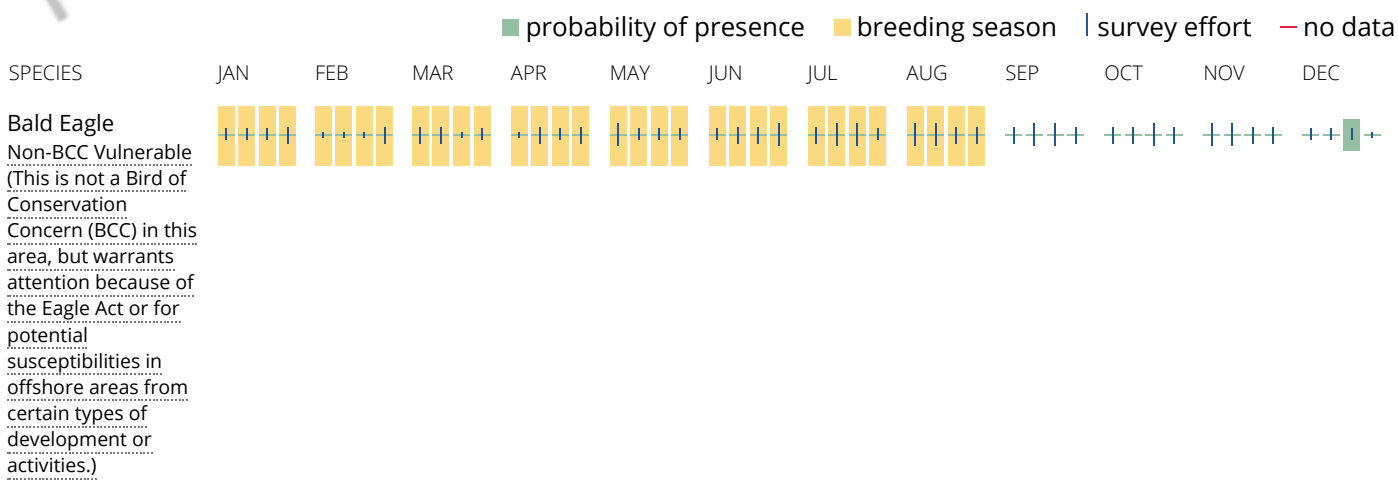
**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

**No Data** (–)
A week is marked as having no data if there were no survey events for that week.

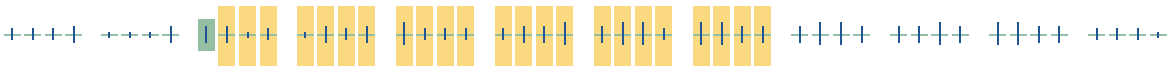
**Survey Timeframe**
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



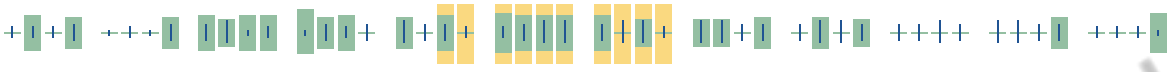


Black Turnstone
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

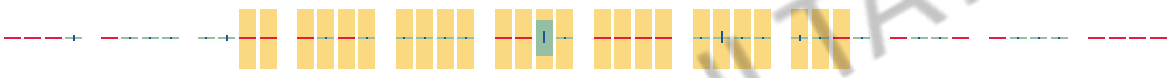
Burrowing Owl
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



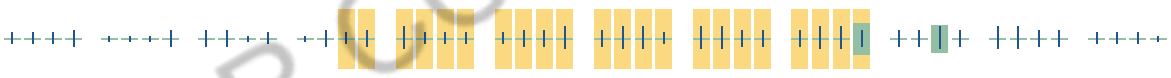
Common Yellowthroat
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Lawrence's Goldfinch
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Lewis's Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Long-billed Curlew
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Nuttall's Woodpecker
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Oak Titmouse
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

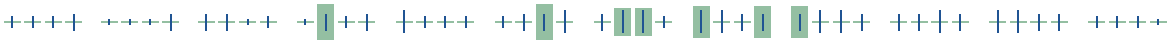
Song Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)


Spotted Towhee
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

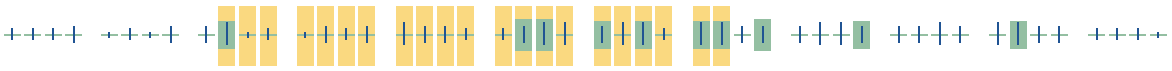
Tricolored Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Whimbrel
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Wrentit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Yellow-billed Magpie
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look

carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

# Facilities

## Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1Kx
- PEM1C
- PEM1F
- PEM1A
- PEM1Fx
- PEM1Cx

FRESHWATER FORESTED/SHRUB WETLAND

- PFOA
- PFOKx
- PSSKx
- PSSA
- PFOC
- PSSC

FRESHWATER POND

- PABH
- PUBKx
- PUBFx
- PUBH
- PUBHx
- PUBF

RIVERINE

- R2UBH
- R2UBHx
- R5UBFx
- R4SBCx
- R2USAx
- R2USA
- R4SBC
- R5UBF

A full description for each wetland code can be found at the National Wetlands Inventory website

**Data limitations**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

**Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

# Appendix D. Cultural Resources Analysis

# Technical Memorandum

| | |
|---|---|
| Date: | Friday, August 24, 2018 |
| Project: | Knights Landing Flood Risk Reduction Feasibility Study |
| To: | Yolo County |
| From: | HDR Engineering, Inc. |
| Subject: | Cultural Resources: Summary of Records Search Results and Feasibility Analysis |

## Project Overview

The County of Yolo, under the California Department of Water Resources Small Community Flood Risk Reduction Program, is preparing a Knights Landing Flood Risk Reduction Feasibility Study (Project) in Yolo and Sutter counties, California. HDR has been contracted to help identify environmental constraints for the Project, including the potential for the Project to impact cultural resources within the project footprints, or areas of potential levee improvement within the Project area. The Project area encompasses the area bounded by the State Plan of Flood Control levee system along the right bank of the Sacramento River, the left levee of Knights Landing Ridge Cut, the south levee of the Colusa Drain, and the west levee of the Yolo Bypass. The Project footprint includes the community of Knights Landing at the north end and cropland south of the community. This memo presents the results of the records search conducted and a high-level analysis of the potential for cultural resources in the Project footprint. The purpose of the records search and high-level review was to identify the potential for historical properties eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) within the Project footprint and a 0.25-mile buffer.

## Methodology

### Records Search Methods

The records search began with written requests on July 9, 2018, to the Northwest Information Center and the Northeast Information Center. Data were requested on the project footprint plus a 0.25-mile buffer. Search results were received from the Northeast Information Center on August 6, 2018, and from the Northwest Information Center on August 7, 2018. The information requested was previous cultural resources investigations, and previously recorded archaeological sites and built environment resources, including the OHP Historic Properties Directory, the OHP Archaeological Determinations of Eligibility, and the California Inventory of Historical Resources (1976). Information was also requested on the Caltrans Bridge Survey, ethnographic information, and local inventories, where present.

# Results

### Records Search Results

The records search results identified 58 previously conducted cultural resources investigations, 10 previously recorded archaeological sites, 36 previously recorded built environment resources, and one additional cultural resource.

### Previous Cultural Resources Investigations

There have been more than 40 previous cultural resources investigations intersecting the Project footprint (**Table 1**). Previous investigations were primarily archaeological or architectural/historical field studies and were conducted for river bank maintenance and flood control projects, levee repair and rehabilitation projects, housing developments, pipelines, and energy facility, and historical studies on the railroad and bridges. These studies documented 200+ prehistoric and historical archaeological sites and historical built environment resources.

**Table 1. Previous Cultural Resources Investigations within the Project Area**

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| Bakic, Tracy D., and Mary L. Maniery | 1998 | Cultural Resource Inventory and Evaluation for the Carquinez Straits Transmission Span Replacement Project, Contra Costa and Solano Counties, California | Archaeological, Architectural/Historical, Evaluation, Field Study | 020045 | 2 Resources Recorded |
| Bakic, Tracy D., and Mary L. Maniery | 1998 | Historic American Engineering Record, Colgate-Oakland Transmission Line, HAER No. CA-190 | Architectural/Historical, Other research | 020045 | 1 Resource Recorded |
| Bakic, Tracy D., and Mary L. Maniery | 1998 | Historic American Engineering Record, Carquinez Straits Transmission Span, HAER No. CA-191 | Architectural/Historical, Other research | 020045 | 1 Resource Recorded |
| Billat, Lorna | 2012 | Collocation Submission Packet; Knights Landing; SAC-293; 42445 County Road 116, Knights Landing, Yolo County | Archaeological, Architectural/Historical, Field Study | 039560 | Negative survey |
| Bouey, Paul D. | 1989 | Cultural Resources Inventory and Evaluation: Sacramento River Bank Protection (Unit 44) Project | Archaeological, Field Study | 010741 | Negative survey |
| Busby, Colin I. | 2004 | Archaeological Records Search and Field Inventory, Tentative Subdivision Map No. 4708, Knights Landing, Yolo County (letter report) | Archaeological, Field Study | 030613 | Negative survey |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| Busby, Colin I. | 2006 | Enhanced Field Inventory and Presence/Absence Testing (Excavation of Shovel Test Units & Rapid Recovery Units) of White Property (Subdivision Map No. 4708), Vicinity of CA-YOL-7, Knights Landing, Yolo County | Archaeological, Excavation, Field Study | 032994 | 5 Resources Recorded |
| Crull, Scott, and Craig Hanson | 2015 | The History and Archaeology of the California-Pacific; the Central-Pacific; the Southern-Pacific; and the California-Northern Railroad Routes Through Yolo County, California: 1869-Present | Architectural/Historical, Field Study | 046943 | 22 Resources Recorded |
| Donaldson, Milford Wayne, and Nancy Haley | 2010 | COE080730K; Continued Consultation Regarding Section 404 of the Clean Water Act Authorization for the PG&E Line 406 and Line 407 Pipeline Project in Placer, Sacramento, Sutter, and Yolo Counties, California (Regulatory Division SPK-2007-01175) | OHP Correspondence | 036479 | 1 Resource Recorded |
| Egherman , R., and B. Hatoff | 2002 | Roseville Energy Facility, Cultural Resources, Appendix J-1 of Application for Certification | Archaeological, Architectural/Historical, Field Study | 025665 | 19 Resources Recorded |
| Gilbert, Rebecca H. | 2011 | Knights Landing Outfall Gates Rehabilitation Project, Archaeological Survey Report, Yolo County, California | Archaeological, Field Study | 038279 | 6 Resources Recorded |
| Glover, Leslie C., and Paul D. Bouey | 1990 | Sacramento River Flood Control System Evaluation, Mid-Valley Area Cultural Resources Survey, Colusa, Sacramento, Sutter, Yolo, and Yuba Counties | Archaeological, Excavation, Field Study | 012190 | 1 Resource Recorded |
| Glover, Leslie C., and Paul D. Bouey | 1990 | Sacramento River Flood Control System Evaluation, Mid-Valley Area Cultural Resources Survey, Colusa, Sacramento, Sutter, Yolo, and Yuba Counties, California | Archaeological, Evaluation, Field Study | 001091 | 1 Resource Recorded |
| Hale, Mark R. , Michael S. | 1995 | Archaeological Inventory Report, Lower Sacramento River Locality, Cultural | Archaeological, Evaluation, Field Study | 022049 | 1 Resource Recorded |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| Kelly, and Elena Wilson | | Resources Inventory and Evaluation, American River Watershed Investigation, California | | | |
| Havelaar, Christian, Melissa Cascella, Patricia Ambacher, and Gabriel Roark | 2012 | Historic Properties Treatment Plan, Sacramento River Bank Protection Project | Archaeological, Evaluation, Field Study, Management/Planning, Other research | 038637 | 13 Resources Recorded |
| Huberland, Amy, and Lisa Westwood | 2001 | Cultural Resources Monitoring Report for the Level (3) Fiber Optic Project, Yolo, Colusa, Glenn, Tehama, and Shasta Counties, California | Archaeological, Architectural/Historical, Excavation, Monitoring | 024035 | 18 Resources Recorded |
| Johnson, Jerald Jay, and Patti Johnson | 1974 | Cultural Resources Along the Sacramento River from Keswick Dam to Sacramento | Other research | 001137 | 139 Resources Recorded |
| Leach-Palm, Laura, Pat Mikkelsen, Paul Brandy, Jay King, Lindsay Hartman, and Bryan Larson | 2008 | Cultural Resources Inventory of Caltrans District 3 Rural Conventional Highways in Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo, and Yuba Counties | Archaeological, Field Study | 035042 | 62 Resources Recorded |
| Loftus, Shannon L. | 2010 | Cultural Resource Records Search and Site Survey, Skyway Towers Site CA-0366B, Knights Landing, 42445 County Road 116, Woodland, Yolo County, California 95645 | Archaeological, Field Study | 038915 | 1 Resource Recorded |
| Lydecker, Andrew D.W. | 2010 | Cultural Resources Remote Sensing Survey and Diver Investigations at Selected Target Locations, Sacramento River Bank Protection Project (SRBPP), Sacramento River and Tributaries | Archaeological, Evaluation, Field Study, Other research | 038635 | 39 Resources Recorded |
| Martinez, Amanda L. and Cindy J. Arrington | 2008 | Final Cultural Resources Survey for the Levee Repair Project at 16 Locations in Glenn, Sacramento, Solano, Sutter, Yolo, and Yuba Counties, California | Archaeological, Field Study | 009795 | 1 Resource Recorded |
| McGowan, Dana | 1991 | Archaeological Survey Report for the Alternate Route A Alignment of the | Archaeological, Field Study | 007208 | Negative survey |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| | | Knights Landing Eastside Gathering System, Yolo and Sutter Counties, California | | | |
| McMorris, Christopher | 2004 | Caltrans Historic Bridge Inventory Update: Metal Truss, Moveable, and Steel Arch Bridges, Contract: 43A0086, Task Order: 01, EA: 43-984433, Volume I: Report and Figures | Architectural/Historical, Evaluation, Field Study | 030907 | 18 Resources Recorded |
| Nadolski, John | 2014 | Cultural Resources Inventory Report, Cultural Resources Investigation for the Yolo Bypass Habitat Restoration Program, Parus Consulting, Inc. | Archaeological, Field Study | 047576 | 5 Resources Recorded |
| Offermann, Janis | 2007 | Fremont Weir Gaging Station Relocation | Archaeological, Field Study | 008909 | Negative survey |
| Offermann, Janis | 1989 | Archaeological Survey Report, Knights Landing Ridge Cut Bridge replacement and road improvements, 03-Yol-113 P.M. R 21.2/21.4 03207-340900 | Archaeological, Field Study | 011572 | Negative survey |
| Offermann, Janis | 1995 | Negative Archaeological Survey Report, proposed replacement of Bridge #22C-012 across the Knights Landing Ridge Cut on County Road 16 in eastern Yolo County, 03-YOL-CR 165 EA 965100 | Archaeological, Field Study | 016953 | Negative survey |
| Perry, Richard M. | 2012 | CESPK-PD-RC Memorandum for Record Field Check of Perry and Montag's 2004 Mid-Valley Cultural Resources Survey and Recordation of an Additional Pump House and the Sacramento River Levee (letter report) | Archaeological, Architectural/Historical, Field Study | 035368 | 4 Resources Recorded |
| Perry, Richard, and Melissa Montag | 2004 | CESPK-PD-R, Memorandum for Record, Archaeological Survey of Sacramento River Flood Control System Evaluation, Mid-Valley Area, Phase III, Sacramento County, Yolo County, California | Archaeological, Architectural/Historical, Field Study | 035368 | 3 Resources Recorded |
| Shapiro, Lisa A. | 1992 | Cultural Resources Inventory for the Colusa Basin/Knights Landing | Archaeological, Architectural/Historical, Field Study | 017949 | 7 Resources Recorded |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| | | Ridge Cut Levees Project, Colusa and Yolo Counties, California, Contract No. DACWO591P1469. | | | |
| Stapleton, Dylan and Cindy J. Arrington | 2016 | Cultural Resources Inventory for the 11010 County Road 116B Project Yolo County, California | Archaeological, Field Study | 048684 | 1 Resource Recorded |
| Stokes and Jones Associates, Inc. | 1991 | Archaeological Survey Report for the Alternate Route A Alignment of the Knights Landing Eastside Gathering System, Yolo and Sutter Counties, California | Archaeological, Field Study | 012691 | Negative survey |
| Syda, Keith, and William Shapiro | 1997 | An Archaeological Assessment Within the Yolo County Service Area 6, Knights Landing Ridgecut Unit 2, and West Levee, Yolo Bypass Unit 1, Yolo and Sutter Counties, California: Part of the Cultural Resources Inventory and Evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 Levee Rehabilitation on the Feather, Bear, Sacramento, and San Joaquin Rivers System, COE Water Basin System Designation Sac-04, DACW05-97-P-0465 | Archaeological, Field Study | 019688 | 5 Resources Recorded |
| Syda, Keith, and William Shapiro | 1997 | An Archaeological Assessment Within the Left and Right Banks of Cache Creek, Cache Creek East Training Levee, Right Bank of Yolo Bypass ( Unit 2), and Right Bank of Knights Landing Ridge Cut (Unit 1), Yolo County, California, Part of the Cultural Resources Inventory and Evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 Levee Rehabilitation on the Feather, Bear, Sacramento and San Joaquin Rivers System, COE Water Basin System Designations Sac 50 and | Archaeological, Field Study | 020007 | 5 Resources Recorded |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| | | Sac 55, DACW05-97-P-0465 | | | |
| URS | 2006 | Cultural Resources Evaluation for the Emergency Levee-Banks Repairs of 16 Critical Erosion Sites | Archaeological, Field Study | 34069 | 1 Resource Recorded |
| URS | 2006 | Architectural History and Levee Evaluations for the Proposed Levee Repair Project | Architectural/Historical, Management/Planning | 34069 | 16 Resources Recorded |
| URS | 2006 | Cultural Resources Evaluation for the Proposed Levee Repair Design Project at 16SAC145.9L | Archaeological, Architectural/Historical, Field Study, Management/Planning | 34069 | N/A |
| URS | 2014 | Cultural Resources Technical Report, Task Order U120 Knights Landing, Non-Urban Levee Evaluations, Knights Landing, Yolo County, California | Archaeological, Evaluation, Field Study | 45840 | Negative Survey |
| Wilson, Kenneth L. | 1978 | Sacramento River Bank Protection Unit 34 Cultural Resources Survey Final Report | Archaeological, Field Study | 001141 | 1 Resource Recorded |
| Wilson, Kenneth L. | 1978 | Sacramento River Bank Protection, Unit 34, Cultural Resources Survey | Archaeological, Field Study | 002947 | Negative survey |
| Wohlgemuth, Eric , Laura Leach-Palm, Sharon Waechter, Mary Maniery, Cindy Baker, and Stephen Wee | 2008 | Cultural Resources Survey for the PG&E Line 407 Project, Placer, Sacramento, Sutter, and Yolo Counties, California | Archaeological, Field Study | 036479 | 32 Resources Recorded |

In addition, there have been 13 cultural resource investigations within 0.25 mile of the Project footprint (**Table 2**). Investigations were primarily archaeological field studies and were conducted for levee repair and rehabilitation projects, highway projects, a telecommunications project, a well relief system, a transmission line, and a rodent damage assessment and repair project. The information provided by the information centers revealed that four of the previous surveys were negative, two resulted in the recordation of a single cultural resource, one resulted in the recordation of four resources, and one survey covering multiple highway projects resulted in the recordation of 119 cultural resources.

**Table 2. Previous Cultural Resources Investigations within the 0.25-mile Radius Surrounding the Project Area**

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| Anonymous | 1984 | Sacramento River Bank Protection Units 37 and 38, Cultural Resources Survey | Archaeological, Field Study | 034211 | Negative Survey |
| Bartroy, Kevin M. | 2004 | Cultural Resource Assessment, Cingular Wireless Facility No. SN-170-C1, City of Knights Landing, Sutter County, California | Archaeological, Field Study | 005927 | Negative Survey |
| Deitz, Frank | 1998 | Cultural Resources Assessment within Reclamation District 1500 Sutter County, California (Sac 3) For: Cultural Resource Inventory and Evaluation for the U.S. Army Corps of Engineers, Sacramento District PL 84-99 Levee Rehabilitation on the Feather… | N/A | 003134 | N/A |
| Hoffman, Robin and Paul Zimmer | 2016 | Rodent Abatement and Damage Repair Activities Project, Archaeological Sensitivity Assessment, Butte, Glenn, and Sutter Counties, California | Literature Search, Other Research | 013478 | Negative Survey |
| Johnson, Jay, and Patti Johnson | 1974 | Reconnaissance Archaeological Survey of 151 Locations on the Sacramento River Drainage from Elder Creek in the North to Rio Vista in the South | Archaeological, Field Study | 001139 | 1 Resource Recorded |
| Leach-Palm, Laura, Pat Mikkelsen, Paul Brandy, Jay King, and Lindsay Hartman | 2008 | Cultural Resources Inventory of Caltrans District 3 Rural Conventional Highways in Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo and Yuba Counties | Archaeological, Field Study | 009539 | 119 Resources Recorded |
| Martinez, Amanda L. and Nancy E. Sikes | 2008 | Cultural Resources Survey for the Levee Repair Project at 20 Locations in Colusa, Sacramento, Sutter, Tehama, and Yolo Counties, California | Archaeological, Field Study | 009874 | Negative Survey |
| Millett, Marshall | 2008 | Cultural Resources Constraints Study for the Replacement of 9 Poles on the Nicolaus-Wilkins Slough | Archaeological, Field Study | 044865 | 1 Resource Recorded |

| Author(s) | Date | Report Title | Study Type | IC File No. | Results |
|---|---|---|---|---|---|
| | | High Voltage Transmission Line, Colusa and Sutter Counties, CA | | | |
| Shapiro, William, Keith Syda, and Lisa Shapiro | 1997 | An Archaeological Assessment for the Sutter Levee District No. 1 Relief Well System in Sutter County, California Part of the Cultural Resources Inventory and Evaluation for U.S. Army of Corps of Engineers, Sacramento District, PL 84-99 Levee | N/A | 003134 | N/A |
| Shapiro, William, Keith Syda, and Lisa Shapiro | 1997 | An Archaeological Assessment for the Sutter Levee District No. 1 Relief Well System in Sutter County, California | Archaeological, Field Study | 003134 | 4 Resources Recorded |
| Shapiro, William, and Keith Syda | 1997 | An Archaeological Assessment within Reclamation District 1500 and the Tisdale Bypass, Sutter County, California Part of the Cultural Resources Inventory and Evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 Levee Rehabilitation | N/A | 003134 | N/A |
| Shapiro, William, and Keith Syda | 1997 | Addendum Report for an Archaeological Assessment within Reclamation District 1500, Sutter County, California Part of the Cultural Resources Inventory and Evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 Levee Rehabilitation | N/A | 003134 | N/A |
| Shapiro, William, and Keith Syda | 1997 | An Addendum Archaeological Assessment for the Sutter Levee District No. 1, Sutter County, California Part of the Cultural Resources Inventory and Evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 Levee Rehabilitation on the… | N/A | 003134 | N/A |

## Previously Recorded Archaeological Sites

The records search identified three prehistoric archaeological sites and two historic archaeological sites intersecting the Project footprint. An additional five prehistoric sites were identified within 0.25 mile. All of the archaeological sites are unevaluated for the NRHP and CRHR.

#### PREHISTORIC SITES

There are three recorded prehistoric archaeological sites within the Project footprint, and an additional five sites within 0.25 mile (**Table 3**). Previously recorded site types include a burial, habitation debris, hearth/pit features, bedrock milling features, an artifact scatter and a rock shelter. With the exception of one habitation site (P-57-000043), recorded prehistoric sites are primarily towards the periphery of the Project footprint. None of the previously recorded sites have been evaluated for their NRHP or CRHR eligibility.

**Table 3. Previously Recorded Prehistoric Archaeological Sites**

| Primary No. | Trinomial No. | Resource Type | NRHP / CR Status | Intersects Project Area? |
|---|---|---|---|---|
| P-51-000052 | CA-SUT-052 | Burial, habitation | Unevaluated | No |
| P-51-000246 | CA-SUT-246 | Lithic scatter, bedrock milling feature, burial, hearth/pit, rock shelter | Unevaluated | No |
| P-51-000247 | N/A | Hearth | Unevaluated | No |
| P-51-000248 | N/A | Bedrock milling feature, hearth/pit | Unevaluated | No |
| P-57-000010 | CA-YOL-007 | Habitation | Unevaluated | Yes |
| P-57-000013 | CA-YOL-010 | Habitation | Unevaluated | No |
| P-57-000043 | CA-YOL-040 | Habitation | Unevaluated | Yes |
| P-57-000046 | CA-YOL-043 | Unknown feature | Unevaluated | Yes |

*Historic Sites*

There are two previously recorded historic archaeological sites within the Project footprint (**Table 4**). The sites are a former residence—including foundations, structural remains, and a cellar—and a historic artifact scatter of farming debris. Both sites are located at the periphery of the Project footprint in the southern half of the Project footprint. The two sites are unevaluated for the NRHP and CRHR.

In addition to the historic archaeological sites listed below, four elements of the California-Pacific RR Route Thru Yolo County District (P-57-000970) were identified during the records search. The four elements are non-extant and would qualify as archaeological sites now; however, because they were originally recorded as standing structures, they are discussed in the built environment section below.

**Table 4. Previously Recorded Historic Archaeological Sites**

| Primary No. | Trinomial No. | Resource Type | NRHP / CR Status | Intersects Project Area? |
|---|---|---|---|---|
| P-51-000152 | CA-SUT-152H | Foundations, cellar | Unevaluated | Yes |
| P-57-000141 | CA-YOL-184H | Dump, farming debris | Unevaluated | Yes |

### HISTORICAL BUILT ENVIRONMENT RESOURCES

There are 29 previously recorded built environment resources intersecting the Project footprint and an additional seven resources within 0.25 mile (**Table 5**). Recorded built environment resources include levees, ditches, pumphouses, houses or residences, commercial buildings, a masonic lodge/temple, a bank, two churches, a cemetery, and the California-Pacific Railroad historic district. Most of the recorded buildings are within the community of Knights Landing at the northern end of the Project footprint. The linear features (ditches, levees, etc.) are found primarily around the periphery and across the southern portion of the Project footprint. Seven resources have been determined not eligible for the NRHP or CRHR. The remaining 29 resources are unevaluated for the NRHP or CRHR.

The California-Pacific Railroad Historic District (P-57-000970) intersects the northern end of the Project footprint. Four recorded elements of the district overlap with the Project footprint: P-57-000142, P-57-000194, P-57-000975, and P-57-000976 (**Table 5**). Three of the elements, originally recorded as bridges, are no longer extant; the fourth element is a railroad spur from which the rail has been removed. The district has not been evaluated for the NRHP or CRHR.

**Table 5. Previously recorded historical built environment resources**

| Primary No. | Other No. | Resource Name | Construction Date | NRHP/CRHR Status | Intersects Project Area? |
|---|---|---|---|---|---|
| P-51-000144 | CA-SUT-144H | Reclamation District 1500 Levee | 1913 | Unevaluated | No |
| P-57-000142 | CA-YOL-185H | California-Pacific Railroad Bridge (AC-S-4) | c. 1869–1934 | Unevaluated | Yes |
| P-57-000194 | CA-YOL-178H | California-Pacific Railroad Spur / Southern Pacific Railroad[1] | c. 1869–1934 | Unevaluated | Yes |
| P-57-000519 | CA-YOL-212H | SRFCO Levee Unit 127 (L-1) | 1930s | Not Eligible | Yes |
| P-57-000579 | - | Ditch 1 | N/A | Not Eligible | Yes |
| P-57-000580 | - | Ditch 2 | N/A | Unevaluated | No |
| P-57-000581 | - | Ditch 3 | N/A | Unevaluated | Yes |
| P-57-000601 | - | Industrial Building Remains (YO001) | | Unevaluated | Yes |
| P-57-000629 | - | County Road 16 Levee | 1915 | Unevaluated | No |
| P-57-000665 | - | CA-0366B Knights Landing-shed | c. 1940–1980 | Not Eligible | Yes |
| P-57-000667 | - | KLRC Pump House 1.90 | N/A | Unevaluated | Yes |
| P-57-000671 | - | Pump House (MVP-2) | c. 1955–1960 | Unevaluated | Yes |
| P-57-000705 | CA-YOL-240H | Colusa Drainage Canal | c. 1903–1911 | Unevaluated | No |
| P-57-000706 | CA-YOL-241H | Knights Landing Ridge Cut | c. 1925 | Unevaluated | Yes |

| Primary No. | Other No. | Resource Name | Construction Date | NRHP/CRHR Status | Intersects Project Area? |
|---|---|---|---|---|---|
| P-57-000970 | - | California-Pacific RR Route Thru Yolo County District | 1869 | Unevaluated | Yes |
| P-57-000975 | - | Old California-Pacific RR Bridge #2[1] | 1906 | Unevaluated | Yes |
| P-57-000976 | - | Old California-Pacific RR Spur Bridge # 3[1] | mid 1930s to 1950 | Unevaluated | Yes |
| P-57-001009 | - | Knights Landing Drawbridge | 1933 | Unevaluated | No |
| P-57-001319 | - | Knights Landing Cemetery | 1850s | Unevaluated | No |
| P-57-001196 | - | North of Knights Landing Ridge Cut Cross Canal | c. 1933 | Unevaluated | No |
| P-57-001358 | - | House (NIC-2016-Ruiz-1) | c. 1935–1950 | Unevaluated | Yes |
| N/A | YOL-HRI-194 | Knights Landing Library | c. 1925 | Not Eligible | Yes |
| N/A | YOL-HRI-195 | Masonic Temple | 1932 | Unevaluated | Yes |
| N/A | YOL-HRI-196 | Silas-Edson House | c. 1865 | Unevaluated | Yes |
| N/A | YOL-HRI-197 | Knights Landing Christian Church | 1875 | Not Eligible | Yes |
| N/A | YOL-HRI-198 | Frank Hooper House | 1920 | Unevaluated | Yes |
| N/A | YOL-HRI-199 | Charles Hooper House | 1926 | Unevaluated | Yes |
| N/A | YOL-HRI-200 | 604 Front Street | c. 1875 | Unevaluated | Yes |
| N/A | YOL-HRI-201 | John Snowball Residence | 1877 | Unevaluated | Yes |
| N/A | YOL-HRI-202 | Holy Rosary Parish Catholic Church | 1925 | Unevaluated | Yes |
| N/A | YOL-HRI-203 | Hooper's Hardware | 1924 | Unevaluated | Yes |
| N/A | YOL-HRI-204 | Pool Hall/Barber Shop | c. 1920 | Not Eligible | Yes |
| N/A | YOL-HRI-205 | Leithold Drug Store | 1920 | Not Eligible | Yes |
| N/A | YOL-HRI-206 | First National and Home Savings Bank of Woodland | 1920 | Unevaluated | Yes |
| N/A | YOL-HRI-207 | John F. Anderson House | 1918 | Unevaluated | Yes |
| N/A | YOL-HRI-208 | Mary LaDue House | 1862 | Unevaluated | Yes |

[1]Resource is non-extant

#### ADDITIONAL RECORDED RESOURCES

In addition to the above, the records search revealed an additional resource type intersecting the Project footprint (**Table 6**). P-57-000132 is the remnants of a natural oak grove forest.

Although the site was originally recorded in 1986 as a historic resource, a 2013 update to the site recorded indicates that the resource does not qualify as either a historic site or as a built environment resource. The resource has not been evaluated for the NRHP or CRHR.

**Table 6. Additional Recorded Resources**

| Primary No. | Other No. | Resource Type | NRHP/CRHR Status | Intersects Project Area? |
|---|---|---|---|---|
| P-57-000132 | YOLO-HRI-1/037 | Valley Oak Groves & Valley Oak Trees and Mixed Vegetation | Unevaluated | Yes |

#### POTENTIAL HISTORIC CULTURAL RESOURCES IDENTIFIED ON HISTORIC MAPS

General Land Office (GLO) survey plat maps were reviewed to identify potential historical era resources within the Project footprint and 0.25-mile buffer (**Table 7**). Some resources depicted on historic maps may become archaeological sites as they disintegrate over time. Potential cultural resources identified include residences, roads, fields, a railroad grade, and the community of Knights Landing. In addition to the named houses or residences below, there are other unnamed structures depicted in the GLOs along the banks of the Sacramento River on the east side of the Project footprint. On GLO maps from 1866 and 1870, much of the Project footprint is labeled as a swampland subject to overflow (BLM 1866, 1870)

**Table 7. Resources Depicted on GLO Survey Maps**

| Date | Resource Type | Location | Intersects Project Area? |
|---|---|---|---|
| 1857 | Road from Knights to Fremont | Rancho Rio Jesus Maria, T11N, R3E | Yes |
| 1857 | Harbin residence | Rancho Rio Jesus Maria, T11N, R3E | Yes |
| 1864 | St. Louis agricultural field and residence | Section 24, T11N, Range 2E | Yes |
| 1864 | Roberts residence | Section 25, T11N, Range 2E | Yes |
| 1864 | Edson residence | Sections 15 and 16, T11N, Range 2E | No |
| 1864, 1866 | Dyer residence, Newkirk residence | Section 13, T11N, Range 2E | Yes |
| 1864, 1866 | Grade of San Francisco and Marysville Railroad (1864), Grade of Vallejo and Marysville (1866) | Runs generally northeast to southwest across sections 14, 23, 27, and 34 | Yes |
| 1864, 1866 | Knights Landing | Section 14, T11N, Range 2E | Yes |
| 1866 | Road | Sections 13 and 14, T11N, Range 2E | Yes |
| 1866 | E.B. Wheatley residence, E. Master's residence | Section 14, T11N, Range 2E | No |
| 1866, 1870 | J. Glasscock residence, J.A. (?) Brewster residence | Section 13, T11N, Range 2E | No |
| 1866 | Road to Marysville | Runs generally north to south through sections 2, 11, and 14, T11N, R2E | Yes |
| 1870 | Road from Knights Landing | Section 18, T11N, R3E | No |

Early USGS topographic maps were also reviewed to identify potential areas where historical structures may be found (**Table 8**). A 1910 map depicts multiple residences on both sides of the Sacramento River (UGSG 1910). The 1910 map also depicts the community of Knights Landing and the railroad in their current locations.

**Table 8. Resources Depicted on Historical USGS Topographic Maps**

| Date | Map | Resource Type | Intersects Project Area? |
|---|---|---|---|
| 1910 | Knights Landing | Several residences depicted both north and south of the Sacramento River east of Knights Landing | Yes |
| 1910 | Knights Landing | Several residences along the east and west banks of the Sacramento River | Yes |
| 1907, 1915 | Davisville, Grays Bend | Two residences at the southern tip of Gray's Bend | Yes |

According the records search results received from the Northeast Information Center, the USGS Knights Landing and Gray's Bend 7.5' and Knights Landing (1952) and Davis (1954) 15' quad maps indicate that Knights Landing, an old railroad grade, Highway 113, a cemetery, levees, the Rio Jesus Maria land grant, roads, and structures were located in the Project footprint. Within the 0.25-mile buffer are the Knights School, more levees, and a dam.

## Feasibility Analysis

A records search identified 34 previously recorded archaeological and built environment resources within the Project footprint and an additional 12 recorded resources within 0.25 mile. Most of the previously recorded structures are in and around Knights Landing. Fifty-four previous investigations have been conducted, most of which were archaeological and/or historical field investigations. None of the previously recorded resources have been determined eligible for listing on the NRHP or CRHR.

Archaeological and built environment sensitivity within the Project footprint and 0.25-mile buffer is highly variable and contingent on the type of resource (prehistoric vs. historical) and geography (proximity to the river). Today the area is generally low and topographically flat. A review of nineteenth-century GLO maps confirms that much of the interior of the Project footprint was prone to inundation before the twentieth-century water control and flood management systems were constructed. These land management practices have almost totally obscured the original topographic landscape and have, undoubtedly, eliminated many near-surface archaeological sites. However, most of the Project footprint has not been previously surveyed. Importantly, Knights Landing was constructed on top of former Native American mounds which were typically located along the historic waterways. Previous investigations in the area have encountered prehistoric sites – including burials, buried hearths, and habitation sites – across the proposed project area, as well as sites within the levee itself. Accordingly, there is a low-to-moderate potential for near-surface unrecorded prehistoric or Native American sites within the unsurveyed portions of the Project area; as well as a moderate-to-high potential for buried archaeological sites throughout the entire Project area.

According to information received from the Northeast Information Center, Knights Landing was founded in 1843 and was important as an early steamboat landing and point of communication between the people east and west of the Sacramento River. The Southern Pacific Railroad was completed in 1890, and bridges across the river were constructed shortly after. A historical map review indicates that, in addition to the community of Knights Landing, there were also multiple residences in the eastern and northern portions of the Project area scattered throughout what is now cultivated farmland. Therefore, sensitivity for historic archaeological sites and historical built environment resources is moderate-to-high throughout the proposed Project area, but concentrated within the community of Knights Landing and in the immediate vicinity of the historic residences.

## Resources

U.S. Department of Interior, Bureau of Land Management (BLM)

1864 Original survey map of Township 11N, Range 2 East. Available online at https://glorecords.blm.gov/

1866 Original survey map of Township 11N, Range 2 East. Available online at https://glorecords.blm.gov/

1870 Original survey map of Township 11N, Range 3 East. Available online at https://glorecords.blm.gov/

U.S. Geological Survey (USGS)

1907 Topographic map of Davisville. Available online at http://historicalmaps.arcgis.com/usgs/

1910 Topographic map of Knights Landing. Available online at http://historicalmaps.arcgis.com/usgs/

1915 Topographic map of Grays Bend. Available online at http://historicalmaps.arcgis.com/usgs/

Original survey plat map of Rancho Rio Jesus Maria. 1857.