Appendix B

Biological Resources Technical Report

Biological Resources Technical Report
for the Sacramento Regional County Sanitation District

Harvest Water Program
Lateral Pipelines and On-Farm Connections Project

Prepared for:

REGIONALSAN

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May 2020

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LIST OF ABBREVIATIONS

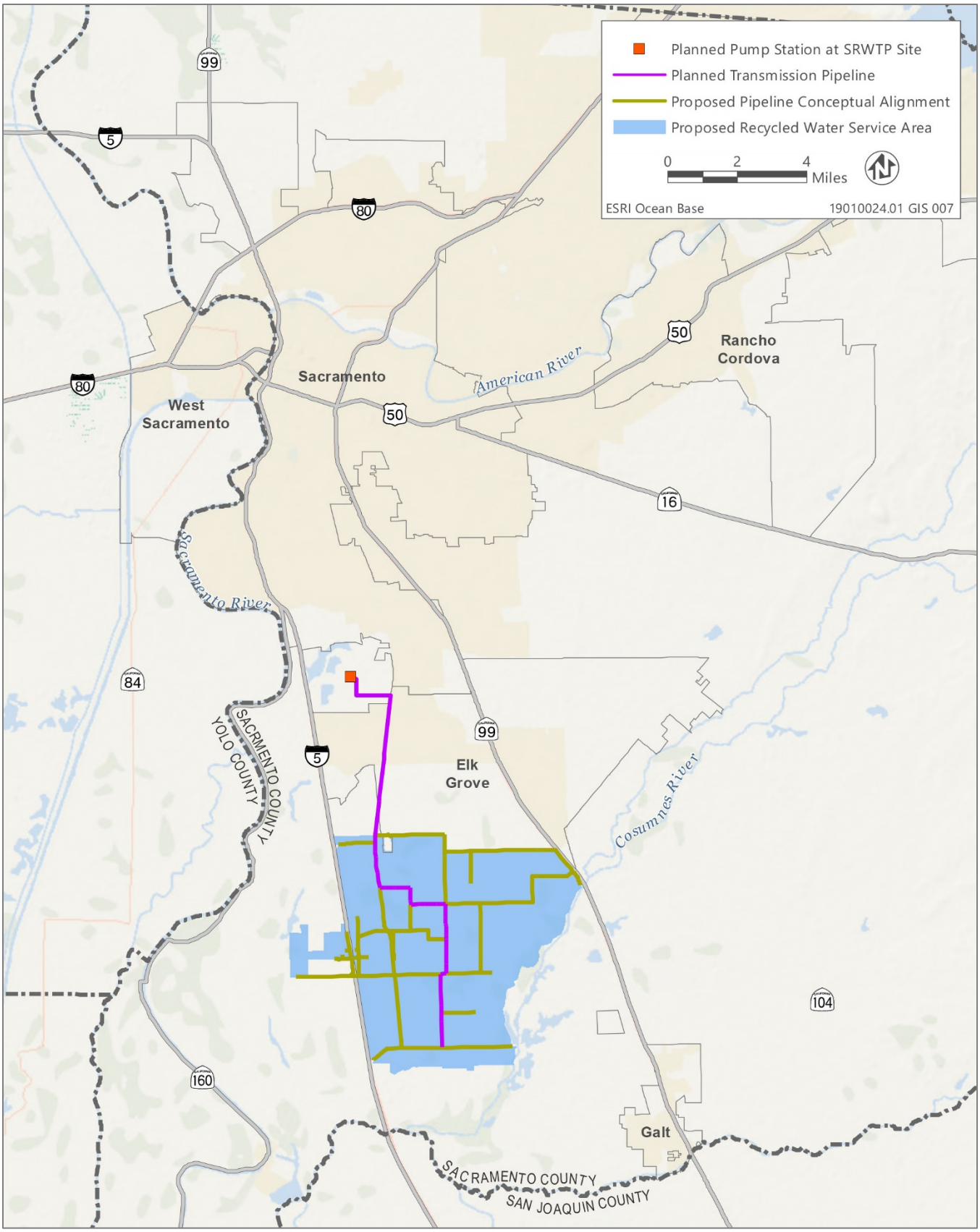
ASP	Abbreviated Standard Permit
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ITP	Incidental Take Permit
LOP	Letter of Permission Procedure
MBTA	Migratory Bird Treaty Act
NMFS	National Marine Fisheries Service
NPPA	California Native Plant Protection Act
NWR	National Wildlife Refuge
PGP	Programmatic General Permit
Regional San	Sacramento Regional County Sanitation District
RWQCB	Regional Water Quality Control Board
SRWTP	Sacramento Regional Wastewater Treatment Plant
SSHCP	South Sacramento Habitat Conservation Plan
USACE	U.S. Army Corps of Engineers
USB	Urban Services Boundary
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

This report presents the results of a biological resources technical assessment for the Sacramento Regional County Sanitation District (Regional San) Lateral Pipelines and On-Farm Connections Project (project). The project is an element of the Harvest Water Program (formerly, the South County Ag Program). The Program area is located in Sacramento County, within portions of the City of Elk Grove, unincorporated Sacramento County, and portions of the Stone Lakes National Wildlife Refuge (NWR). The project's approximate boundaries are Interstate 5 (I-5) to the west, Highway 99 to the east, Bilby Road to the north, and the Cosumnes River Preserve to the south (Figure 1).

The Harvest Water Program includes constructing a recycled water system to serve the South County, and consists of pumping Title 22 tertiary-treated, disinfected recycled water from the Sacramento Regional Wastewater Treatment Plant (SRWTP) through new pipelines to potential customers. The initial phase of the program will include the installation of a pump station within the SRWTP site and up to 13.8 miles of transmission pipelines. Figure 1 shows the locations of these facilities, which were evaluated at a project level in the Program EIR prepared for the Harvest Water Program. The Lateral Pipelines and On-Farm Connections Project, which is a component of the Harvest Water Program, includes the installation of new distribution mains, service connection laterals, and appurtenant facilities. Service connection laterals and distribution mains would be located on County and city streets and rural roads, primarily within public road rights-of-way, although distribution mains and service laterals may also occur on private agricultural lands. Figure 1 shows the conceptual alignments for these pipelines as well as the proposed recycled water service area.

The purpose of this report is to describe the existing biological resources within and adjacent to the project footprint; assess the potential for special-status species and other sensitive biological resources to be affected by project activities; and describe potential permitting requirements under the Clean Water Act (CWA), Porter-Cologne Water Quality Control Act, Endangered Species Act (ESA), and California Endangered Species Act (CESA).



Source: Adapted by Ascent Environmental in 2020

Figure 1 Project Vicinity

2 METHODS

Biological resources were evaluated, and land cover types were mapped by Ascent biologists during reconnaissance surveys conducted on June 27, July 2, July 3, November 20, and November 26, 2019. The survey area consists of the public rights-of-way within which the Lateral and On-Farm Connection pipelines are proposed to be constructed. The project area includes the survey area of the proposed pipeline alignment and the proposed recycled water service area (Figure 2). Figure 2 also shows the locations of the planned pump station and transmission pipelines, both of which, as noted previously, were evaluated at a project level in the Program EIR prepared for the Harvest Water Program. Land cover was not quantified and mapped outside of the survey area. Land cover types were classified according to the South Sacramento Habitat Conservation Plan (SSHCP) land cover identification scenario, except for sensitive natural communities, which were classified to the alliance level using the *Manual of California Vegetation* (Sawyer et al. 2009).

Information on sensitive biological resources previously recorded in or near the project area was collected through a search of the California Natural Diversity Database (CNDDB) and other existing documentation pertaining to biological resources in the region as listed below.

- CNDDB record search of the Bruceville, Galt, Elk Grove, Florin, Clarksburg, Courtland, Isleton, Thornton, and Lodi North U.S. Geological Service 7.5-minute quadrangles of the project area (CNDDB 2019);
- eBird database search within the study area (eBird 2019);
- California Native Plant Society (CNPS), Rare Plant Program database search of the Bruceville, Galt, Elk Grove, Florin, Clarksburg, Courtland, Isleton, Thornton, and Lodi North U.S. Geological Service 7.5-minute quadrangles (CNPS 2019a);
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation project planning tool (USFWS 2019);
- Regional San's South Sacramento County Agriculture and Habitat Lands Recycled Water Program Draft Environmental Impact Report (Program EIR) (Regional San 2016); and
- Final South Sacramento County Habitat Conservation Plan (County of Sacramento et al. 2018).

Lists of special-status plant and wildlife species were compiled from these queries and are presented in Tables 2 and 3. The tables include common and scientific names, legal status, habitat requirements, and a brief assessment of the likelihood that the species could occur in the project area.

2.1 DEFINITIONS

The CNDDB is a statewide database, managed by the California Department of Fish and Wildlife (CDFW) that is continually updated with the reported locations of the state's rare and declining species. Although the CNDDB is the most current and reliable tool available for tracking occurrences of special-status species, it contains only those records that have been reported to CDFW and processed into the GIS database. Therefore, it is possible that a special-status plant or animal could be present on the property but not documented in the CNDDB and absence of special-status species records in the CNDDB is not evidence of species absence from a project site.

Sensitive biological resources are protected and/or regulated by federal, state, and/or local laws and policies. Sensitive biological resources include special-status species and sensitive natural communities.

Special-status species are plants and animals in the following categories:

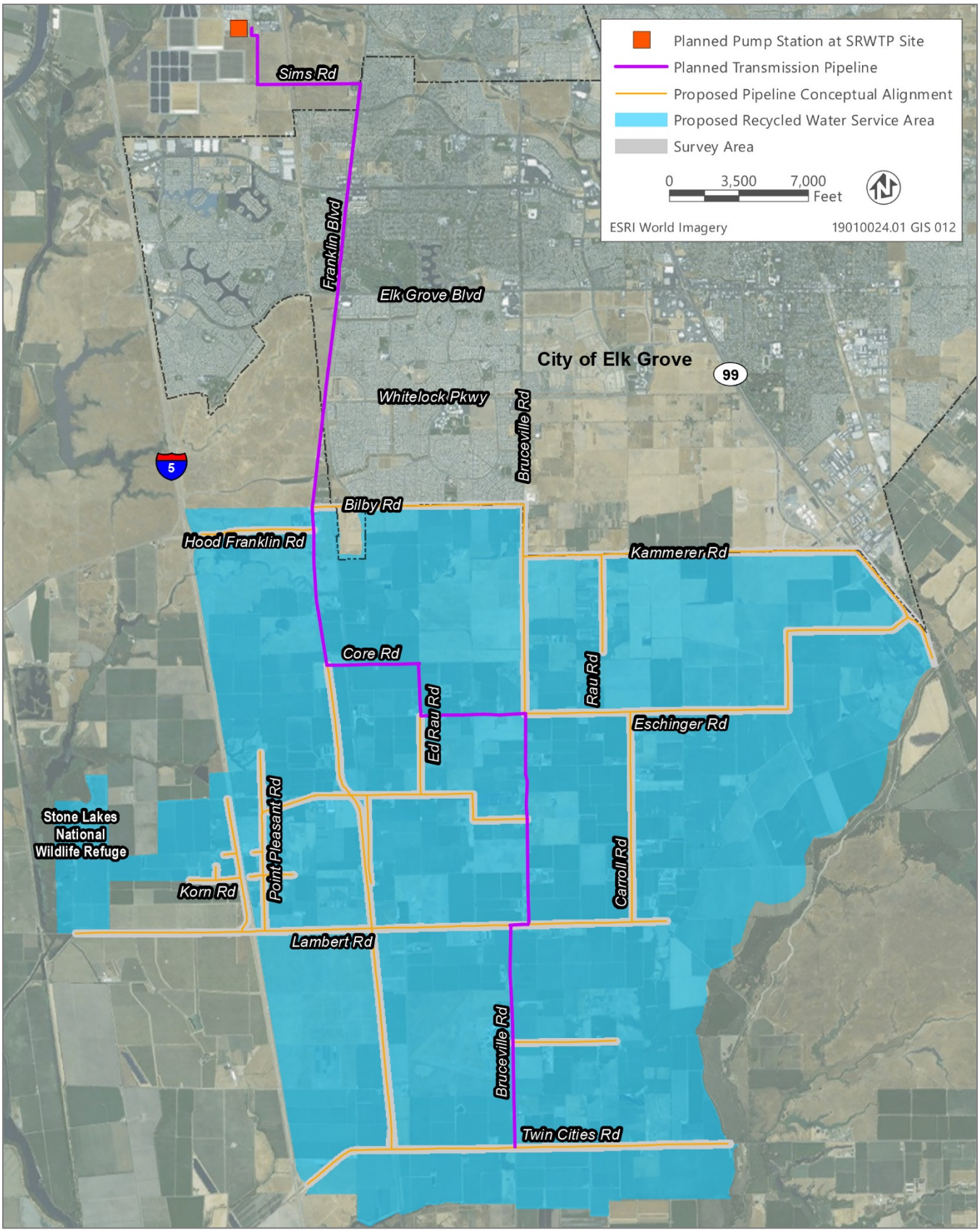
- listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing;
- listed or candidates for listing by the State of California as threatened or endangered under CESA;
- listed as rare under the California Native Plant Protection Act;

- listed as Fully Protected under the California Fish and Game Code;
- identified by CDFW as species of special concern;
- taxa considered by CDFW to be "rare, threatened, or endangered in California" and assigned a California Rare Plant Rank (CRPR). The CDFW system includes six rarity and endangerment ranks for categorizing plant species of concern, which are summarized as follows:
  - CRPR 1A - Plants presumed to be extinct in California;
  - CRPR 1B - Plants that are rare, threatened, or endangered in California and elsewhere;
  - CRPR 2A - Plants that are presumed extirpated in California, but more common elsewhere;
  - CRPR 2B - Plants that are rare threatened, or endangered in California, more common elsewhere;
  - CRPR 3 - Plants about which more information is needed (a review list); and
  - CRPR 4 - Plants of limited distribution (a watch list).

  All plants with a CRPR are considered "special plants" by CDFW. The term "special plants" is a broad term used by CDFW to refer to all of the plant taxa inventoried in CDFW's CNDDB, regardless of their legal or protection status. Plants ranked as CRPR 1A, 1B, 2A, and 2B may qualify as endangered, rare, or threatened species within the definition of CEQA Guidelines Section 15380. CDFW recommends that potential impacts to CRPR 1 and 2 species be evaluated in CEQA documents. In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to CEQA Guidelines Section 15380. However, these species may be evaluated by the lead agency on a case-by-case basis.
- considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G); or
- otherwise meets the definition of rare or endangered under CEQA Section 15380 (b) and (d).

Sensitive natural communities are those native plant alliances defined by CDFW as having limited distribution statewide or within a county or region and that may be vulnerable to environmental effects of projects (CDFW 2018). Many types of wetland and riparian communities are considered sensitive natural communities because of their limited distribution in California. Sensitive natural communities may or may not contain special-status species or their habitat, but they typically provide important habitat values to native species. Sensitive natural communities are ranked by CDFW from S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable. Sensitive natural communities have high potential to support special-status plant and animal species. Sensitive natural communities can also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

Other sensitive biological resources include habitats that are subject to U.S. Army Corps of Engineers (USACE) jurisdiction under Section 404 of the CWA, Section 1602 of the California Fish and Game Code, and the state's Porter-Cologne Water Quality Control Act, which protects waters of the state.



Source: Adapted by Ascent Environmental in 2020

Figure 2 Project Area

3 KEY REGULATORY ISSUES

Biological resources in California are protected and/or regulated by a variety of federal and state laws and policies. Key regulatory issues that may be applicable to the project are discussed below.

3.1 CLEAN WATER ACT

Section 404 of the CWA requires a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Fill material is material placed in waters of the United States where the material has the effect of replacing any portion of a water of the United States with dry land or changing the bottom elevation of any portion of a water of the United States. Waters of the United States include navigable waters of the United States; interstate waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; relatively permanent tributaries to any of these waters, and wetlands adjacent to these waters. Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Potentially jurisdictional wetlands must meet three wetland delineation criteria: hydrophytic vegetation, hydric soil types, and wetland hydrology. Wetlands that meet the delineation criteria may be jurisdictional under Section 404 of the CWA pending USACE and U.S. Environmental Protection Agency (EPA) review.

Pursuant to Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain a water quality certification from the Regional Water Quality Control Board (RWQCB) indicating that the project would uphold state water quality standards.

3.2 FEDERAL ENDANGERED SPECIES ACT

Pursuant to ESA, USFWS has authority over projects that may affect the continued existence of federally listed (threatened or endangered) species. Section 9 of ESA prohibits any person from "taking" an endangered or threatened fish or wildlife species or removing, damaging, or destroying a listed plant species on federal land or where the taking of the plant is prohibited by state law. Take is defined under ESA, in part, as killing, harming, or harassing. Under federal regulations, take is further defined to include habitat modification or degradation where it results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 10 of the ESA applies if a non-federal agency is the lead agency for an action that results in incidental take and no other federal agencies are involved in permitting the action. Section 7 applies if a federal discretionary action is required (e.g., a federal agency must issue a permit), in which case the involved federal agency is required to consult with USFWS or National Marine Fisheries Service (NMFS) if the action may affect federally listed species.

3.3 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. Section 703, et seq.), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or egg of any such bird. United States Department of the Interior's Office of the Solicitor issued a legal, revised interpretation (Opinion M-37050) of the MBTA's prohibition on the take of migratory bird species. Opinion M-37050 concludes that "consistent with the text, history, and purpose of the MBTA, the statute's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs." According to the Opinion M-37050, take of a migratory bird, its nest, or eggs that is incidental to another lawful activity does not violate the MBTA, and the MBTA's criminal provisions do not apply to those activities. Opinion M-37050 may affect

how the MBTA is interpreted but it does not legally change the regulation itself. The Ninth Circuit Court of Appeals, the controlling federal appellate court for California, has also held that habitat modification which harms migratory birds "does not 'take' them within the meaning of the MBTA." Seattle Audubon Soc. v. Evans, 952 F.2d 297, 303 (1981). The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations (CFR), Section 10.13. The list includes nearly all birds native to the United States. Migratory birds are known to nest within the project site.

3.4 BALD AND GOLDEN EAGLE PROTECTION ACT

Under the Bald and Golden Eagle Protection Act, it is illegal to take bald eagles, including their parts, nests, or eggs unless authorized. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment (USFWS 2007: 31156). In addition to immediate impacts, this definition also addresses impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

3.5 CALIFORNIA ENDANGERED SPECIES ACT

Pursuant to CESA, a permit from CDFW is required for projects that could "take" a species state listed as threatened or endangered. Section 2080 of CESA prohibits take of state listed species. Under CESA, take is defined as any activity that would directly or indirectly kill an individual of a species. The definition does not include "harm" or "harass" as in the federal act. As a result, the threshold for take under CESA is higher than under ESA (i.e., habitat modification is not necessarily considered take under CESA). The take of state-listed species incidental to otherwise lawful activities requires a permit, pursuant to Section 2081(b) of CESA. The state has the authority to issue an incidental take permit under Section 2081 of the California Fish and Game Code. If the species is listed under both CESA and ESA and a federal incidental take statement (ESA Section 7) or an incidental take permit (ESA Section 10) and biological opinion is obtained from USFWS, CDFW may issue a consistency determination if the federal documents are consistent with CESA. If a consistency determination is issued, no further authorization or approval would be required under CESA. A consistency determination must be requested by the applicant and is issued at the discretion of the Director of CDFW.

3.6 CALIFORNIA NATIVE PLANT PROTECTION ACT

In addition to CESA, the California Native Plant Protection Act (NPPA) provides protection to endangered and "rare" plant species, subspecies, and varieties of wild native plants in California. The NPPA's definition of "endangered" and "rare" closely parallel the CESA definitions of "endangered" and "threatened" plant species.

3.7 PORTER-COLOGNE WATER QUALITY CONTROL ACT

Each of the nine RWQCBs in California must prepare and periodically update water quality control plans (basin plans) pursuant to the Porter-Cologne Water Quality Control Act. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Under the Porter-Cologne Act, features containing surface water are often classified as waters of the state. Projects that affect waters of the state must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification under Section 401 of the CWA.

Waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. This includes all waters of the United States, but also areas not regulated under the federal Clean Water Act. The State Water Resources Control Board has adopted a State Wetland Definition and Procedures for Discharges of

Dredged or Fill Material to Waters of the State (Procedures). The Office of Administrative Law approved the Procedures on August 28, 2019. The Procedures will go into effect May 28, 2020. The approved state wetland definition is:

An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

3.8 CALIFORNIA FISH AND GAME CODE SECTION 1602—STREAMBED ALTERATION

All activities that may result in diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. CDFW interprets this regulation to further include removal of vegetation from the bed, channel, or bank (e.g., riparian vegetation) of any river, stream, or lake. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

- substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation (California Code of Regulations Title 14, Section 1.72). CDFW regulatory authority within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

3.9 CALIFORNIA FISH AND GAME CODE

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (e.g., hawks, owls, eagles, and falcons), including their nests or eggs.

3.10 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA applies to projects proposed to be undertaken or requiring approval by state and local governmental agencies. "Projects" are public agency actions with potential to have an impact on the physical environment. Once an activity is determined to be a "project" under CEQA, the lead agency must decide whether it is categorically or statutorily exempt. If it is not exempt, the lead agency must assess the potential for significant environmental effects to occur as a result of the project. Appendix G of the State CEQA Guidelines provides questions that are typically used as significance criteria for assessing the severity of environmental impacts.

For biological resources, Appendix G asks, 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 CDFW or USFWS?
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?
- 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?
- 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?
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state conservation plan?

3.11 SACRAMENTO COUNTY GENERAL PLAN

CONSERVATION ELEMENT

The Sacramento County General Plan Conservation Element (Sacramento County 2011) includes the following goals, objectives, and policies relevant to the project:

GOAL: Preserve and manage natural habitats and their ecological functions throughout Sacramento County.

Objective: Mitigate and restore for natural habitat and special status species loss.

- Policy CO-58: Ensure no net loss of wetlands, riparian woodlands, and oak woodlands.
- Policy CO-59: Ensure mitigation occurs for any loss or modification to the following types of acreage and habitat function: vernal pools, wetlands, riparian, native vegetative habitat, and special status species habitat.
- Policy CO-60: Mitigation should be directed to lands identified on the Open Space Vision Diagram.
- Policy CO-61: Mitigation should be consistent with Sacramento County-adopted habitat conservation plans.
- Policy CO-62: Permanently protect land required as mitigation.

GOAL: Preserve, protect, and enhance natural open space functions of riparian, stream, and river corridors.

Objective: Protect and restore natural stream functions.

- Policy CO-107: Maintain and protect natural function of channels in developed, newly developing, and rural areas.

GOAL: Sacramento County vegetative habitats preserved, protected, and enhanced.

Objective: Heritage and landmark tree resources preserved and protected for their historic, economic, and environmental functions.

- Policy CO-138: Protect and preserve non-oak native trees along riparian areas if used by Swainson's hawk, as well as landmark and native oak trees measuring a minimum of 6 inches in diameter or 10 inches aggregate for multi-trunk trees at 4.5 feet above ground.
- Policy CO-139: Native trees other than oaks, which cannot be protected through development, shall be replaced with in-kind species in accordance with established tree planting specifications, the combined diameter of which shall equal the combined diameter of the trees removed.

- **Policy CO-140:** For projects involving native oak woodlands, oak savannah, or mixed riparian areas, ensure mitigation through the methods described.

3.12 SACRAMENTO COUNTY SWAINSON'S HAWK ORDINANCE

Chapter 16.130 of Title 16 of the Sacramento County Code addresses the reduction in Swainson's hawk foraging habitat within unincorporated Sacramento County. Participating in the County's Swainson's Hawk Mitigation Program, which is voluntary, is one option for mitigating the loss of foraging habitat within unincorporated areas of the County. Under this program, mitigation for impacts less than 40 acres can be achieved by paying a mitigation fee or providing replacement habitat (title or easement to suitable Swainson's hawk mitigation lands on a per-acre basis); mitigation for impacts of 40 acres or greater can be achieved only by providing replacement habitat under this program. Another option for permitting impacts to Swainson's hawk is participation in Sacramento County's South Sacramento Habitat Conservation Plan (SSHCP), discussed below.

3.13 SACRAMENTO COUNTY TREE PRESERVATION ORDINANCE

The Sacramento County Tree Preservation Ordinance (Sacramento County Code 19.12) provides protection for trees within the designated urban area of the unincorporated area of Sacramento County. The Tree Preservation Ordinance applies only to the designated urban area, except for projects that require a discretionary land use entitlement, such as a parcel map. The project area is outside of the designated urban area and therefore not subject to the Tree Preservation Ordinance. Therefore, this ordinance will not be discussed further in this report.

3.14 SOUTH SACRAMENTO HABITAT CONSERVATION PLAN

The project area is located within the SSHCP area and Regional San is a Plan Partner that is eligible to utilize the SSHCP as a "Participating Special Entity." The project is a SSHCP-covered activity. The Harvest Water Program is identified in the SSHCP as providing recycled water service from the existing SRWTP to agriculture and habitat lands in the southwest portion of the SSHCP Plan Area. Consistent with the current Harvest Water Program project description, the SSHCP states that recycled water would be used to irrigate agricultural lands and improve aquatic and terrestrial habitat on existing and future conservation lands near the existing Cosumnes River Preserve. Recycled water may also be used to irrigate reestablished/established wetlands and groundwater recharge basins.

Both construction and maintenance of facilities associated with the Harvest Water Program are SSHCP Covered Activities. For construction, the pipeline footprint would generally follow existing roadways; however, pipelines would also cross agricultural lands, including existing and planned Agricultural Preserves. In addition, approximately one recharge pond totaling approximately 560 acres would be constructed to operate the recycled water system.

Maintenance activities generally include, but are not limited to, inspection, cleaning, rehabilitation, repair, and/or replacement of aboveground and belowground recycled water facilities. These facilities include, but are not limited to, recycled water pipelines, pumping stations, underground pressurized pipelines (e.g., water, recycled water, chemical), valves, gates, weirs, other groundwater recharge and reclamation facilities (including recharge ponds or spreading basins for indirect groundwater recharge purposes), other miscellaneous structures and equipment (e.g., power, control, diversion, discharge, junction, metering, telemetry), and access facilities (e.g., structures, vaults, maintenance holes, roads).

The SSHCP is intended to provide a streamlined process for incidental take authorization under both the ESA and CESA, permitting under Section 404 of the CWA, and water quality certification under Section 401 of the CWA. The SSHCP provides strategies to conserve habitat for special-status plant and wildlife species that are covered under the plan. Once implemented, it will serve as a multi-species, multi-habitat conservation plan addressing the biological impacts of future urban development within the Urban Services Boundary (USB) in the southern portion of the county.

The emphasis of the SSHCP is to secure large, interconnected blocks of habitat that focus on protecting intact subwatersheds, while minimizing edge effects and maximizing heterogeneity. Habitat losses within the USB will be offset primarily through the establishment of large preserves outside the USB, but core and satellite preserves may be established within the USB. Land developers that convert habitat within the USB will pay a defined per-acre fee to mitigate impacts and these fees will be used to protect, restore, maintain, and monitor habitat, or will dedicate land to the preserve system.

SSHCP participants implementing covered activities agree to complete specific habitat-level and species-level actions for the benefit of HCP-covered species. The South Sacramento Conservation Agency will collect mitigation fees from projects (based on impact to habitat ratios, by habitat type) to accomplish the SSHCP's conservation goals and objectives and assemble a network of conservation areas.

The process for developing the SSHCP was initiated in 1992. The SSHCP was adopted in fall 2018. A joint Biological and Conference Opinion was issued by USFWS and USACE on April 30, 2019. This joint Opinion issues an ESA Section 10(a)(1)(b) Permit from USFWS and authorizes implementation of a CWA Section 404 Permit Strategy. This CWA Section 404 Permit Strategy consists of an USACE Programmatic General Permit (PGP), a Letter of Permission Procedure (LOP), and an Abbreviated Standard Permit (ASP) Process. All three of these elements became effective as of July 25, 2019. A CWA Section 401 Water Quality Certification for the USACE PGP was issued by the California Regional Water Quality Control Board, Central Valley Region, on April 12, 2019. Individual project applicants utilizing the SSHCP and either the PGP or ASP for CWA Section 404 permitting will continue to need to obtain individual 401 certifications. An Incidental Take Permit (ITP) under CESA was issued by CDFW on August 19, 2019.

4 RESULTS

4.1 LAND COVER

The project footprint is within the SSHCP and the plan's land cover classification system was used to map land cover within the survey area. The land cover classification system developed for the SSHCP includes 24 land cover types and is a modification of the California Natural Communities classification system developed by CDFW. The plan's land cover classification system maps land cover at too broad a scale to capture sensitive natural communities, which are identified at the alliance level (see Section 2.1 in this report for a detailed description of sensitive natural communities); therefore for purposes of this report, areas that qualify as a sensitive natural community were mapped and classified to the vegetation alliance level according to the *Manual of California Vegetation* (CNPS 2019b). A vegetation alliance is a category of vegetation classification which describes repeating patterns of plants across a landscape. Each alliance is defined by plant species composition, and reflects the effects of local climate, soil, water, disturbance, and other environmental factors (CNPS 2019b).

SSHCP land cover types and sensitive natural communities within the survey area, and acreage of each type within the survey area are provided in Table 1. The project area is mainly composed of irrigated pasture, disturbed, and cropland land cover types. Other land cover types include major roads, low-density development, vineyard, orchard, valley grassland, stream/creek, mixed riparian scrub, freshwater marsh, mixed riparian woodland, valley oak woodland, open water, and seasonal wetland. Within the surveys area, major roads and other disturbed land comprise 84 percent of the land cover. These land cover types are described in detail in Section 3.2 of the SSHCP (County of Sacramento et al. 2018). Sensitive natural communities within the survey area are described in Section 4.1.3 of this report. Appendix A displays the locations and extent of land cover types in the survey area. Botanical nomenclature follows *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

4.1.1 Natural Land Cover Types

AQUATIC LAND COVER TYPES

The SSHCP aquatic habitat types present in the survey area consist of seasonal wetlands, freshwater marsh, stream/creek, and open water. Seasonal wetlands, as defined by the SSHCP, are wetlands that pond for an extended period during a portion of the year. Seasonal wetlands in the survey area are found only at the constructed drainage at the toe of the railroad berm adjacent to Franklin Boulevard; however, additional seasonal wetlands, including vernal pools, occur in the project area at Stone Lakes NWR and in pastures. Freshwater marsh is dominated by perennial herbaceous plant species, and in the survey area, is generally dominated by cattails (*Typha* spp.) and or tules (*Schoenoplectus* spp.). Freshwater marsh in the project area is found at the Stone Lakes NWR and in small pockets associated with natural channels or within irrigation canals and ditches constructed in uplands. Freshwater marsh habitat includes some areas of hardstem and California bulrush marsh vegetation alliance, a designated sensitive natural community.

Table 1 SSHCP Land Cover Types and Manual of California Vegetation Alliances within the Survey Area

Program EIR Land Cover Types	SSHCP Land Cover Types	Area (Acres) in Study Area
	SSHCP Natural Land Cover Types	
Vernal Pool/Vernal Swale Grassland Complexes and Large Drainage Features	*Aquatic Land Cover*	
	Seasonal wetland	0.60
	Freshwater marsh	1.41
	Hardstem and California bulrush marsh[1]	0.86
	Stream/creek	7.23
	Open water	0.05
	Riparian Land Cover	
	Mixed riparian woodland	4.90
	Fremont cottonwood forest[1]	0.03
	Black willow thicket[1]	0.05
	Mixed riparian scrub	2.58
	Terrestrial Land Cover	
	Valley grassland	0.24
	Valley Oak Woodland[1]	0.70
Active Agriculture	Cropland	4.30
	Orchard	0.97
	Vineyard	2.01
	Irrigated pasture	5.42
	SSHCP Developed/Non-habitat Land Cover Types	
Disturbed/Ruderal Lands	Disturbed	124.35
	Low-density development	17.32
	Major roads	135.92

1. These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) and are included in the broader SSHCP land cover types. Note: SSHCP land cover types include constructed wetland features that do not meet USACE wetland criteria.

Sources: County of Sacramento et al. 2018, CNPS 2019b, Compiled by Ascent Environmental in 2019

The SSHCP's open water land cover type includes perennial water features, such as ponds, lakes, and reservoirs, that are mostly free of rooted vegetation except in the shallow areas along the shorelines. The stream/creek land cover type includes intermittent and perennial linear water features such as rivers, streams, creeks, and ditches. In the project area, open water is found in portions of South Stone Lake and linear water features classified in the SSHCP as stream/creek land cover, which includes rivers, streams, creeks, drainages, and roadside and irrigation ditches. Many of the ditches in the study area drain agricultural lands rather than supply water to them. Features identified in the survey area that fit into the stream/creek category consist primarily of roadside and irrigation ditches; however, the proposed pipelines cross natural streams in a few locations. Portions of South Stone Lake consist of open water while other portions support mixed riparian woodland and freshwater marsh.

RIPARIAN LAND COVER TYPES

Riparian habitat types present in the project area include mixed riparian woodland and mixed riparian scrub. As described in the SSHCP, riparian land covers are associated with streams/creeks and occur between the active stream channel and adjacent uplands and are transitional between aquatic and terrestrial ecosystems. Within the project area, riparian cover is found along the natural stream segments crossed by the proposed pipelines, at South Stone Lake, Cosumnes River, and also on some of the larger irrigation ditches. Mixed riparian woodland cover is distinguished by an open tree canopy dominated by some combination of the following species: Fremont cottonwood (*Populus fremontii*), black willow (*Salix gooddingii*), valley oak (*Quercus lobata*), sycamore (*Platanus* sp.), and walnut (*Juglans* sp.). Mixed riparian scrub consists of an open to dense shrub layer dominated by one or more of the following species: sandbar willow (*Salix exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), or Himalayan blackberry (*Rubus armeniacus*). In the survey area, Himalayan blackberry is the most common dominant species in the mixed riparian scrub land cover, followed by sandbar willow. Wild rose (*Rosa californica*) is a common associate in mixed riparian scrub, as is the invasive species perennial pepperweed (*Lepidium latifolium*). A shrubby riparian scrub layer is often present under a mixed riparian woodland canopy and freshwater marsh vegetation is often present in the herbaceous layer in either mixed riparian woodland or mixed riparian scrub cover. Sensitive natural communities identified within the riparian land cover types in the survey area consist of Fremont cottonwood forest and black willow thicket. Other sensitive natural communities found in riparian land cover types within the project area but outside of the survey area consist of valley oak woodland and California rose briar patch.

TERRESTRIAL LAND COVER TYPES

Terrestrial habitat types present in the study area include valley grassland, valley oak woodland, and agricultural crops.

VALLEY GRASSLAND

Valley grassland is uncommon in the project area, which is composed primarily of developed and disturbed or agricultural cover types; however, it occurs at a few locations. Within the survey area, there is only 0.24 acre of valley grassland cover. This land cover type is characterized by dense cover of nonnative annual grasses and forbs that have become naturalized in the Sacramento Valley, such as wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), ryegrass (*Festuca perennis*), foxtail fescue (*Festuca myuros*), filaree (*Erodium* spp.), true clovers (*Trifolium* spp.), bird's-foot trefoil (*Lotus corniculatus*), and bur clover (*Medicago polymorpha*). Though nonnative species are typically dominant in valley grasslands, many native wildflowers are also found in this land cover type including California poppy (*Eschscholzia californica*), narrow tarplant (*Holocarpha virgata*), Fitch's spikeweed (*Centromadia fitchii*), and miniature lupine (*Lupinus bicolor*).

VALLEY OAK WOODLAND

Valley oak woodland is found in small stands in isolated locations within the survey area and is dominated by valley oaks (*Quercus lobata*) in the overstory. Valley oak woodland has an herbaceous understory of annual grasses

and forbs characteristic of the valley grassland land cover type but some stands within the project area have a landscaped understory because they are associated with residences. Valley oak woodland is a sensitive natural community.

AGRICULTURAL CROPS

The most common land cover types in the project area are agricultural crops composed of field crops, orchard, vineyard, or irrigated pasture. In the project area, cropland consists of annual field and row crops such as small grains, corn, and tomatoes. Orchards in the project area consist of fruit and nut trees. Vineyards are composed of rows of planted grapes climbing wire trellises. Between the rows of grapes, vegetation is absent or, in some vineyards, weedy annual species grow, including red maids (*Calandrinia menziesii*), annual bluegrass (*Poa annua*), shepherd's purse (*Capsella bursa-pastoris*), and filaree. Irrigated pastures in the project area include alfalfa, clover, and grass hay crops and seasonal summer pasture and year-round pasture for livestock. Irrigated pasture is typically seeded, cut or grazed, then reseeded on a regular basis on a 5- to 7-year cycle.

4.1.2 Developed/Non-Habitat Land Cover Types

Developed and disturbed land cover types in the project area consist of major roads, disturbed cover, and low-density development. Major roads constitute a large portion of the survey area as the proposed pipelines parallel roads. Disturbed areas include the maintained road shoulders and other open areas that have been subject to past or ongoing disturbances such as scraped or graded land and land that is continually maintained free of vegetation. Low-density development in the project area includes rural residential units, dairies and other lands with farming support facilities, a correctional center, solar fields, and water treatment facilities.

4.1.3 Sensitive Natural Communities

Sensitive natural communities are those native plant communities defined by CDFW as having limited distribution statewide or within a county or region and that are often vulnerable to environmental effects of projects (CDFW 2018). These communities may or may not contain special-status species or their habitat. Sensitive natural communities are ranked by CDFW from S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable. CDFW's natural-community rarity rankings follow the 2009 NatureServe Conservation Status Assessments: Methodology for Assigning Ranks (Faber-Langendoen et al. 2012), in which all alliances are listed with a global (G) and state (S) rank, where G1 is critically imperiled, G2 is imperiled, G3 is vulnerable, G4 is apparently secure, and G5 is secure.

Sensitive natural communities have potential to support special-status plant and animal species. Sensitive natural communities can also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

Vegetation types within the project area that are included on the CDFW list of sensitive natural communities consist of Fremont cottonwood woodland, black willow thicket, valley oak woodland, California rose briar patch, and hardstem and California bulrush marsh. Of these, all but rose briar patch are present in small stands within the survey area.

4.2 COMMON WILDLIFE SPECIES

The project area contains suitable habitat for many common wildlife species. Wildlife species observed during reconnaissance field surveys include white-crowned sparrow (*Zonotrichia leucophrys*), western kingbird (*Tyrannus verticalis*), mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), red-winged blackbird (*Agelaius phoeniceus*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), western fence lizard (*Sceloporus occidentalis*), California ground squirrel (*Otospermophilus beecheyi*), and coyote (*Canis latrans*).

4.3 SPECIAL-STATUS SPECIES

A total of 15 special-status plant species and 22 special-status wildlife species have potential to occur in or near the project area (Tables 2 and 3). Three special-status wildlife species were observed during the reconnaissance surveys. A small mixed colony of approximately 20 tricolored and red-winged blackbirds was observed foraging near the Stone Lakes NWR during the June and July reconnaissance surveys. Swainson's hawks were also observed foraging over the project area during the July surveys. A potential Swainson's hawk nest was also found in the project area in a large valley oak tree near a dairy barn within 50 feet of the proposed pipeline alignment. A pair of Swainson's hawks were observed circling above the nest tree, but they did not visit the nest and it could not be confirmed to be active. A flock of sandhill cranes was observed flying over the survey area during the November reconnaissance survey. Asterisks in Tables 2 and 3 indicate species covered by the SSHCP.

4.3.1 Special-Status Plant Species

Of the 20 special-status plants identified during the review of existing data, 15 special-status plant species could occur in or near the project area. For species that "May occur" or are "Known to Occur," this statement is shown in **bold** in the last column of the table.

Table 2 Special-Status Plant Species Known to Occur in the Region and their Potential for Occurrence in the Project Area

Species	Listing Status[1]			Habitat	Potential for Occurrence
	Federal	State	CRPR		
Watershield *Brasenia schreberi*	—	—	2.1	Freshwater marshes and swamps; 0 to 7,000 feet elevation; blooms June-September.	**Known to occur**. The project area contains suitable freshwater marsh habitat for this species and there is a 1976 occurrence record from the Stone Lakes NWR (CNDDB 2019) that overlaps the project area.
Bristly sedge *Carex comosa*	—	—	2.1	Lake margin marshes; -15 to 3,300 feet elevation; blooms May–September.	**Known to occur**. The project area contains suitable freshwater marsh habitat for this species and there are documented occurrences in the Stone Lakes NWR (CNDDB 2019) within the project area.
Pappose tarplant *Centromadia parryi* ssp. *parryi*	—	—	1B.2	Chaparral, coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland. Vernally mesic, often alkaline sites. 7 – 1378 feet in elevation. Blooms May–November.	**May occur**. Suitable habitat is present in the Stones Lakes NWR within the project area. The nearest known occurrence of pappose tarplant is from North Stone Lake within the Stone Lakes NWR (Calflora 2019).
Bolander's water hemlock *Cicuta maculata* var. *bolanderi*	—	—	2.1	Freshwater and brackish marshes, mostly along banks of tidal creeks; 0 to 650 feet elevation; blooms July–September.	Not expected to occur. The species is known only from coastal and Delta waterways west of I-5. The nearest known occurrence is approximately 4.5 miles southwest of the project area (CNDDB 2019).
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	—	—	2.2	Freshwater marshes and swamps; 50 to 1,000 feet elevation; blooms July-October.	Not expected to occur. Suitable marsh habitat is present in the project area; however, there is only one reported occurrence within the nine-quad search area approximately 2.7 miles northwest of the project area and it is an unconfirmed record from the Elk Grove area. The nearest confirmed occurrence is from Merced County (CNDDB 2019).
Dwarf downingia* *Downingia pusilla*	—	—	2B.2	Wetland. Valley and foothill grassland (mesic sites), vernal pools. Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 3 to 1,608 ft in elevation. Blooms March–May.	**May occur**. Suitable seasonal wetland and swale habitats are present in the project area. The nearest known occurrence of dwarf downingia is approximately 0.6 mile southeast of the project area (CNDDB 2019).

Species	Listing Status[1]			Habitat	Potential for Occurrence
	Federal	State	CRPR		
Boggs Lake hedge-hyssop* *Gratiola heterosepala*	—	SE	1B.2	Chaparral, valley and foothill grassland, cismontane woodland, vernal pools, meadows and seeps. Vernally mesic sites. Sometimes on edges of vernal pools. 98 to 3363 ft in elevation. Blooms March-June.	**May occur**. Suitable seasonal wetland and swale habitats are present in the project area. The nearest known occurrence of this species is approximately 6.5 miles northeast of the project area (CNDDB 2019).
Woolly rose-mallow *Hibiscus lasiocarpus*	—	—	1B.2	Margins of freshwater marshes, wet riverbanks, and on low, peat islands in sloughs of the Delta; 0 to 400 feet elevation; blooms June–September.	**May occur**. Suitable freshwater marsh habitat is present in the project area. The nearest known occurrence of this species is within the Stone Lakes NWR, approximately 0.2 mile southwest of the project area (CNDDB 2019).
Northern California black walnut *Juglans hindsii*	—	—	1B	Riparian scrub, woodland, and forest.	Not expected to occur. Only one confirmed, native occurrence appears viable as of 2003 in Lake County (CNPS 2019a). Reported as possibly present in Butte County, but native status is questionable. Widely naturalized in cismontane CA. Formerly cultivated as rootstock for *J. regia*, with which it hybridizes readily (CNPS 2019a).
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	—	—	1B	Freshwater and brackish marshes, usually along the edges. Found in the San Joaquin delta region at 0 to15 feet elevation; blooms May–September.	**May occur**. Suitable freshwater marsh habitat is present in the project area. The nearest known occurrence of this species is from Snodgrass Slough, approximately 1.7 miles southwest of the project area (CNDDB 2019).
Legenere* *Legenere limosa*	—	—	1B.1	Vernal pools, wetland. In beds of vernal pools. 3 to 2,887 ft in elevation. Blooms April–June.	**May occur**. Suitable seasonal wetland and swale habitats are present in the project area. The nearest known occurrence of this species is approximately 1.2 miles northwest of the project area (CNDDB 2019).
Heckard's peppergrass *Lepidium latipes* var. *latipes*	—	—	1B.2	Alkaline flats in valley and foothill grassland; 6 to 656 feet elevation. Bloom: March–May.	**May occur**. Suitable alkaline valley grassland habitat could be present within the Stone Lakes NWR in the project area. The nearest known occurrence of this species is within the Stone Lakes NWR, approximately 1.7 miles northwest of the project area (CNDDB 2019).
Mason's lilaeopsis *Lilaeopsis masonii*	—	R	1B.1	Flooded tidal zones on mud-banks and flats along erosional creek-banks, sloughs, and rivers with freshwater marsh, brackish marsh, or riparian scrub influenced by saline water; 0 to 35 feet elevation; blooms April–November.	Not expected to occur. Marsh habitat in the project area is not tidally influenced and therefore not suitable microhabitat. The nearest known occurrence is from Delta Meadows State Park approximately 4 miles southwest of the project area (CNDDB 2019).
Slender Orcutt grass* *Orcuttia tenuis*	FT	SE	1B.1	Vernal pools, wetland. Often in gravelly substrate. 82 to 5758 ft in elevation. Blooms May-September (October).	**May occur**. Suitable seasonal wetland and swale habitats are present in the project area. The nearest known occurrence of this species is approximately 8 miles northeast of the project area (CNDDB 2019).
Sacramento Orcutt grass* *Orcuttia viscida*	FT	SE	1B.1	Vernal pools, wetland. 49 to 279 ft in elevation. Blooms April-July (September).	**May occur**. Suitable seasonal wetland and swale habitats are present in the project area. The only documented occurrence in the nine-quad search area of this species is approximately 9.8 miles

Species	Listing Status[1]			Habitat	Potential for Occurrence
	Federal	State	CRPR		
					northwest of the project area and this species is extirpated from this location (CNDDB 2019).
Sanford's arrowhead* *Sagittaria sanfordii*	—	—	1B.2	Wetland. Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0 to 2133 ft in elevation. Blooms May-October (November).	**May occur**. Suitable marsh and canal habitats are present in the project area and this species has been documented near the project area in the Stone Lakes NWR (CNDDB 2019).
Marsh skullcap *Scutellaria galericulata*	—	—	2.2	Freshwater marshes and swamps, meadows and seeps; 0 to 7,000 feet elevation; blooms June–September.	**May occur**. Suitable freshwater marsh habitat is present in the project area. The nearest known occurrence of this species is approximately 3.1 miles southwest of the project area (CNDDB 2019).
Side-flowering skullcap *Scutellaria lateriflora*	—	—	2.2	Freshwater marshes and swamps, meadows and seeps; 0 to 7,000 feet elevation; blooms June–September.	**May occur**. Suitable freshwater marsh habitat is present in the project area. The nearest known occurrence of this species is approximately 2.7 miles southwest of the project area (CNDDB 2019).
Suisun Marsh aster *Symphyotrichum lentum*	—	—	1B.2	Brackish and freshwater marshes along the banks of sloughs and other waterways; 0–10 feet elevation; blooms May–November.	Not expected to occur. Suitable freshwater marsh and canal habitat is present in the project area, but this species is generally known from lower elevations in Delta waterways. The nearest known occurrence of this species is approximately 5.1 miles southwest of the project area along the Delta Cross Channel (CNDDB 2019).
Saline clover *Trifolium hydrophilum*	—	—	1B.2	Salt marshes and in alkaline soils in moist valley and foothill grasslands and vernal pools; 0 to 1,000 feet elevation; blooms April–June.	**May occur**. Seasonal wetland and valley grassland habitats are present in the project area. The nearest known occurrence of this species is within the Stone Lakes NWR, approximately 1.3 miles northwest of the project area (CNDDB 2019).

Notes: CRPR = California Rare Plant Rank

[1] Listing Status Definitions

* SSHCP Covered Species

Federal:
FT Threatened (legally protected by ESA)
State:
SE Endangered (legally protected by CESA)
R Rare
California Rare Plant Ranks:
1B Plant species considered rare or endangered in California and elsewhere (protected under CEQA, but not legally protected under ESA or CESA)
2B Plant species considered rare or endangered in California but more common elsewhere (protected under CEQA, but not legally protected under ESA or CESA)
Threat Ranks:
0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
* SSHCP Covered Species

Sources: CNDDB 2019; CNPS 2019a, USFWS 2019

4.3.2 Special-Status Wildlife Species

Of the 41 special-status wildlife species identified during the review of existing data, 22 could occur in or near the project area. For species that "May occur," are "Known to Occur," or are "Likely to occur," these statements are shown in **bold** in the last column of the table. Ten species of fish are not expected to occur within the project area but are known to occur in the Sacramento River downstream from the project area.

Table 3 Special-Status Animal Species Known to Occur in the Region and their Potential for Occurrence in the Project Area

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Reptiles				
Western pond turtle* *Emys marmorata*	–	SSC	Aquatic, artificial flowing waters, marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters. A primarily aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	**Likely to occur**. Suitable aquatic habitat is present in the irrigation canals and streams/creeks in the project area. The project area also contains a limited amount of potentially suitable upland egg-laying habitat within grasslands. There is a known occurrence of this species is that overlaps the survey area at Twin Cities Road. (CNDDB 2019).
Giant garter snake* *Thamnophis gigas*	FT	ST	Marsh and swamp, riparian scrub, wetland. Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	**Likely to occur**. Suitable aquatic habitat is present and there are CNDDB occurrence records of giant garter snake within the project area (CNDDB 2019).
Amphibians				
California tiger salamander * *Ambystoma californiense*	FE	ST	Cismontane woodland, meadow and seep, riparian woodland, valley and foothill grassland, vernal pool, and wetlands. Sonoma county DPS federally listed as endangered. Need underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.	Not expected to occur. Suitable vernal pool habitat is not present within the study area, and this species is only known to occur south of the Cosumnes River, despite extensive surveys to locate the species north of the Cosumnes River (County of Sacramento et al. 2018). There are no known occurrences of this species within the nine-quad search area.
Foothill yellow-legged frog *Rana boylii*	–	CE SSC	Aquatic, chaparral, cismontane woodland, coastal scrub, Klamath/north coast flowing waters, lower montane coniferous forest, meadow and seep, riparian forest, riparian woodland, and Sacramento/San Joaquin flowing waters. Partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	Not expected to occur. This species is presumed extirpated from the Mokelumne River drainage. The one known occurrence is from 1958 north of Lodi (CNDDB 2019).
California red-legged frog *Rana draytonii*	FT	SSC	Aquatic, artificial flowing waters, artificial standing waters, freshwater marsh, marsh & swamp, riparian forest, riparian scrub, riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, south coast flowing waters. Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Not expected to occur. This species is presumed to be extirpated from the Central Valley. There are no known occurrences of this species within the nine-quad search area.
Western spadefoot* *Spea hammondii*	–	SSC	Cismontane woodland, coastal scrub, valley and foothill grassland, vernal pool, and wetlands. Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Not expected to occur. Suitable vernal pool breeding habitat is lacking within the study area and there are no known occurrences of this species within the nine-quad search area.

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Birds				
Cooper's hawk* *Accipiter cooperii*	–	–	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river floodplains; also, live oaks.	**Known to occur**. Suitable nest trees are present in the project area and there is suitable foraging habitat within open areas such as grasslands and irrigated pasture in and adjacent to the project area. The nearest known Cooper's hawk nesting occurrence is approximately 4.2 miles north (CNDDB 2019), but there are multiple eBird records in the project area.
Tricolored blackbird* *Agelaius tricolor* (nesting)	–	ST SSC	Freshwater marsh, marsh and swamp, swamp, wetland. Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	**Known to occur**. Tricolored blackbird could use blackberry brambles and freshwater marsh in and adjacent to the project area as nesting habitat. Suitable foraging grassland and agricultural habitat is present in the project area. Tricolored blackbird was observed in the project area during the reconnaissance survey in June 2019 and has been documented on the Stone Lakes NWR (USFWS 2007). The CNDDB also contains records of this species from the project area (CNDDB 2019).
Burrowing owl* *Athene cunicularia* (burrow sites)	–	SSC	Coastal prairie, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran Desert scrub, and valley and foothill grassland. Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Likely to occur**. Suitable grassland and burrow habitat are present within the project area and there are multiple occurrence records of burrowing owl in and adjacent to the project area (CNDDB 2019).
Ferruginous hawk* *Buteo regalis*	–	–	Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats.	**May occur**. Wintering only. This species could migrate through and forage or overwinter in the study area, but this species does not nest in the Central Valley. The two known occurrences within the nine-quad search area are approximately 4.7 and 5.6 miles from the project area in the vicinity of the Bufferlands Preserve, a known transient/wintering site (CNDDB 2019).
Swainson's hawk* *Buteo swainsoni* (nesting)	–	ST	Great Basin grassland, riparian forest, riparian woodland, valley and foothill grassland. Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Known to occur**. Suitable nest trees are present in the study area and there is suitable foraging habitat within grasslands and irrigated pasture in and adjacent to the project area and there are multiple nesting occurrence records in and adjacent to the project area (CNDDB 2019). Swainson's hawk was observed in the project area during the reconnaissance survey in June 2019.
Northern harrier* *Circus cyaneus* (nesting)	–	SSC	Coastal scrub, Great Basin grassland, marsh and swamp, riparian scrub, valley and foothill grassland, and wetlands. Coastal salt and fresh-water marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Likely to occur**. Potentially suitable grassland nesting and foraging habitat for this species is present in the project area. While there are no known nesting occurrences of northern harrier within the nine quad search area, northern harrier has been documented within the Stone Lakes NWR (eBird 2019) and Bufferlands and is observed regularly in

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
				the project vicinity by local Ascent biologists. This species is underreported in the CNDDB.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis* (nesting)	FT	SE	Nests in large blocks of deciduous riparian thickets or forests with dense, low-level or understory foliage adjacent to slow-moving watercourses, backwaters along broad, lower floodplains of larger river systems. Willow and cottonwood are almost always a component of the vegetation. In the Sacramento Valley, also utilizes adjacent walnut orchards.	Not expected to occur. This species could migrate through and forage in the project area, but nesting is not expected. The nearest known presumed extant occurrence is approximately 4.3 miles southwest of the study area and the site is believed to support a migratory corridor (CNDDB 2019). A CNDDB occurrence from 1896 near Clarksburg indicates this species once occurred in the Sacramento-San Joaquin Delta (CNDDB 2019). There are reported occurrences from the Cosumnes River Preserve (eBird 2019).
White-tailed kite* *Elanus leucurus* (nesting)	–	FP	Cismontane woodland, marsh and swamp, riparian woodland, valley and foothill grassland, and wetlands. Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Likely to occur**. Suitable nest trees are present in the project area and there is suitable foraging habitat within grasslands, irrigated pasture, and marsh habitat in and adjacent to the project area. The nearest known white-tailed kite nesting occurrence is approximately 0.9 mile east of the project area (CNDDB 2019). White-tailed kite has been documented within the project area (eBird 2019) and is regularly observed in the project vicinity by local Ascent biologists. This species is underreported in the CNDDB.
Lesser sandhill crane *Grus canadensis* (wintering)	–	SSC	Annual and perennial grassland habitats, pastures, moist croplands with rice or corn stubble, and open, emergent wetlands.	**Known to occur**. Suitable winter foraging habitat is present, and this species is known to winter in the project vicinity between Elk Grove and Galt. Routinely observed in high concentrations by Regional San biologists. Species does not breed in California, wintering only.
Greater sandhill crane* *Grus canadensis tabida* (nesting and wintering)	–	ST, FP	Annual and perennial grassland habitats, pastures, moist croplands with rice or corn stubble, and open, emergent wetlands. Typically nests in mounds of wetland plants or hummocks in remote portions of extensive wetlands. Sometimes nests in grass-lined depressions on dry sites.	**Known to occur**. Suitable winter foraging habitat is present, and this species is known to winter in the project vicinity between Elk Grove and Galt and also at the Stone Lakes NWR (USFWS 2007). This species only overwinters in the Central Valley; it does not breed in the Central Valley. This species was observed flying over the project area during the November 2019 reconnaissance surveys and is regularly observed in high concentrations in the project vicinity by local Ascent and Regional San biologists.
Least bittern *Ixobrychus exilis* (nesting)	–	SSC	Nests in freshwater and brackish marshes with tall, dense emergent vegetation with clumps of woody plants over deep water.	**Likely to occur**. Suitable habitat is present in freshwater marsh habitat in the project area. Least bittern has been documented at Stone Lakes NWR (eBird 2019).
California black rail *Laterallus jamaicensis coturniculus* (year round)	–	ST, FP	Brackish marsh, freshwater marsh, marsh and swamp, salt marsh, wetland. Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	**May occur**. Suitable habitat is present in the project area in freshwater marsh habitats. The nearest known occurrence of this species is approximately 1.1 miles southwest of the project area within Stone Lakes NWR (CNDDB 2019), but this occurrence at the Stone Lakes Blue Heron Trail is considered unusual (Chris Conard 2020).

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Loggerhead shrike* *Lanius ludovicianus* (nesting)	–	SSC	Forages and nests in grasslands, shrublands, and open woodlands. Nests in trees and shrubs.	**Likely to occur**. Suitable habitat is present in the project area. Loggerhead shrike has been documented immediately adjacent to the project area and within the Stone Lakes NWR (eBird 2019).
Song sparrow – "Modesto" population (*Melospiza melodia*) (year round)	_	SSC	Nests and forages primarily in emergent marsh, riparian scrub, and early successional riparian forest habitats in the north-central portion of the Central Valley; infrequently in mature riparian forest and sparsely vegetated ditches and levees. Forages primarily on exposed ground or in leaf litter.	**Likely to occur**. Suitable habitat is present in marsh and riparian habitat in and adjacent to the project area. The nearest known occurrence is within 500 feet southwest of the project area within the Stone Lakes NWR (CNDDB 2019).
Yellow warbler *Setophaga petechia* (nesting)	_	SSC	Nests and forages in riparian communities, preferably with willow, cottonwood, aspen, sycamore, or alder.	**May occur**. Suitable habitat is present in riparian habitat in and adjacent to the project area. Yellow warbler has been documented at the Stone Lakes NWR (eBird 2019). However, nesting is considered unlikely in the project area. The two nesting records recorded at the Cosumnes Preserve were in extensive areas of willow/cottonwood riparian. The patchy riparian areas in the project areas would not likely support nesting yellow warblers (Chris Conard 2020).
Least Bell's vireo *Vireo bellii pusillus*	FE	SE	Low, dense riparian vegetation thickets along waterways, or along dry parts of intermittent streams. Typically associated with willow, cottonwood, coyote brush, or blackberry.	Not expected to occur. Project area is outside nesting range. CNDDB reports two occurrences near the Yolo Bypass. Also recorded at Bufferlands and Cosumnes River Preserve; however, this species is migratory only in this region. Summer resident of low riparian scrub in southern California.
Yellow-headed blackbird *Xanthocephalus xanthocephalus* (nesting)	_	SSC	Nests in freshwater emergent wetlands with dense vegetation, deep water, and an abundance of large insects, typically on the edges of lakes, reservoirs, or large ponds.	**May occur**. Suitable habitat is present in the project area within the Stone Lakes NWR. The nearest known nesting occurrence is approximately 5.6 miles northwest of the study area and is from 1899 (CNDDB 2019). Yellow-headed blackbird has been observed immediately adjacent to the project area and within the Stone Lakes NWR as recently as 2015 (eBird 2019).
Fish				
Green sturgeon – southern DPS *Acipenser medirostris*	FT	SSC	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters. These are the most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramento, Klamath, and Trinity Rivers. Spawns at temperatures between 8-14 degrees C. Preferred spawning substrate is large cobble but can range from clean sand to bedrock.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
White sturgeon *Acipenser transmontanus*	–	SSC	Aquatic, estuary, Klamath/north coast flowing waters, Sacramento/San Joaquin flowing waters. Live in estuaries of large rivers, moving into freshwater to spawn. Most abundant in brackish	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. There are no

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
			portions of estuaries. In estuaries adults concentrate in deep areas with soft bottoms.	documented occurrences of this species within the nine-quad search area.
Pacific lamprey *Entosphenus tridentatus*	–	SSC	Aquatic, Klamath/north coast flowing waters, Sacramento/San Joaquin flowing waters, South coast flowing waters. Found in Pacific Coast streams north of San Luis Obispo County, however regular runs in Santa Clara River. Size of runs is declining. Swift-current gravel-bottomed areas for spawning with water temperatures between 12-18 degrees C. Ammocoetes need soft sand or mud.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
Delta smelt *Hypomesus transpacificus*	FT	SE	Aquatic, estuary. Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt. Most often at salinities < 2ppt.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat. The nearest known occurrence of delta smelt is approximately 7.8 miles southwest of the project area in the mainstem Sacramento River (CNDDB 2019).
River lamprey *Lampetra ayresii*	–	SSC	Aquatic, Sacramento/San Joaquin flowing waters. Lower Sacramento River, San Joaquin River and Russian River. May occur in coastal streams north of San Francisco Bay. Adults need clean, gravelly riffles, ammocoetes need sandy backwaters or stream edges, good water quality and temperatures < 25 C	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
Sacramento hitch *Lavinia exilicauda*	–	SSC	Aquatic. Slow, warm waters, including lakes and slow-moving river reaches or low-gradient streams among aquatic vegetation in sandy runs or pools.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
Steelhead - California Central Valley DPS *Oncorhynchus mykiss irideus* pop. 11	FT	–	Aquatic. Sacramento/San Joaquin flowing waters. Populations in the Sacramento and San Joaquin rivers and their tributaries.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. The nearest known occurrence of Central Valley steelhead is from the Cosumnes River immediately adjacent to the project area (CNDDB 2019).
Chinook salmon – Central Valley fall / late fall-run ESU *Oncorhynchus tshawytscha* pop. 13	–	SSC	Aquatic. Sacramento/San Joaquin flowing waters. Populations spawning in the Sacramento and San Joaquin rivers and their tributaries.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this population is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
Chinook salmon – Central Valley spring-run ESU *Oncorhynchus tshawytscha* pop. 6	FT	ST	Aquatic. Sacramento/San Joaquin flowing waters. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps >27 C are lethal to adults. Federal listing refers to populations spawning in Sacramento River and tributaries.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this population is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
Chinook salmon - Sacramento River winter-run ESU *Oncorhynchus tshawytscha* pop. 7	FE	SE	Aquatic. Sacramento/San Joaquin flowing waters. Sacramento River below Keswick Dam. Spawns in the Sacramento River, but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 C for spawning.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this population is known to occur in the Sacramento River. There are no documented occurrences of this species within the nine-quad search area.
Sacramento splittail *Pogonichthys macrolepidotus*	–	SSC	Aquatic, estuary, freshwater marsh, Sacramento/San Joaquin flowing waters. Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay and associated marshes. Slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. The nearest known occurrence of Sacramento splittail is from the Sacramento River approximately 4.2 miles west at its closest point to the project area (CNDDB 2019).
Longfin smelt *Spirinchus thaleichthys*	FC	SSC	Aquatic, estuary. Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 ppt but can be found in completely freshwater to almost pure seawater.	Not expected to occur. The irrigation ditches and streams/creeks within the project area are not suitable habitat, but this species is known to occur in the Sacramento River. The nearest known occurrence of longfin smelt is from the Sacramento River approximately 2.6 miles west at its closest point to the project area (CNDDB 2019).
Invertebrates				
Conservancy fairy shrimp *Branchinecta conservatio*	FE	–	Valley and foothill grassland, vernal pool, wetland. Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	Not expected to occur. Suitable vernal pool habitat is not present, and this species is not known to occur in Sacramento County ((USFWS 2012). There are no known occurrences of this species within the nine-quad search area.
Vernal pool fairy shrimp* *Branchinecta lynchi*	FT	–	Valley and foothill grassland, vernal pool, wetland. Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**May occur**. Vernal pool and seasonal wetland habitat within the project area could provide suitable habitat. The nearest known vernal pool fairy shrimp occurrence is approximately 0.9 miles northwest of the project area within the Stone Lakes NWR (CNDDB 2019).
Mid-valley fairy shrimp* *Branchinecta mesovallensis*	–	–	Vernal pool, wetland. Vernal pools in the Central Valley.	**May occur**. Vernal pool and seasonal wetland habitat within the project area could provide suitable habitat. The nearest known occurrence of mid-valley fairy shrimp is approximately 0.9 mile northwest of the project area (CNDDB 2019).
Valley elderberry longhorn beetle* *Desmocerus californicus dimorphus*	FT	–	Riparian scrub. Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus nigra* ssp. *caerulea*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	**May occur**. Elderberry shrubs were not observed in the survey area during the reconnaissance visits during June, July, and November 2019 but could occur on private land within the project area. The nearest known valley elderberry longhorn beetle occurrence overlaps the project area (CNDDB 2019).
Ricksecker's water scavenger beetle* *Hydrochara rickseckeri*	–	–	Aquatic, Sacramento/San Joaquin flowing and standing waters,	Not expected to occur. This species is known only from eight localities in more than 120 years and only from a single locality in the last 45 years (Short et al. 2017). The nearest known occurrence

Species	Listing Status[1]		Habitat	Potential for Occurrence
	Federal	State		
				of this species is approximately 1.8 miles south of the project area from the Cosumnes River Preserve (CNDDB 2019).
Vernal pool tadpole shrimp* *Lepidurus packardi*	FE		Valley and foothill grassland, vernal pool, wetland. Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	**May occur**. Vernal pool and seasonal wetland habitat within the project area could provide suitable habitat. There are CNDDB occurrence records within and adjacent to the project area (CNDDB 2019).
Mammals				
Western red bat* *Lasiurus blossevillii*		SSC	Cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland. Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**May occur**. Western red bat may forage in the project area. Suitable roost habitat is present in oak and riparian trees in the project area and vicinity. There are no known occurrences of this species within the nine-quad search area.
Riparian brush rabbit *Sylvilagus bachmani riparius*	FE	SE	Riparian areas with dense thickets of rose, willow, and blackberry.	Not expected to occur. Suitable riparian habitat is present in and adjacent to the project area; however, the project area is outside the species' range and this species is known only from the San Joaquin River. The single CNDDB record of this species is from an artificial breeding program at the White Slough Wildlife Area.
American badger* *Taxidea taxus*	–	SSC	Drier open shrub, forest, and herbaceous habitats with friable soils. Needs open, uncultivated land.	Not expected to occur. American badger could occasionally forage in grasslands within the project area, but regular agricultural disturbance makes it generally unsuitable for this species to den. The single CNDDB record of American badger is from 1938 approximately 2 miles west of the project area (CNDDB 2019).

Note: CNDDB = California Natural Diversity Database

1. Legal Status Definitions

Federal:
FE Endangered (legally protected)
FT Threatened (legally protected)
FC Candidate

State:
FP Fully protected (legally protected)
SSC Species of special concern (no formal protection other than CEQA consideration)
SE Endangered (legally protected)
ST Threatened (legally protected)
CE Candidate

* SSHCP Covered Species

Sources: CNDDB 2019; eBird 2019, USFWS 2019

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Appendix A

Land Cover Maps

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 1 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 2 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 3 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 4 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 5 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 6 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 7 of 40

Source: Adapted by Ascent Environmental in 2020

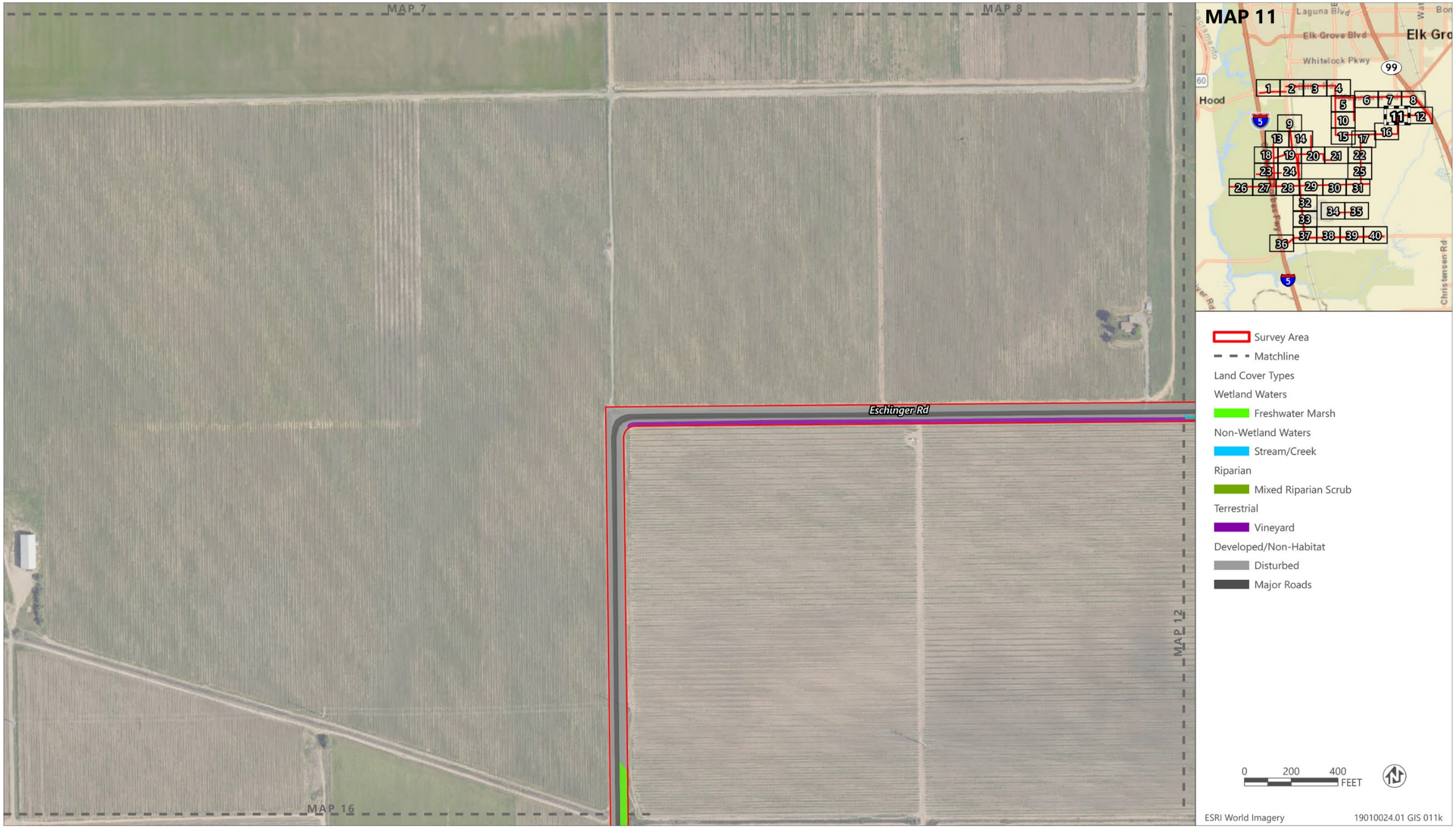
Land Cover Types – Map 8 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 9 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 10 of 40



Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 11 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 12 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 13 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 14 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 15 of 40

Source: Adapted by Ascent Environmental in 2020

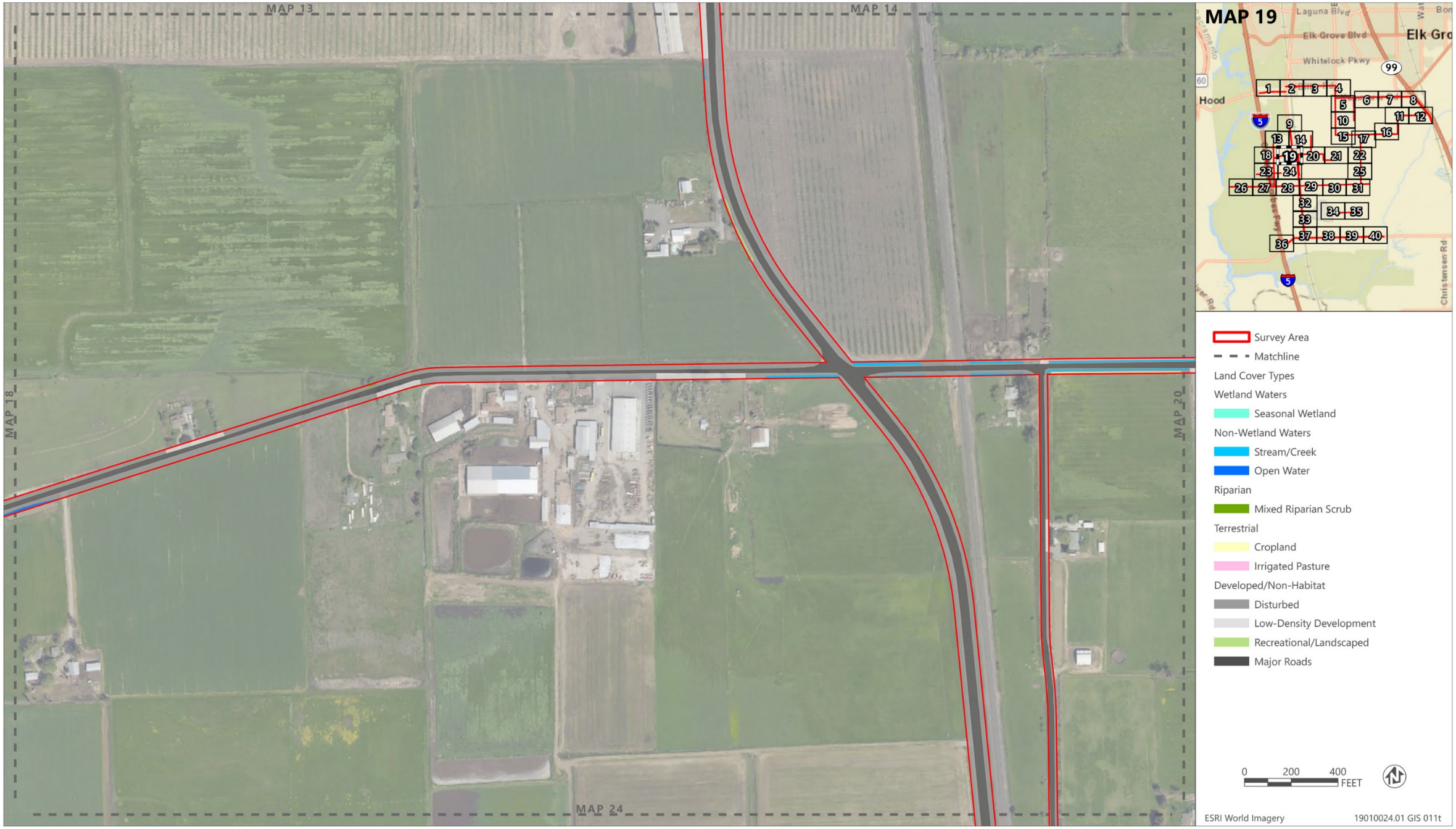
Land Cover Types – Map 16 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 17 of 40

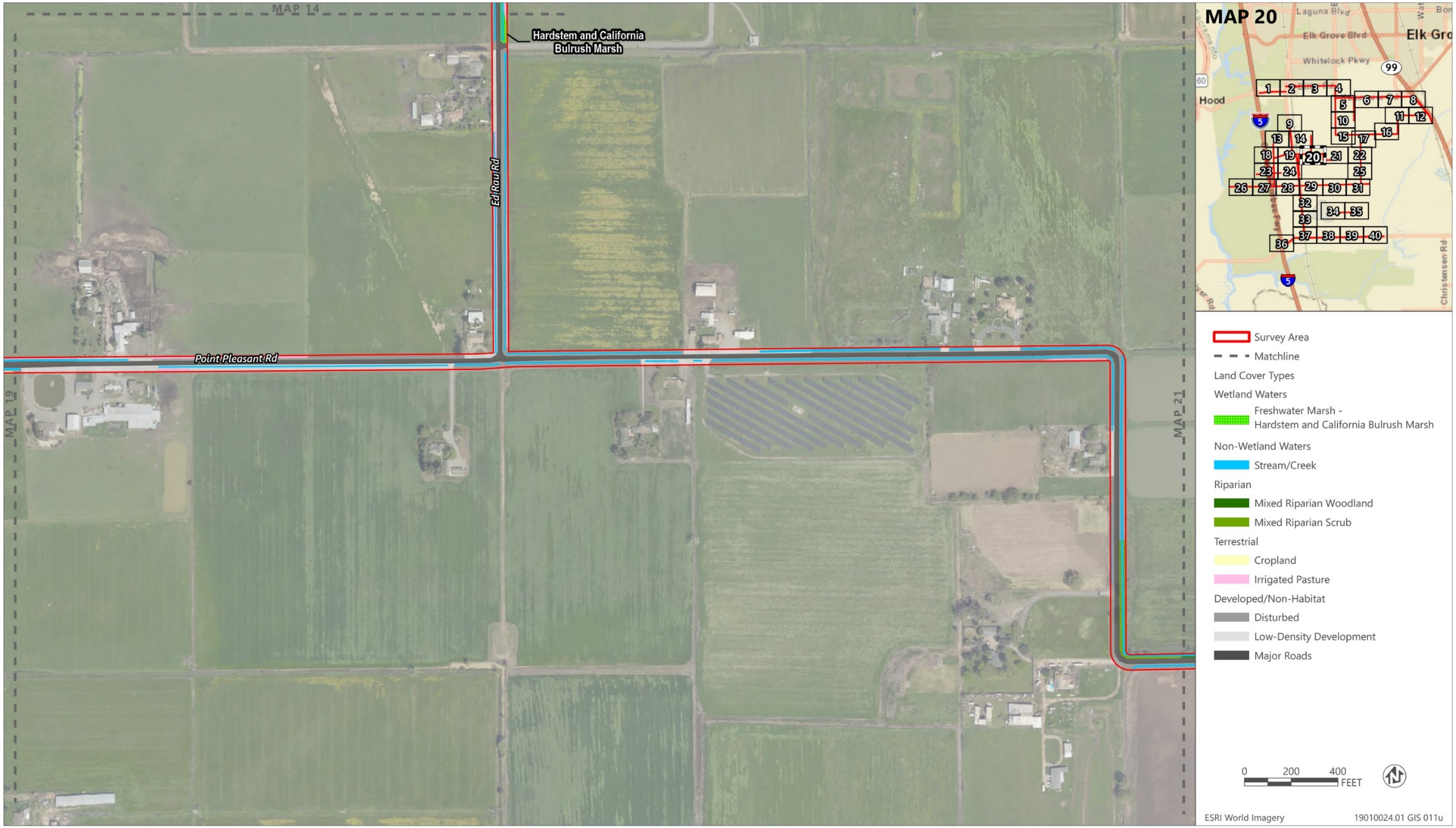
Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 18 of 40



Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 19 of 40



Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 20 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 21 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 22 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 23 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 24 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 25 of 40

Source: Adapted by Ascent Environmental in 2020

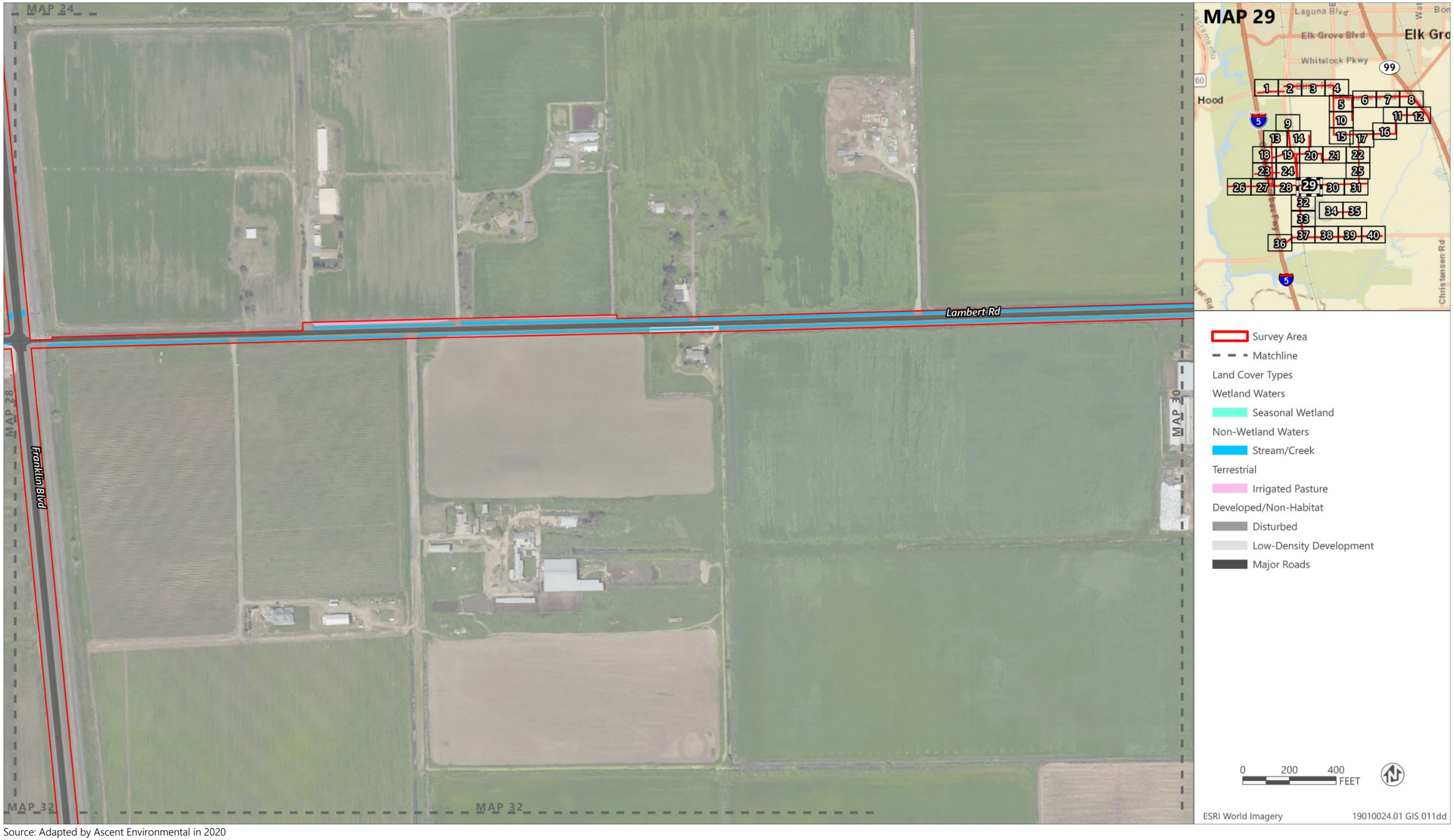
Land Cover Types – Map 26 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 27 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 28 of 40



Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 29 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 30 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 31 of 40

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Land Cover Types – Map 32 of 40

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Land Cover Types – Map 33 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 34 of 40

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Land Cover Types – Map 36 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 37 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 38 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 39 of 40

Source: Adapted by Ascent Environmental in 2020

Land Cover Types – Map 40 of 40