Putah-Cache Watershed Arundo Eradication Project
Yolo and Solano Counties, California

Initial Study and Mitigated Negative Declaration

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Acronyms Used

Acronym	Meaning
BMP	Best Management Practice
CDFW	California Department of Fish and Wildlife
Cal-IPC	California Invasive Plant Council
CCAP	Cache Creek Area Plan
CARLF	California Red-Legged Frog
CCRMP	Cache Creek Resources Management Plan
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CVS	Central Valley spring-run
DPR	Department of Pesticide Regulation
DWR	Department of Water Resources
EPA	Environmental Protection Agency
FESA	Federal Endangered Species Act
FWS	Fish and Wildlife Service
GHG	Greenhouse gas
HCP	Habitat Conservation Plan
HQ	Hazard Quotient
IRWM	Integrated Regional Watershed Management
IS/MND	Initial Study/Mitigated Negative Declaration
LD50	Lethal Dose 50
LOC	Level of concern
MND	Mitigated Negative Declaration
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observable Adverse Effect Level
NPDES	National Pollution Discharge Elimination System
NPE	Nonylphenol polyethoxylate
NRCS	Natural Resources Conservation Service
RCD	Resource Conservation District
SERA	Syracuse Environmental Research Associates
SWRCB	State Water Resources Control Board
RWQCB	Regional Water Quality Control Board
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
VELB	Valley Elderberry Longhorn Beetle
WCB	Wildlife Conservation Board
YCRCD	Yolo County Resource Conservation District
YCFCWCD	Yolo County Flood Control and Water Conservation District

Initial Study

I. BACKGROUND INFORMATION

A. Project Background

Arundo donax (giant reed or arundo) was introduced into and has expanded throughout many of the waterways in Yolo County to varying degrees from dense, flow diverting stands to small scattered clumps. For decades, various organizations and agencies have carried out work to reduce or remove stretches and patches of arundo as well as several other known riparian noxious, invasive weeds that degrade stream function and habitat including: tamarisk (*Tamarix parviflora* and *T. ramosissima*), Ravenna grass (*Saccharum ravennae*) and perennial pepperweed (*Lepidium latifolium*). However, approximately 256 acres of arundo and about 200 acres of *Tamarisk* spp. remain along 96 miles of creeks and waterways in the Putah-Cache Watersheds in Yolo County. The Yolo County Resource Conservation District (YCRCD) is embarking on a concerted effort to eradicate arundo from all of Yolo County, along with as many of these other noxious, invasive weeds as is realistic and economical to do concurrently. To do this effectively we will coordinate and communicate with managers of Solano and Lake County's adjacent waterways.

B. Project Summary

Project Title:	Putah-Cache Watershed Arundo Eradication Project, Yolo and Solano Counties, California
File No.:	WC-1740BC, Project ID:2018020
Project Location:	Putah-Cache Watershed
Name of Property Owner:	About 300 landowners are identified
Name of Applicant:	Yolo County Resource Conservation District (YCRCD)
Assessor's Parcel Number(s):	About 661 APNs are identified
Acreage of Project:	Up to 456 acres: 256 (arundo) + 200 (tamarisk) acres of non-native plant control
General Plan Designation:	Numerous
Zoning Districts:	Solano County: Exclusive Agricultural (A-40). Yolo County: Agricultural Intensive (A-N), Agricultural Extensive (A-X), Public/Quasi Public (PQP), Cities.
Lead Agency:	Yolo County Resource Conservation District (YCRCD)
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II. DESCRIPTION OF PROJECT AND ENVIRONMENTAL SETTING

A. Project Description

Introduction

The Yolo County Resource Conservation District (YCRCD) plans to implement a large scale invasive *Arundo donax* (giant reed or arundo) eradication project in the Putah-Cache Watershed (Figure 1). Removal of arundo and other invasive species allows native vegetation to re-establish, restoring the native character of the landscape as well as saving water and reducing fire and flood risk. Arundo is a difficult plant to control and is a prolific colonizer. For this project to be successful, all the arundo in Yolo County will need to be controlled. This work will build directly on the Central Valley mapping of arundo by the California Invasive Plant Council (Cal-IPC 2019) which is funded by the Wildlife Conservation Board. Populations of arundo growing in the Putah-Cache Watershed are impacting numerous physical and biological processes in the riparian area. Large stands of arundo have increased erosion of banks, trapped sediment which alters river geomorphology, created localized impacts on stream channel processes, pushed low flows into alternate channels and resulted in flooding on streamside properties and occasional farmland loss (Cal-IPC 2011, Higgins & Kamman 2010). In addition, arundo negatively impacts habitat quality and ecosystem functions for many aquatic and riparian species (Cal-IPC 2011).

Project Need

Arundo is a bamboo-like perennial grass up to 8m (25 ft.) tall that grows in riparian habitat, forming large dense stands and using three times the amount of water used by native riparian vegetation (DiTomaso 2007). This project, if implemented, will save an estimated 2,540 acre-feet of water per year by eliminating approximately 127 acres of arundo (Cal-IPC 2011). Arundo out-competes native vegetation and provides poor quality habitat for native wildlife (DiTomaso 2007).

The flora and fauna that make up the riparian habitat in the Putah-Cache Watershed are negatively impacted by arundo through direct displacement, competition for water, modification of fluvial and hydrologic processes, increased erosion rates, increased fire risk, and human disturbance responding to arundo impacts (responding to fire and flood damage). Unlike native riparian plants, arundo provides little shading to the in-stream habitat, leading to increased water temperatures and reduced habitat quality for aquatic wildlife. Aquatic species also require native leaf litter, and the litter from arundo plants is coarser, breaks down more slowly and is generally of a poorer quality for native invertebrates (Dudley & Going, 2007). Once established, arundo has the ability to out-compete and completely suppress native vegetation and significantly alter aquatic and riparian habitat. Sensitive wildlife species at risk due to the presence and proliferation of arundo include threatened species such as the fall-run Chinook salmon and the federally listed Valley elderberry longhorn beetle.

Infrastructure is also at risk due to arundo (Cal-IPC 2011). Arundo growing in the riparian area alters the flood regime by increasing floodplain roughness and raising peak flow water levels, creates unstable banks due to its poorly developed root systems that easily fragment, and contributes to bridge and flood control structure failure by becoming lodged against bridge pylons and blocking and diverting flows. Eventually enough water backs up against the bridge or other structure causing the structure to fail or flows to bypass the structure, causing extensive damage. The project will conserve water, reduce erosion, mitigate flood and fire risks, restore the fluvial processes impacted by arundo, and improve habitat for wildlife by removing arundo from the Putah-Cache Watershed.

Background and Site Description

The proposed arundo eradication efforts will begin upstream at the county line for Cache Creek and at Monticello Dam for Putah Creek (Figure 1). The Cache Creek corridor from the Yolo County line to the

Sacramento River runs 52.8 river miles. Putah Creek from Monticello Dam at Lake Berryessa to the Sacramento Rivers runs 23.6 river miles. The riparian corridors of these and a number of smaller tributaries combined within their watersheds total more than 96 miles and 256 acres of arundo.

Although the project is focused on controlling arundo, other invasive non-native plants will also be treated in the project area using the same methodologies outlined in this document. The California Invasive Plant Council lists these plants in the Invasive Plant Inventory for California (http://www.cal-ipc.org/ip/inventory). Approximately 200 acres of tamarisk co-occurring with arundo may also also be controlled (Figure 1), as well as other invasive non-native plants that are degrading riparian function in the project area such as Ravenna grass, perennial pepperweed, and Himalayan blackberry.

The Putah-Cache Watershed covers approximately 2,500 square miles and combines several smaller watersheds, including Cache Creek in the northwestern part of Yolo County, Putah Creek along the southern boundary of the county, Pleasants Creek in neighboring Solano County, and five smaller tributaries of the foothills in the western part of the county known as the Westside tributaries: Cottonwood Slough, Willow Slough, Union School Slough, Dry Slough and Chickahominy Slough.

Cache Creek and Putah Creek are the two prominent waterways in Yolo County flowing from the Coast Range toward the Sacramento River. Cache Creek is the source of irrigation water for the majority of Yolo County farmland. The headwaters of Cache Creek begin north of Clear Lake in the Coast Range and leave at the outlet of Clear Lake. There are two main tributaries: the North Fork, starting in the Mendocino National Forest north of Clear Lake and dammed by the Indian Valley Reservoir, and Bear Creek, which starts in Bear Valley. Irrigation water is diverted for distribution throughout Yolo County at the Capay Diversion Dam, just west of the town of Capay. The historic Cache Creek channel continues to flow eastward and into the Cache Creek Settling Basin east of Woodland. During high flows, the Settling Basin overflows into the Yolo Bypass and to the Sacramento River.

The upper Putah Creek watershed begins at Cobb Mountain in Lake County, in the Coast Range, flows into Lake Berryessa and out through Monticello Dam, through the cities of Winters and Davis toward the Putah Creek sinks and the Yolo Bypass. This project also includes Pleasants Creek, which begins in Solano County and empties into Putah Creek just upstream of Winters.

Smaller waterways that drain the Rocky Ridge between Cache and Putah Creeks include Cottonwood Slough, Willow Slough, Union School Slough, Dry Slough and Chickahominy Slough. These are often referred to within Yolo County as the Westside Tributaries and also empty in various ways into the Yolo Bypass. Pleasants Creek enters Putah Creek on its south bank from Solano County.

The project area can be found on two USGS 7.5 x 7.5 minute maps entitled: “Santa Rosa E” and “Sacramento W” and includes all of the waterways within the Putah-Cache watershed that lie within the Yolo County boundaries. It also includes Pleasants Creek, which begins in Solano County and empties into Putah Creek just upstream of Winters.

Existing Land Use

Yolo County agriculture is heavily dependent on surface water from these watersheds, with some areas supplied by groundwater or with groundwater as a backup during droughts. The primary land uses in the Putah-Cache watershed include upland grazing, irrigated pasture, agricultural crops such as orchards, vineyards, annual row crops and field crops, urban areas and public and private open space lands. Grazing occurs in the foothills, Coast Range Mountains and portions of the valley floor. The tree, vine and annual crops cover the flat portions of the valley, encroaching into the foothills. About 85% of our project area in Yolo County is located adjacent to cropland in the Agricultural Intensive (A-N) zone, 13% in the grazing Agricultural Extensive (A-X) and University of California Davis Public/Quasi Public zones. There are a few patches within city limits. In Solano County, 100% of the project area is zoned Exclusive Agricultural (A-40).

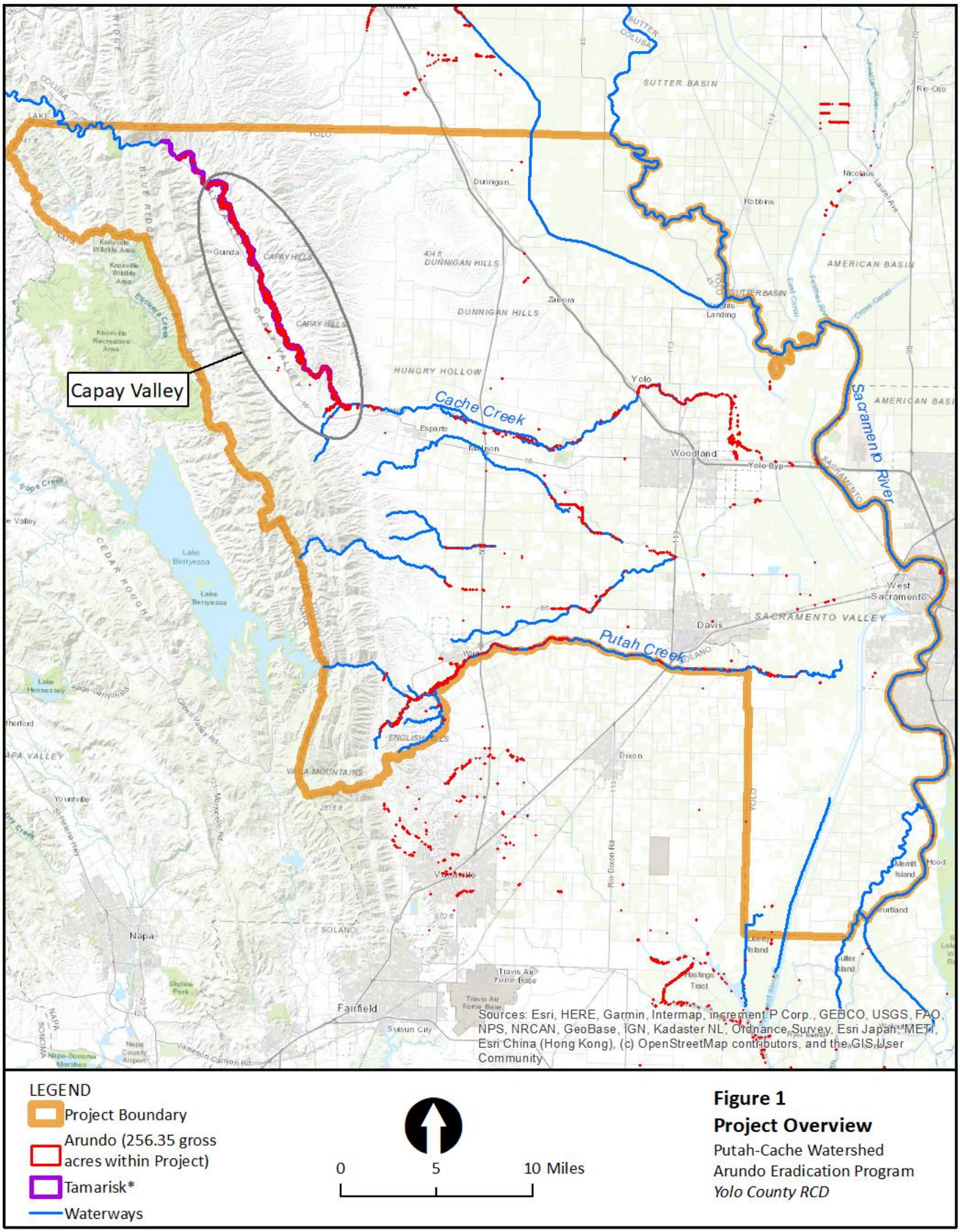

Figure 1
Project Overview
Putah-Cache Watershed
Arundo Eradication Program
Yolo County RCD

* Tamarisk was mapped only in the Capay Valley area.

The majority of arundo control will be concentrated along the active channel and floodplain within the stream corridor, though some efforts will also extend to higher elevation banks as needed to achieve full control from treatment areas. The stream corridor is a landscape feature that encompasses the stream channel and the adjacent areas that are directly shaped or influenced by hydrologic and geomorphic processes (Figure 2). Key components of the stream corridors in the Putah-Cache Watershed include:

- the channel **thalweg**: the main channel alignment that follows the path of minimum elevation and carries water during low-flow conditions;
- the **active channel**: includes the low flow channel and adjacent bar surfaces that are mostly unvegetated and inundated at times of moderately high discharge;
- the **floodplain**: the relatively flat area adjacent to the stream channel created by depositional processes associated with lateral migration of the stream channel; and
- **terrace** surfaces: an abandoned floodplain created under an earlier set of hydrologic conditions. Terraces are typically perched at a higher elevation than the active floodplain.

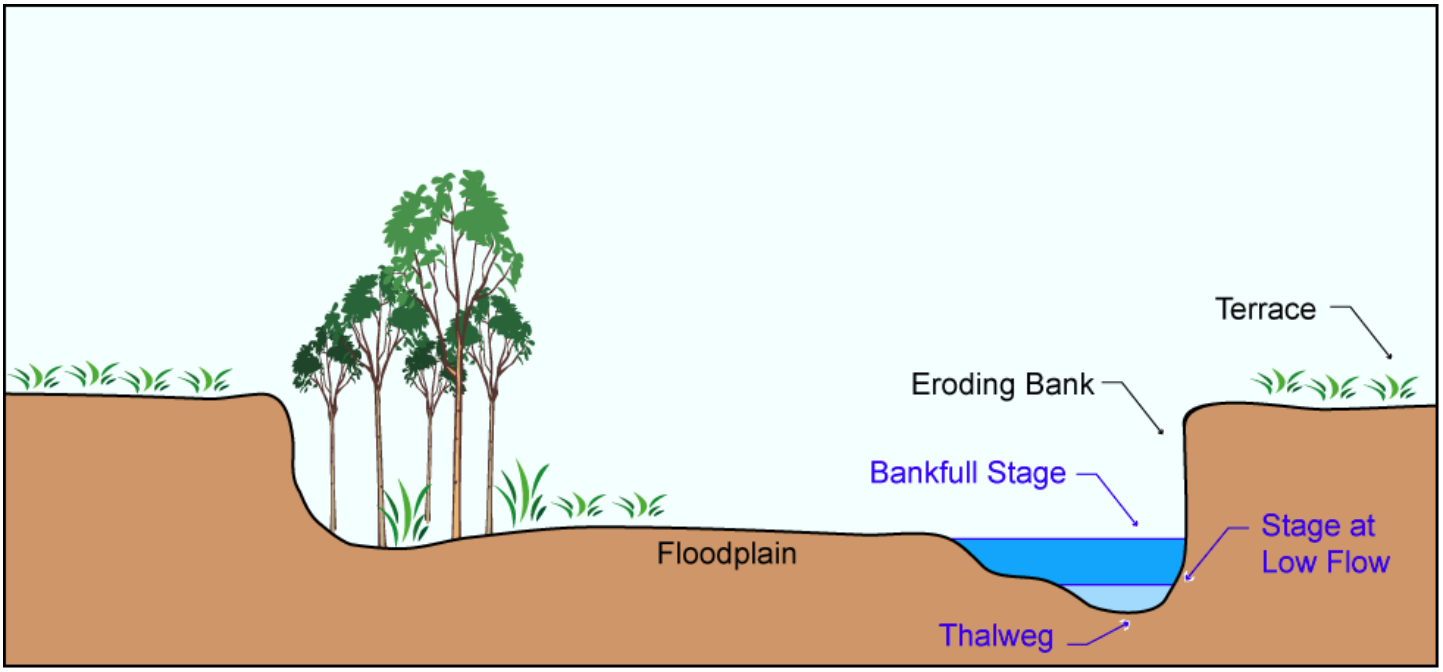

Figure 2. Schematic illustrating the primary components of the stream corridor in cross-sectional profile.

The alignment and configuration within the stream channel changes over time due to episodic cycles of sediment erosion, transport, and deposition that frequently rework streambed material. The present alignment and channel configuration is just one component of a much broader stream corridor through which the channel migrates laterally by natural geomorphic processes. KHE (2010) concludes that channel migration processes are an important mechanism essential to the maintenance of a functional river system within the Putah-Cache Watershed. Concurrent processes of streambank erosion and floodplain sedimentation dissipate energy during peak flow events, allow for maintenance of a stable channel profile, and sustain a variety of aquatic and riparian habitats that depend on relatively frequent disturbance.

A number of factors have altered the riparian vegetation characteristics within the Putah-Cache Watershed over the last 150 years. Expansion of agricultural activities included land clearance within areas of riparian woodland. Agricultural activities have transitioned through several different phases but current agricultural production includes orchards, field crops, and livestock grazing. Many of the lands that border the stream corridor are cultivated on floodplain soils and, more commonly, on the alluvial terraces. Farming these areas

includes an element of risk associated with the loss of land due to channel migration and streambank and terrace erosion.

The floodplains within the stream corridor are frequently dominated by non-native plants such as salt cedar, arundo, and Ravenna grass. Invasive, non-native plants have been known to alter the ecologic, hydrologic, and geomorphic conditions of the stream corridor. Arundo and tamarisk, for example, tend to grow in dense stands which trap and stabilize alluvial sediments and can trigger aggradation on floodplain surfaces which may result in channel narrowing, a decreased channel capacity, and increased overbank flooding. Stabilization of mid-channel or lateral gravel bars can direct flows toward the opposite bank and result in streambank erosion.

Partnerships and Funding

The YCRCD will lead a project team that will control arundo using methods outlined in the Initial Study, implement project monitoring and reporting, plant native, riparian vegetation in targeted areas to control erosion when needed, as well as complete all necessary local, state, and federal permits for the control and removal of arundo in the Putah-Cache Watershed. The project team will work in partnership to engage about 400 landowners with arundo on their property. Several organizations that have a long history of active stewardship in the watershed are working with YCRCD and include: the Putah Creek Council, the Lower Putah Creek Coordinating Committee, the Cache Creek Conservancy, the Yolo County Flood Control and Water Conservation District and the Solano RCD. The proposed project uses a collaborative, locally-led strategy to leverage existing landowner relationships to achieve full participation in the project. Long-term success will be accomplished through long-term management agreements with participating landowners. The project will be further supported by: USDA Natural Resources Conservation Service, Yolo County Ag Commissioner, University of California at Davis, Solano County Water Agency County of Yolo as well as private landowners.

YCRCD's project will be funded mainly through grant funding sources. Initial implementation is likely to be provided under the WCB Proposition 1 Streamflow Enhancement Program. Additional funding may occur through other agencies and programs such as: CDFW, SWRCB, DWR, IRWM, NRCS, State Resources, USFWS, etc. The project area includes many public and private properties. No work will occur without a right of entry agreement signed by both the land owner and the project lead (YCRCD). Lands owned by the Federal Government (Forest Service, Department of Defense, etc.) are excluded from the project area, this Initial Study, and the Mitigated Negative Declaration.

Project Timeline

Intensive project activities are to be carried out from July 16th to November 30th (herbicide treatment, hand cutting and hauling- with avian pre-surveys and buffers for work between July 16th and August 15th) and September 1st to November 30th (biomass reduction with mowers/tractors). The timing of these activities avoids or minimizes impacts to wildlife, fish and native plants (by avoiding work during breeding season). If needed, replanting will occur between November 1st and February 29th. Passive (no mechanized equipment) maintenance work (watering, treating with back pack sprayers, hand weeding, and hand watering) in revegetation and areas where biomass has been removed or cut (areas with no vegetation cover/nesting structure) is carried out from May 1st to July 15th. No work occurs from February 29th to April 30th (Table 1). These work dates are based on other arundo programs in the region and state, as well as stream restoration programs on Cache and Putah Creeks with active 1600 CDFW permits and California Environmental Quality Act (CEQA) coverage. Final work dates and avoidance measures (surveys and buffers) will be determined by CDFW and USFWS.

Table 1. Arundo Eradication Work Timeline

	Passive Work (maintenance)	Active Work (treatment, biomass handwork)	Active Work (biomass mowing)	Planting	No Work
Work Activity	Watering, backpack treatment, and hand weed control only (no mechanical/ powered equipment or cutting)	Treatment, cutting and hauling biomass, chipping: Smaller mechanical equipment & chippers.	Biomass reduction (mowing) with tractors	Planting container plants and cuttings, seeding	No work, only monitoring allowed
Dates of Occurrence	May 1 – July 15	July 16 – Nov 30	Sep 1 – Nov 30	Nov 1 – Feb 29	March 1 – April 30
Restrictions	Restricted to areas where target biomass has been removed and/or re-vegetation is occurring. No avian survey required.	Avian pre-surveys required July 16 to Aug 15.		Restricted to areas where target biomass has been removed and/or re-vegetation is occurring. Raptor/owl surveys Jan 15-Feb 29.	
Sensitive Biological Activities Occurring	Avian breeding, insect adult emergence, plant reproduction	Possible avian and insect activity			
Work status in water flows	No work in flowing water		No work in flowing water, but crossing water allowed.	No work in flowing water	

Arundo Removal Methods

The non-native, invasive plant control and riparian restoration project for the Putah-Cache watershed is based on systematic, landscape-level control of the target species, particularly arundo. This approach provides long term ecological and resource protection benefits. The methods used have been developed and tested in sections of lower Cache Creek within the county's Cache Creek Area Plan (CCAP) and under the Cache Creek Resources Management Plan (CCRMP). The arundo control project is also modelled on other large-scale programs that aim to accomplish watershed wide eradication of arundo, which include Salinas, San Luis Rey, and Santa Ana watersheds. These programs are centered on a strong lead agency, typically an RCD, mapping of arundo, GIS tracking of project permissions and authorizations for work, comprehensive long term permitting, securing grant funding, and a long-term landowner commitment to the re-treatment regimen. Control methods were pioneered and further developed for this region by the YCRCD over the last 25 years.

There are two parts of arundo control: (1) reduction and/or cutting/removal of biomass, which is usually used for dense stands and (2) treatment with herbicide to control the plant. Typically, biomass reduction occurs first, followed by herbicide treatment of re-sprouting arundo. Most of Yolo County will have arundo biomass cut and removed by hand or arundo will be treated with herbicide and left in place. Only target non-native plants will be treated with herbicide or mowed. Large stands of arundo and tamarisk in Capay Valley will require the use of tractors to mow the plants.

For large stands of arundo and tamarisk in the Capay Valley project area, the biomass reduction process involves using large mowers to mulch the plant material, and leave it in place. Mowers are large tractors (up to 50,000 lb) with fixed teeth mowing heads mounted in front of enclosed cabs with either rubber mining tires or tracks. No stands of native vegetation will be reduced or mowed and no cutting or mowing of native material greater than 4" in diameter at breast height will occur. In some instances where access for large equipment is impractical, such as steep banks, hand crews using chainsaws will cut the arundo stands. Cut material is hauled

to mowed areas and masticated with mowers. No biomass is left or deposited in the low flow channel. Scattered small patches of arundo may be treated and left in place to decay naturally.

The herbicide treatment of arundo, tamarisk and other target non-native vegetation occurs primarily in the summer and fall using glyphosate and imazapyr herbicide. This includes both initial treatments and treatments of re-sprouting arundo (referred to as arundo retreatments). Arundo retreatments are typically carried out annually in the fall until 100% control is achieved (approximately 10 years). Herbicides applied will only be formulations approved by the US Environmental Protection Agency (EPA) for use in riparian areas or when adjacent to open water, such as the trade name chemicals Habitat, Polaris, Aquamaster, Rodeo and Roundup Custom. The herbicide triclopyr such as Garlon-3A may also be used on select target woody species, as it has an aquatic approved formulation. These herbicides have very low toxicity to wildlife when used according to EPA approved labels (see biological resources section of checklist).

Areas that have biomass reduction (either mowing or cutting and chipping) may be re-planted with native riparian vegetation if needed using cuttings and/or container plants. Sites that have biomass reduced first, followed by herbicide treatment for re-growth, typically are replanted in within two years. After biomass reduction and initial treatment, sites enter a re-treatment cycle using low volume back pack application of approved herbicides on any re-sprouting target non-native plants. Retreatment is typically carried out annually in the late summer and fall for ten years to ensure complete control of target non-native plants, including: arundo, Ravenna grass, tamarisk and perennial pepperweed. Additional maintenance work, such as watering, weed control or re-vegetation, may occur from May 1st to February 29th in areas that have had biomass reduction/removal.

Native woody vegetation has stronger root structure than arundo, which shears and rips during high flows, leading to soil loss and bank failure. Where necessary, bank stabilization within the biomass reduction zones will be achieved through native revegetation (i.e., non-structural) bioengineering methods. The Natural Resources Conservation Service (NRCS) (1998[1]) defines bioengineering as, "Integrating living woody and herbaceous materials with organic and inorganic materials to increase the strength of the soil. This is accomplished by a dense matrix of roots which hold the soil together. The above-ground vegetation increases the resistance to flow and reduces flow velocities by dissipating energy. The biomass also acts as a buffer against the abrasive effect of transported materials and allows sediment deposition due to low shear stress near the bank."

In contrast, traditional engineered approaches to streambank stabilization include riprap, concrete revetments, bulkheads, concrete-lined channels, etc. There are also bank stabilization structures constructed from wood in lieu of rock and concrete that fall into the realm of bioengineering methods. For purposes of this project, only revegetation-type bioengineering will be employed because structural bioengineering approaches require significant funding for earth work and repair of bank disturbance resulting from construction. This will be discussed further in the revegetation section.

In some instances, revegetation may be augmented with mulch (typically straw or wood) and biodegradable erosion control blankets/mats. Erosion control blankets/mats and/or mulch are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, these measures may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

[1] Bentrup, G., and Hoag, J.C., 1998, The practical streambank bioengineering guide: user's guide for natural streambank stabilization techniques in the aric and semi-arid Great Basin and Intermountain West. Prepared for: USDA Natural Resources Conservation Service, Plant Materials Center, Aberdeen, Idaho, May, 150p.

B. Project Partners and Proponents

Background on the Yolo County Resource Conservation District and Project Partners

The Yolo County Resource Conservation District (YCRCD) is an independent, non-regulatory special district formed under Division 9 of the California State Public Resources Code. It is governed by a volunteer board of local directors appointed by the Yolo County Board of Supervisors. Since 1955 the YCRCD has provided guidance, expertise, technical assistance and implementation of conservation practices and programs on numerous large and small projects with both public and private partners. It is locally and regionally recognized as being the key resource for watershed planning and habitat improvement. Its greatest asset is its relationships with local private landowners who voluntarily work on solving land management problems. It also maintains valuable working relationships with other local and regional conservation organizations, city and county governments, and state and federal agencies to accomplish land improvement goals.

The Putah Creek Council (PCC), a project partner, was formed in 1988 with the mission of protecting and enhancing Putah Creek and its tributaries through advocacy, education and community-based stewardship along a 23 mile stretch of the creek. They too have long-standing relationships with landowners and are committed to working with the YCRCD on outreach to landowners, and will assist in future project maintenance by working with landowners. The PCC has active volunteer programs whose members have been restoring sites in the watershed for years, and will be able to plant more sections of the creek once our implementation project is complete. The Putah Creek Council has implemented arundo control for over 10 years. They will play a critical role in the long-term maintenance and control of arundo and other weeds in areas where they are active.

The Cache Creek Conservancy, a project partner, was founded in 1996 and is dedicated to creek restoration, preservation and education. The Conservancy works primarily along the 14-mile section of the creek between the Capay Dam and Interstate 5 at the town of Yolo. It has been controlling large infestations of arundo and tamarisk along the creek since 1999. Their experience, expertise and landowner contacts will be invaluable to our project. When implementation begins, their Habitat Restoration Program Manager will assist in monitoring both wildlife and plants, and continue to control invasive plants. The Manager will also work with interested landowners on restoration projects on newly treated sites. They will play a critical role in the long-term maintenance and control of arundo and other weeds in areas where they are active.

The Solano Resource Conservation District, a project partner, focuses on habitat restoration, education, and partnership building. They have done some invasive plant control work on Pleasants Creek, a tributary of Putah Creek, and know many of the landowners there. They are committed to coordinating landowner agreements and education and outreach along this creek. They will play a critical role in the long-term maintenance and control of arundo and other weeds in areas where they are active.

Yolo County Flood Control and Water Conservation District (YCFC), a project partner, is dedicated to managing water resources and providing a reliable agricultural water supply to western Yolo County. Cache Creek is the conveyance corridor for water from Clear Lake down to the Capay Dam, where it is then distributed into local sloughs (Westside Tributaries) and a complex of delivery canals to serve most of the agricultural land in central Yolo County. YCFCWCD is a progressive water agency that has taken the unusual step of planting native plants along some of their irrigation ditches to improve bank stability, water quality and habitat. They are committed to assisting this project by sharing landowner contacts and water monitoring using their wells adjacent to the creek, and in the future will maintain control of arundo and other weeds in areas under their control.

Background on Additional Project Proponents

Solano County Water Agency (SCWA) provides water from Putah Creek to cities and agricultural lands in Solano County. SCWA is a progressive water agency that works with partners to manage and restore sections of Putah Creek through the Lower Putah Creek Coordinating Committee (LPCCC), which was formed to protect, monitor and enhance the resources of lower Putah Creek. SCWA funds a Streamkeeper for Putah Creek who

has successfully written and received large grants for weed work, restoration, bank stabilization projects, and several fish and wildlife monitoring projects with UC Davis. They will also provide support for outreach to landowners and will play a critical role in the long-term maintenance and control of arundo and other weeds in areas where SCWA works.

The California Invasive Plant Council (Cal-IPC), a non-profit dedicated to protecting California's lands and waters from invasive plants, has mapped arundo in the Central Valley using WCB funding and supports this project with detailed project mapping and technical support.

C. Other Public Agencies Whose Approval is Required

Federal agencies:

U.S. Army Corps of Engineers (ACOE)

The project may operate under US Army Corps of Engineers (ACOE**)** Nationwide Permit #27 (Riparian Restoration), which will allow completion of the 404 process, unless ACOE determines project activities do not require 404 certification.

U.S. Fish and Wildlife Service

All methods and approaches will be designed to allow a determination by U.S. Fish and Wildlife Service (USFWS) of no adverse effects to listed species by using minimization and avoidance measures under an informal consultation or technical assistance. If the USFWS determines that a formal consultation is required, it will be completed (typically under the ACOE NWP 27 process).

State agencies:

State Water Resources Control Board/Regional Water Quality Control Board

A State Water Resources Control Board/Regional Water Quality Control Board (SWRCB/RWQCB) 401 certification will be obtained if it is determined that certification is required for the project. This would likely be under the National Pollutant Discharge Elimination System (NPDES) program with the US EPA.

California Department of Fish and Wildlife

YCRCD is preparing an application to the California Department of Fish and Wildlife (CDFW) 1600 Streambed Alteration Agreement to cover the project area. Conditions outlined in this initial study and CEQA Mitigated Negative Declaration (MND) are expected to be consistent with the 1600 Agreement and with other regulatory agency requirements. The YCRCD and its partners have previously obtained CDFW 1600 agreements for individual weed management and riparian restoration projects and will work closely with CDFW and other permitting agencies to meet all permit requirements.

California Office of Historic Preservation

A formal consultation has taken place with the Yocha Dehe Winton Nation (Tribe) as part of the development of this CEQA MND and mitigation measures developed. In addition, Tom Origer and Associates completed a cultural record survey and search of the archaeological base maps, site records, and survey reports on file at the Northwest Information Center, Sonoma State University (NWIC file no. 18-2261). Figure 7 shows the records search area in Capay Valley along Cache Creek. Review of the NWIC base maps showed there are 49 resources within the records search area and less than 10% of the 13,149-acre records search area has been subjected to cultural resources study. Table CR-1 lists the studies that have been conducted within records search area and Table CR-2 lists the resources that are within records search area. The Tribe is the only known tribal stakeholder in the search area.

All permits will be followed and annual reports and work plans will be prepared and submitted to regulatory agencies at the required times. The project conditions, minimization measures and reporting are presented in Sections E-G below.

D. Project Methods

Summary of Invasive Plant Control Methods:

1) ***Biomass Reduction:***
   Mow the *arundo* stand down and then spray the re-growth with an aquatic formulation of glyphosate. Used for large stands.
   - Biomass reduction is not a stand-alone control method.
   - This is an effective treatment method and it reduces biomass that might otherwise lead to flooding issues during high water flow events.
   - Re-treatments required for approximately 10 years. Re-treatments may be with glyphosate and/or imazapyr.

2) ***Herbicide Treatments***
   Spray glyphosate on small stands (<1/4 acre) of arundo and leave the stalks standing. This is the preferred method for treatment of scattered arundo patches.
   - This is a less expensive treatment method because labor costs are lower.
   - This method provides the best initial control (over 95%).
   - This is a good method for small, scattered infestations.
   - Biomass will remain standing on site, decaying over time.
   - This will require several repeated treatments, but fewer than the other methods. Re-treatments may be with glyphosate and/or imazapyr.

   Spray imazapyr on small stands (<1/4 acre) of arundo and leave the stalks standing.

   - This is a less expensive treatment method because labor costs are lower.
   - This method provides the best initial control (over 95%).
   - This is a good method for small, scattered infestations.
   - Biomass will remain standing on site, decaying over time.
   - This will require several repeated treatments, but fewer than the other methods.
   - Imazapyr suppresses growth in the treatment area for several years, limiting re-vegetation.

   Cut stump treatment—cut arundo with chainsaws, haul and chip biomass and treat the stumps with herbicide.

   - This method is used on sites that cannot be mowed.
   - It is the most expensive method because it is extremely labor intensive.
   - Re-treatments required for approximately 10 years. Re-treatments may be with glyphosate and/or imazapyr.

3) ***Biological Control***
   Release insects or pathogens that are natural enemies of the target plants that will kill or reduce the vigor of the target plant.

- This method requires no labor—the biocontrol agents do the work
- Biological control is an organic treatment method because it does not use herbicide
- Biomass will remain standing on site, decaying over time unless managed
- Biocontrol is very slow and should not be relied upon to fully succeed

4) Revegetation

Plant native species on sites that require it for bank stabilization or to prevent an infestation of a new invasive plant.

- Adds extra bank stabilization, erosion control and native habitat
- Is not required for every treated site
- Adds extra cost to work on the site

Detailed Description of Invasive Plant Control Methods

There are two parts of arundo control: (1) reduction and/or cutting/removal of biomass, which is usually used for dense stands and (2) treatment with herbicide to control the plant. Typically, biomass reduction occurs first, followed by herbicide treatment of re-sprouting arundo. Most arundo stands in the project area are under ¼ acre in size. Stands larger than ¼ acre will have biomass cut by hand, hauled and chipped while smaller stands will be treated with herbicide and left in place. Only target non-native plants will be treated with herbicide. Large stands of arundo and tamarisk in Capay Valley will require the use of tractors to mow the arundo (large scale biomass reduction). Timing of work, biological surveys, and buffers will be ultimately specified under CDFW and USFWS program permits.

1) Biomass Reduction

Biomass reduction entails hand cutting arundo or mowing with tractors (Capay Valley only) to decrease above ground vegetation mass. Biomass reduction, if carried out, will usually occur before herbicide treatment. Biomass reduction is typically required when dense, mature stands with significant plant biomass are present. These arundo stands are usually larger than ¼ acre. Biomass reduction by mowing may begin September 1st and end by November 30th, weather permitting. Mowing is carried out using fixed tooth or flail mowing attachments that are typically mounted on the front of the tractor. The tractor will have either rubber tires or tracks. After being mowed, the arundo canes or stands are reduced to many small pieces resulting in a mulch layer covering the ground surface. Arundo biomass mulch is left within the original footprint of the stand. No mowing occurs in the low flow channel and no mowed material is placed in the low flow channel.

Biomass reduction work by hand is usually prescribed for areas inaccessible to the mower and may begin July 16thst and end by November 30th (avian pre-surveys are required for work between July 16 and Aug 15). Hand cut arundo is typically carried to areas where mowing has already occurred, where it is then stacked and mowed. In areas outside of Capay Valley, hand cut biomass may be hauled, chipped and then spread over disturbed areas that are dominated by non-native weed cover. Cut arundo is never stacked and left unchipped within the flood zone. Chipped arundo material is rarely taken off site, as transport and disposal are costly. The arundo mulch layer after mowing or chipping is typically less than 6 inches thick and provides a benefit to the site as it suppresses weed growth and reduces soil water loss. Mowed and chipped arundo material possess very low risk for spreading plant propagules downstream. Many programs mow live arundo stands into mulch. Arundo sprouting from cane fragments is very rarely seen in field monitoring of other watershed based Arundo control programs in the Salinas, San Luis Rey, Santa Margarita, San Diego, and Santa Anna watersheds. Arundo propagules encountered in the field are from rhizome material, which will not be mobilized during removal/control efforts.

For large arundo and tamarisk stands in Capay Valley, the biomass reduction process for arundo begins with reducing the biomass of target plants, which involves using large mowers to mulch the plant material in place.

Mowers are fixed teeth mowing heads mounted on large tractors weighing approximately 50,000 pounds with either rubber mining tires or tracked. No stands of native vegetation will be reduced or mowed and no cutting or mowing of native material greater than 4" in diameter at breast height will occur. In some instances where access for large equipment is impractical, such as steep banks, hand crews using chainsaws will cut the arundo stands. Cut material is hauled to mowed areas and mowed. No biomass is left or deposited in the low flow channel. Scattered small patches of arundo may be treated and left in place to decay naturally.

Arundo that forms scattered small stands (generally less than 1/4 acre) is usually treated with herbicide described below and left to decompose naturally, a process that takes about 5 years. Areas with very low cane density or areas re-sprouting after fire events are likewise treated and left to decompose naturally. Re-sprouting canes that are treated are also left to decompose naturally, a process that takes about one year.

Biomass reduction cannot be used as a stand-alone treatment and must be followed with herbicide treatment.

2) Herbicide Treatment

The invasive plant control project will conduct herbicide treatments on target plants (arundo, tamarisk, Ravenna grass, and other invasive non-native species) between July 16th and November 30th (avian pre-surveys are required for work between July 16 and Aug 15). Arundo that forms scattered small clumps (generally less than 1/4 acre) will primarily be treated and re-treated as needed with herbicide and left to decompose naturally, a process that takes about 5 years. Areas with very low cane density or areas re-sprouting after fire events are likewise treated and left to decompose naturally. Treating re-sprouting arundo after mowing and hand-cutting will occur in early summer and will primarily be done using hand held power sprayers, as regrowth is vigorous. Re-sprouting canes that are treated (referred to as re-treatments) are also left to decompose naturally, a process that takes about one year.

Treatment typically involves foliar application of aquatic herbicide formulations of glyphosate and/or imazapyr, or triclopyr, all of which are approved for use in wetland areas. Triclopyr formulation will be used for woody vegetation only. A marking dye may be added to the herbicide mix to allow applicators to see drift and assure thorough coverage of target plants.

For foliar application on arundo, stands are prepared or 'prepped' for spraying by creating a physical space between target and non-target plants. Arundo may be pulled away from native shrubs and trees and/or the native plants and other vegetation may be trimmed (if smaller than 4 inches diameter).

The herbicide treatment of arundo, tamarisk and other target non-native vegetation occurs primarily in the summer and fall using glyphosate and/or imazapyr herbicide. Herbicides applied will only be formulations approved by the US Environmental Protection Agency (EPA) for use in riparian areas or when adjacent to open water, such as the trade name chemicals Aquamaster, Rodeo and Roundup Custom. The herbicide triclopyr may also be used on select target woody species, as it has an aquatic approved formulation, such as Garlon-3A. These herbicides have very low toxicity to wildlife (see checklist section 4).

Arundo, tamarisk and other target woody vegetation may be treated with the "cut stump" method, which involves cutting the plant down and painting herbicide on the stump.

Crews may also use backpack sprayers from May 1st to November 30th to carry out treatments on arundo and other weeds in re-vegetation sites and mowed areas that lack native woody vegetation cover. Crews apply only targeted herbicide applications using backpack or hand held sprayers. Only target non-native plants are treated with herbicide. No broadcast or blanket applications are made from booms, aircraft, or other mechanical devices.

3) Biological Control

Biological control is part of integrated pest management, as is defined as the beneficial action of natural enemies in controlling pests, including invasive plants. Classical biocontrol is the use of introduced natural

enemies to control an exotic pest. With invasive plants, this involves researching a natural enemy, such as an insect, of a plant in its region of origin, and bringing that enemy to the invaded region and releasing it. Currently these imported natural enemies are quarantined and tested in highly controlled laboratories to be sure they will not cause damage to other, desirable plants such as crops and native plants.

There are several biocontrol agents for arundo being researched and released by the USDA-Agricultural Research Service. From their website:

"One of the biocontrol candidates, a scale insect called *Rhizaspidiotus donacis*, attacks the reed's root. This insect's release has been recommended by the Technical Advisory Group (TAG), a North American organization that oversees releases of weed biological control agents.

Another of the biocontrol candidates, the *Tetramesa romana* wasp, was released in Texas in April 2009. This wasp attacks the weed's main stem, weakening the plant, reducing its overall height, and causing it to form galls and put out side shoots.

The third promising biocontrol agent, the arundo fly (*Cryptonevra* spp.), eats the inside of new shoots of the plant, while the leaf sheath miner, *Lasioptera donacis*, destroys the plant's leaves.

The scale insect—which has an outstanding reproductive capacity and feeds on the part of the root known as the rhizome, where most of the plant biomass occurs—shows the most promise of the four biocontrol candidates. Debilitating the rhizome could have a big impact on the plant's growth and spread."

However, these biocontrol agents have had limited success, and biocontrol is a slow process under the best circumstances. This project would not depend on biocontrol, as we are planning to eradicate arundo.

Salt cedar *(Tamarix parviflora)* is a major invasive plant pest in the watershed, especially Cache Creek. A biological control agent, the tamarisk leaf beetle *(Diorhabda elongata)*, was released in Cache Creek in 2001. This TLB has been very successful along the Colorado River and in other Southwestern states, but Cache Creek may be too far north. It was slow to establish, and then in 2007 expanded along ten river miles, and defoliated thousands of tamarisk bushes. However, none of these plants actually died, and the populations have since dropped to the point where defoliation is barely perceptible.

Another tamarisk leaf beetle, *Diorhabda carinulata*, shows promise for northern latitudes, and we are planning to work with the USDA-ARS to get this beetle released. This too will be a long process, but eventually, if these biocontrol agents are successful, they will weaken and either kill the target plant or make it more susceptible to treatment.

In summary, biological control will be assessed and utilized as appropriate, as some agents are more effective than others, and some not at all. All agents are tested and approved by the USDA.

4) Revegetation

Active revegetation will be a component of the enhancement or restoration process for some project areas that have hydrology favorable for planting and is a critical element to replacing target invasive plants and discouraging re-infestation. Planting may occur from November 15th through February 29th. Planting is typically started after winter rains have begun and soils are moist. Effective control of target plants is required prior to re-vegetation to avoid situations where re-treatments would harm a significant number of plantings. Areas that have biomass reduction by mowing may frequently be planted the following year. Areas that have been cut stump treated may also be planted the following year, or even the same year if retreatments are implemented carefully.

Plants for revegetation may be from containers or cuttings. The plant palette will vary based where conditions are favorable, species typical of the watershed or sub-watershed, presence or absence of tree canopy, and

position in the stream profile. Re-vegetation focuses on re-establishing native riparian canopy and understory shrub and perennial sub-shrub and vine cover.

Planting is typically done at a density of 200 to 400 plants per acre- with a 5-year goal of 150 plants per acre alive and established. Additional 'fill in' planting occurs in successive years until sufficient densities of native plants are established. Depending on rainfall and water table position, plants are usually watered in and left to grow without irrigation. Supplemental watering may be needed, but occurs by hand and only for the first year. Work can be done to native plantings to help them survive through the summer and fall of the first year. Average survival rates vary by species, but can typically exceed 50-70%. Upper terraces that are dry and sandy will have lower planting survival and may not be planted. Restored sites with favorable hydrology typically attain high cover from planted shrubs and semi-woody perennials and vines by year five, which helps to shade out ruderal weeds that would otherwise begin to migrate into the site as the reduced biomass or mulch begins to break down.

The goal is to replace invasive plants with native plants not only for wildlife habitat but for a healthier creek overall. Revegetating with native vegetation will maintain bank structure and increase stability and improve natural creek functions, from flow conveyance to improved water quality due to decreased erosion. In some sites, we may perform the revegetation in stages—start planting in year one and plant towards the bank before removing more arundo. We can plant lines of vegetation higher on bank and those plantings will develop roots and stabilize the lower banks as we replace the arundo with native vegetation.

Table 2. Typical Site Plant Palette

Latin name	***Common Name***
Trees	
Alnus rubra	Red alder
Populus fremontii	Fremont cottonwood
Salix goodingii	Goodings black willow
Quercus lobata	Valley Oak
Acer negundo	Box elder
Fraxinus latifolia	Oregon ash
Platanus racemosa	Sycamore
Shrubs	
Baccharis salicifolia	Mulefat
Cephalanthus occidentalis	Buttonwillow
Salix exigua	Sandbar willow
Baccharis pilularis	Coyote bush
Sambucus nigra ssp. caerulea	Elderberry
Cornus sericea	Red twig dogwood
Rhus trilobata	Skunkbush
Cercis occidentalis	Redbud
Aesculus californica	California buckeye
Sub-shrubs, forbs, vines, grasses	
Artemisia douglasiana	Mugwort
Rosa californica	California rose
Clematis ligusticifolia	Clematis
Vitus californica	California grape
Rubus ursinus	California blackberry
Oenatherea elata ssp. hookeri	Evening primrose
Grindelia camporum	Gum plant
Asclepias fascicularis	Narrow-leaf milkweed
Asclepias speciosa	Showy milkweed
Muhlenbergia rigens	Deer grass
Elymus triticoides	Creeping wild rye
Carex barbarae	White root sedge

4) Maintenance

The arundo treatment process is expected to take 10 years to achieve 100% control of arundo. Sites that have had revegetation with natives and/or *Arundo* biomass reduction (mowing or hand cutting canes) will have 'low-impact maintenance' where arundo re-sprouts are treated using back pack sprayers. Watering of plantings may also occur as well as control of annual weeds (hand pulling or backpack spraying). These activities will not use any gas-powered equipment or any mechanical equipment such as tractors. A water tank and pump can be used for watering, but only if located outside the riparian habitat on adjacent roads or staging areas. Native woody vegetation is not disturbed or entered, and no flowing or standing water is entered. Low-impact maintenance may occur between May 1 – July 15.

5) Monitoring

Two types of monitoring will occur: (1) biological monitoring during work activities and (2) performance and planning monitoring before and after active work. There are two types of biological monitoring that occur during work activities: (a) general biological monitoring and (b) targeted biological surveys. General monitoring is performed by a general biologist, either RCD staff or a consultant, and it assures that crews are following permits, crews are working in the correct areas, and that project methods and avoidance measures are being followed. General biological monitoring typically occurs as a daily check-in with crews at work sites. The presence of an onsite biologist is usually not required at all times for all types of work being completed. Targeted biological surveys are carried out when work areas need to be checked for the presence of a specific biological resource, such as birds during nesting season, or a listed species, any detections initiate specific protection conditions such as work buffers and work restrictions. CDFW and FWS permits frequently require certified biologists to complete surveys before or during work. An effort is made to schedule the timing and type of work activities that minimize the need for targeted biological surveys, but some work situations require pre-work surveys to be carried out. All final determinations regarding biological monitoring outlined in permits will be followed.

Performance and planning monitoring are carried out by biologists to both plan the type and timing of work and to assess project performance. Monitoring occurs to assure that all regulatory protection measures are followed and to assure that any newly discovered resources are adequately protected. Site by site assessments are made by RCD biologists to determine what type of work is implemented, where crews stage, and the exact timing of work. Timing of work is based on the plant growth stage (height of re-sprouts, dormancy, etc.), stream flow conditions, and general field site conditions such as soil moisture. Performance monitoring is used to track effectiveness of treatments (arundo cover and cane density) and success of native plantings (planting survival and cover). Specific sites are tracked over the project life. Monitoring data and photos are used for both regulatory reports and grant reports.

E. Measures to Protect Natural Resources

The types of habitat restoration and enhancement activities carried out under this project are routinely considered by regulatory agencies such as the CA Department of Fish & Wildlife (CDFW), the US Fish & Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACOE) to qualify as mitigation for impacts to riparian habitat. This demonstrates the net benefit that these projects will provide. The end result of this project will be habitat enhancement benefiting native flora and fauna. USFWS and CDFW permits will outline specific minimization and avoidance measures that will be used to protect listed species, migratory birds, other native wildlife and plants.

Invasive plant control methods that minimize impacts to non-target native vegetation will be used. These methods include preparing target plants for herbicide application by separating them from native vegetation, using targeted foliar application of herbicide by crews on foot, using highly qualified personnel who have experience treating invasive plants in sensitive riparian habitat, and using herbicides that are approved for use in wetlands such as aquatic-approved formulations of glyphosate, imazapyr and triclopyr that have been shown to be non-toxic or have very low toxicity to fish and fauna (environmental checklist, sections 3-7). Glyphosate, imazapyr and triclopyr herbicides were chosen due to their efficacy in controlling the target species, low toxicity to non-target organisms, and chemical properties that limit potential impacts to the environment. EPA aquatic-approved formulations for use near water will be utilized for all target plants in riparian and wetland areas.

1. General Avoidance Measures

The following general avoidance and minimization measures are in place to assure that there will be less than significant impacts to natural resources:

a. Glyphosate is a non-selective systemic herbicide. It is applied directly to the plant where it is absorbed across leaves and stems. In plants it disrupts the shikimic acid pathway by inhibiting

enzymes and reducing production of three aromatic amino acids that are vital for protein synthesis and plant growth. Imazapyr is a non-selective systemic herbicide. It is applied directly to plant where it is absorbed across leaves and stems. In plants it disrupts the production of three aromatic amino acids (different than the three impacted by glyphosate) that are vital for protein synthesis and plant growth. Triclopyr is commonly used to control woody plants. Triclopyr does not injure grasses when used at recommended application rates. Triclopyr mimics indole auxin plant growth hormones and causes uncontrolled growth in plants. Triclopyr is absorbed by green bark, leaves, roots, and cut stem surfaces, and moves throughout the plant. Triclopyr accumulates in the meristem of the plant. A nonylphenol polyethoxylate (NPE) surfactant may be tank mixed with the herbicides to increase efficacy. However, most terrestrial glyphosate products contain NPE surfactants as formulation constituents and do not require additional surfactants. The NPE-based surfactants improve foliar coverage and decrease surface tension of the herbicide solution which facilitates herbicide penetration through the leaf's cuticle layer.

b. All mixing of herbicides and maintenance of equipment will occur only in areas that are adjacent to existing roads and have compacted disturbed soils. These areas should not have sensitive species habitat present, are not adjacent to open water in the stream or slough channels, and they have no cover of native woody vegetation.

c. Only certified and licensed applicators will be used to conduct applications and will use personal protective equipment as required by product labeling or Department of Pesticide Regulation (DPR) regulations.

d. A general biologist will oversee work activities to assure that conditions of CDFW and USFWS permits are being followed. The general biologist will check on crews daily, reviewing work completed and work planned.

e. Work methods are segregated into work activity periods that will minimize disturbing crucial life-cycle stages of plants and wildlife. (Table 1). Active work (arundo herbicide treatment) is from July 16th to November 30th, active work for arundo biomass reduction by hand is from July 16th-Nov. 30th and active work for biomass reduction by mowing is from September 1st to November 30th. Planting work occurs from November 1st through February 29th. Passive maintenance work from May 1st through July 15th occurs in areas where non-native biomass has been previously reduced or cut and hauled away, these areas lack structure for nesting. Work activities include watering plantings, hand weeding and backpack spraying (no powered equipment used). No work occurs from March 1st through April 30th to avoid nesting season.

f. Annual reports documenting work and compliance will be provided to regulatory agencies that have issued permits. These are expected to be USACE, CDFW and USFWS. A work plan for the following year will also outline planned work areas and activities. All permits will clearly outline work conditions and minimization and avoidance measures. Regulatory agencies, YCRCD project managers and the project biologist will assure compliance with these conditions. Any violations would result in suspension of active work, in addition to possible requests for compensatory mitigation or fines.

g. Work crews will avoid passing through and impacting upland native habitat areas. They will use established roads, agricultural areas, and entry points to riparian and wetland areas.

2. Specific actions to avoid or minimize impacts to sensitive fish on Putah and Cache Creeks

a. YCRCD shall meet (in person or by phone) with the National Marine Fisheries Service (NMFS) staff and the CDFW local wildlife and fisheries biologists in June of each year to review the project. The NMFS and CDFW may provide additional, or modify existing, conditions and measures on the projects. Such conditions shall be included in a memo from NMFS/CDFW to

YCRCD. During work in riparian areas with known salmon runs or sensitive fish species, the following will be in place to minimize impacts to habitat:

b. No activities may alter the flow, dewater or modify the stream channel.

c. No mechanical biomass reduction (mowing) will occur in the low flow channel or within 10 feet of flowing water (mowing is only occurring in Capay Valley on Cache Creek).

d. The YCRCD shall use existing ingress or egress points to perform work when possible.

e. The YCRCD shall monitor and maintain a record of all interactions with salmon during project activities. Reporting information will include animal behavior and any effects, location, and number observed. Project activities are scheduled to occur outside salmon presence in the system so interactions between project activities and salmon are unlikely.

3. Specific actions to avoid impacts to riparian systems when applying herbicides

a. Work active treatment activities may only occur July 16th to November 30th (this includes use of powered spraying equipment and backpacks, Table 1). Passive work may occur between May 1 and July 15th (this is maintenance work in areas that have had biomass reduction, no powered equipment may be used, Table 1).

b. No more than three crews will be active on the watershed at one time.

c. Crew size will not exceed 25 individuals.

d. Herbicide application will occur by hand with either backpack sprayers or hand-held power sprayers. Power sprayers consist of three parts: 1) the hand held applicator, 2) the pump, and 3) the reservoir/tank. The pump and reservoir are typically mounted or towed by ATV's, but they may also be mounted on light duty tractors, skidders, or trucks. The pump is usually a small gas-powered engine with around 3 horsepower. The tank or reservoir ranges from 30 to 200 gallons of useable volume.

e. To reduce the chance or impact of spillage, work crews will only mix herbicide and refuel power equipment in staging areas. Mixed herbicide may be transported and transferred into tanks and backpacks within the project site.

f. Staging areas are previously disturbed areas such as roads, shoulders, graded areas, or sites with compacted soil that support no vegetation or weedy non-native vegetation.

g. Foliar spraying will not occur when ambient wind speeds exceed 10 miles per hour.

h. Crew members will avoid wading through streams and standing water whenever possible.

i. Each crew may use up to 2 ATV’s or other small wheeled vehicles to move mixed herbicide in jugs to crews in the field.

j. ATV’s and other small-wheeled vehicles will not drive in wet channel areas.

k. ATV’s and other small-wheeled vehicles will operate only in open areas. Woody vegetation greater than one-inch diameter at breast height will not be cleared or driven upon.

l. Site preparation is carried out prior to treatment of arundo. Preparation entails separating, or creating a space, between stands of arundo and native vegetation. This allows the arundo to be treated without affecting the native woody vegetation. The space between arundo and native vegetation is created by pushing, detangling and/or trimming the vegetation. Both arundo and native woody vegetation may be trimmed. However, woody vegetation that is in excess of six inches in diameter may not be trimmed. Excessive trimming of arundo is not usually carried out because this triggers re-sprouting which results in a much longer re-treatment cycle.

m. All regulations involving use of herbicides will be followed. All contractors will be licensed and certified. Aquatic herbicide formulations will be used when near open water including spreading agents, dyes and other additives.

n. A marking dye will be used to assure that drift or overspray onto non-target vegetation is not occurring. The dye will also assure that good coverage on target plants is occurring.

o. All garbage and waste material generated by the work crew will be removed from the site.

4. Specific actions to avoid impacts to riparian systems during biomass reduction work

Biomass reduction: mowing

Mowing is carried out using a fixed tooth or hammer flail mowing attachment mounted on a tractor. The mowing attachment mulches the arundo cane into a layer about 6" thick. The mowing attachment and tractor do not dig into the soil surface or change topography of the site. Tractors are frequently rubber tired, but may also have tracks. Several sizes of tractors are used. Larger, 50,000-pound tractors could have four large tires (about 56" x 18") or wide tracks and a front-mounted mowing implement approximately 100" wide or smaller. Medium, 12,000-pound tractor or skidders have 48" x 16" tires or 10-16" tracks with a front-mounted mowing implement around 74" wide. These are specialized mastication mowing attachments that grind the biomass into material comparable to that achieved when using a chipper. Tractor operators are able to avoid mowing mature native woody vegetation. Live or dead arundo stands and other non-native plant biomass is mowed in place. Hand cut and hauled biomass is stacked and mowed within the footprint of target non-native plants.

a. Biomass reduction by mowing occurs between September 1st and November 30th (Table 1).

b. No native woody vegetation is mowed.

c. No mowing will occur in the active stream channel and 10' buffer from the low flow channel/standing water will be maintained.

d. No mulched or mowed biomass will be deposited in the active stream channel.

e. All mowed material is left within the footprint of the arundo stand (or tamarisk). Hand cut biomass may be stacked and mowed in previously mowed areas or outside the river on compacted soils, dirt roads and shoulders that have no native vegetation.

f. Equipment used during the biomass reduction phase such as: tractors with mowing attachments, chippers, chainsaws, and other hands tools, will be staged outside of riparian habitat in areas that are located along roads or other degraded areas with no native vegetation. Compacted dirt lots, road shoulders, and old disturbed sites are typically the type of areas that are used for staging equipment.

g. Refueling and maintenance of tractors and other larger equipment occurs only in staging areas, on roads or areas outside of the riparian habitat.

h. Equipment may cross the low flow channel to reach stands of non-native vegetation, but these crossings will be the absolute minimum required to achieve work.

i. All garbage and waste material generated by the work crew will be removed from the site.

Biomass Reduction: Cutting by hand crews

Crews cut arundo using chainsaws. Hand tools such as loppers and machetes may also be used, but in limited situations.

a. Biomass cutting, hauling and chipping occurs between July 16th and November 30th (Table 1).

b. Crews cut biomass and then carry it to areas that have been previously mowed, where it is stacked and then mowed. Cut biomass may also be hauled and chipped if mowers are not being used (mowing only occur in Capay Valley) on site or access is poor. No cut biomass is left un-mowed or un-chipped. Cut arundo is never stacked and left un-mulched.

c. Crews are of 25 or fewer individuals. Typically, crews break into teams of 5 to 6 individuals, where one or two people cut and 4 to 5 individuals pull, haul, and stack the cut dead arundo canes in previously mowed areas or chip the material.

d. No more than one crew will operate at a given site.

e. No more than three sites will be active in the watershed at once.

f. Biomass hand crews typically do not use ATV's, but sites far from roads with previously used trails may be used as access routes in open areas. ATVs or standard vehicles may also traverse mowed arundo areas. No ATV or vehicle use can occur in wet channel areas or in areas with native woody vegetation.

g. Hand crews may use chippers where mowing is not occurring (outside of Capay Valley) or where mowing is not possible due to site topography or substrate such as riprap or bolder banks. Chippers may be staged on roads, disturbed areas, or moved through areas where arundo has been cut. Chippers may chip material onto disturbed or maintained areas outside the creek profile, chip into areas where arundo previously existed, or chip into containers or trucks for hauling off site. Taking arundo biomass off site rarely occurs due to cost.

h. Crew members will avoid wading through streams whenever possible.

i. All garbage and waste material generated by the work crew will be removed from the site.

5. Actions to reduce impacts during re-vegetation and planting activities

a. Work occurs between November 15th to February 29th (Table 1), which is the best time for planting in California.

b. No more than three crews will be active on the watershed at one time.

c. Only one crew will operate at a given site at a time.

d. Crew size will not exceed 25 individuals.

e. Each crew may use up to 2 ATVs or vehicles to move plants from staging areas to planting locations. ATVs/vehicles typically drive only in areas that have been mowed, driving over dead arundo mulch. Sites that are flat and connected to roads, may allow use of four-wheel drive trucks to access mowed areas and deliver plants.

f. ATVs and other vehicles will not drive in wet channel areas.

g. ATVs and other vehicles will operate only in open areas, usually on mowed dead arundo mulch. No woody vegetation greater than one-inch diameter at breast height will be cleared or driven upon.

h. Equipment used during the re-vegetation phase such as ATVs/vehicles and hands tools will be staged at areas which are located along roads or on degraded areas with no native vegetation. Compacted dirt lots, road shoulders, and old disturbed sites are typically the type of areas that are used for staging.

i. Crew members will minimize crossing standing water.

j. All garbage and waste material generated by the work crew will be removed from the site.

6. Actions taken to reduce impacts on nesting birds and erosion: No Work Period

- **a.** No work occurs between March 1st and April 30th (Table 1).
- **b.** Only biological monitoring of the work site may occur during this period.
- **c.** No equipment may be used.
- **d.** No flowing or standing water may be entered or crossed.

7. Maintenance Activities: Passive work

- **e.** Work occurs between May 1st and July 15th (Table 1).
- **f.** No areas may be worked in that have woody vegetation structure suitable for nesting (work only in mowed or cut areas).
- **g.** No powered equipment may be used at the restoration sites; only watering, treatments with backpacks, and hand weeding will be done. A water truck with a gas-powered pump may be used, but this will operate along access roads or in staging areas.
- **h.** Equipment used during the maintenance phase, such as trucks and hands tools, will be staged at areas which are located along roads or on degraded areas with no native vegetation. Compacted dirt lots, road shoulders, and old disturbed sites are typically the type of areas that are used for staging.
- **i.** Crew members will avoid wading through streams.
- **j.** All garbage and waste material generated by the work crew will be removed from the site.

8. Conducting biological monitoring to protect natural resources

The goal of monitoring is to assure project success. Two types of monitoring occur: biological monitoring during work activities and performance/planning monitoring before and after active work. Monitoring during work activities occurs to assure that all regulatory protection measures are followed in addition to assuring that any newly discovered resources are adequately protected. There are two types of biological monitoring that occur during work activities: general biological monitoring and targeted surveys.

General biological monitoring is performed by an experienced general biologist, either RCD staff or a consultant. It assures that crews are following permits, crews are working in the correct areas, and that project methods and approaches are being followed. This biologist must be familiar with both native and non-native vegetation and have previous monitoring experience. General biological monitoring typically occurs as a daily check-in, the presence of an onsite biologist is usually not required at all times for all types of work being completed. Targeted biological surveys are carried out when areas need to be checked for the presence of a specific biological resource, such as birds during nesting season, or a listed species with specific conditions, such as elderberry buffers and work restrictions. Biological surveys frequently require special certified biologists to complete surveys before or during work (specified under CDFW and FWS permits). Both the general and survey biologists may stop all work at any time or divert work away from observed or potential biological resources. An effort is made to schedule the timing and type of work activities that minimize the need for targeted biological surveys, but some situations require pre-surveys to be carried out. All final determinations regarding biological monitoring outlined in permits will be followed. The biologist will assist RCD staff in yearly reporting, and RCD staff will report any interactions with and avoidance of any sensitive species at work sites.

Performance and general monitoring will be carried out by RCD staff and biologists to both plan the type and timing of work and to assess project performance. Site by site assessments are made by YCRCD biologists to determine what type of work is to be implemented, where crews stage, and the exact timing of work. Timing of work is based work activity periods (Table 1), on the plant's growth stage, such as height of re-sprouts or dormancy, river flow conditions, and general condition of field sites, such as soil saturation levels. Performance monitoring is used to track effectiveness of treatments and success of native planting. Site performance monitoring will occur annually to assess effectiveness of treatments and re-vegetation effort. This monitoring will include photos of the site, field estimates of treatment success (percent control: cover and density) by species and survival of native plantings. This data will be presented in the annual report that is submitted to USFWS, CDFW, NMFS and ACOE. Additional monitoring may also occur as specified under specific funding grants. This information will also be available to regulatory agencies. Monitoring data will be used to help determine when re-treatments should occur and when re-vegetation should occur, both initial and fill-in planting. Project work is considered successful if cover is less than 5% by year 5. By year 10 arundo cover should be <1%, with the goal of 100% control.

9. Performance standards

Target non-native vegetation at treated sites will be less than 1% cover by year five (5). Areas where biomass reduction occurred and that were re-planted with native vegetation will have a minimum established native plant density of 100 plants per acre with an approximate spacing of 20 feet between plants by year five.

10. Yearly work plan and report

Each summer an annual 'Work Plan and Report' outlining the expected non-native plant control and re-vegetation work for the current year will be prepared by July 15th. The annual report will document work and compliance over the past year as well as planned activities in the next year. It will be provided to regulatory agencies that have issued permits: US ACOE, CDFW, and US FWS. This report will notify agencies of the intended work project areas for each year and allow modification of work activities if necessary.

The annual report will clearly outline what work was completed in the last 12 months and what work is planned in the next 12 months. Reporting on completed work will include a discussion of what treatment activities occurred (both initial and re-treatments), what re-vegetation has occurred, and success of efforts based on monitoring. Photo documentation, non-native plant control effectiveness (reduction in percent cover of target plants) and planting success (estimated percent survival) will be provided. Detailed GIS maps will clearly indicate work areas.

Proposed work for the next year will be outlined on maps indicating likely work areas for the next season. Work areas will be funded in a variety of ways including but not-limited to: state, federal and/or local grants, fines, mitigation programs and landowner cash and in-kind contributions.

F. Measures to protect biological resources

The YCRCD's Arundo Control and Eradication project will have an overall positive impact on riparian and aquatic habitats that benefit riparian flora and fauna. Controlling target non-native invasive plant species, particularly arundo and tamarisk, will allow native plants to reoccupy riparian areas, normalizing ecological process that have been impacted by the encroachment of the target non-native invasive plant species.

A query of the California Natural Diversity Database (CNDDB), using CNDDB March 2018, was carried out in February 2019 for sensitive species in the project area. The data extraction area was a 5-mile buffer around Yolo County, with the tributary of Pleasants Creek in Solano County added (Figure 3). The foothills to the west of Yolo County were not included in the data extraction, as no work is planned in that area, and the higher elevation foothills are dissimilar from the proposed riparian lowland work areas. Only species that would occur or utilize the riparian vegetation and habitat types worked in are included in the analysis presented in the checklist. Species occurring in vernal pools, foothills, upland woodlands, etc., were not analyzed. These areas will not be entered during project work. The Cal Fish database, the California Department of Fish & Wildlife, Natural Diversity Database Special Animals List (November 2018), and Fish Species of Special Concern in California, Second Edition. (Moyle, P.B., Yoshiyama, R.M., Williams, J.E., and Wikramanayake, E.D. 1995), Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) May 2017, and numerous other references (including data from USFWS) were also reviewed in order to determine the possible occurrence of special status and sensitive species. Sixty species, seventeen plants and forty-three fauna were evaluated (Table 3-4, Figures 4-6).

Please see the environmental checklist for more details.

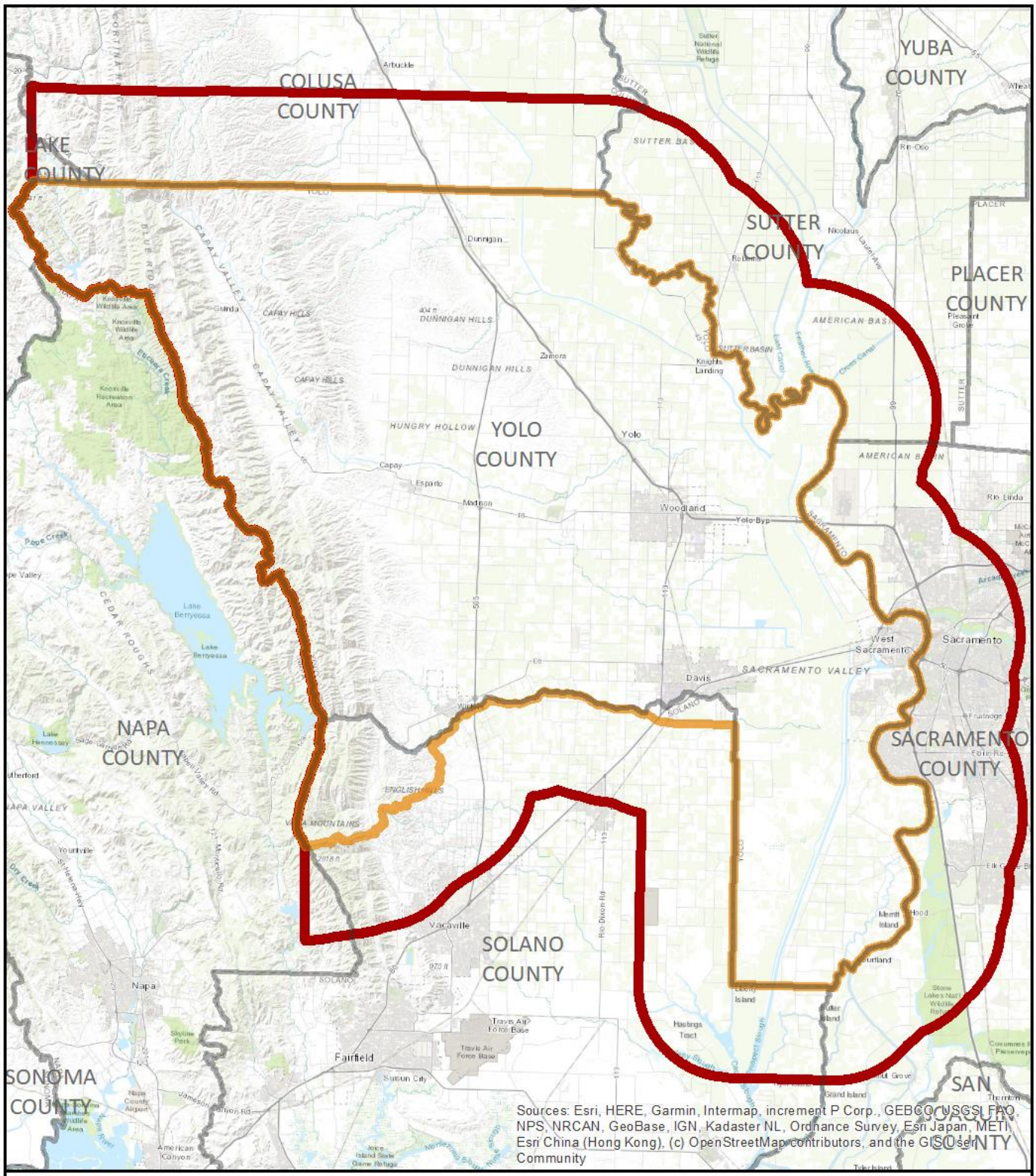

Figure 3
CNDDB Search Area
Putah-Cache Watershed
Arundo Eradication Program
Yolo County RCD

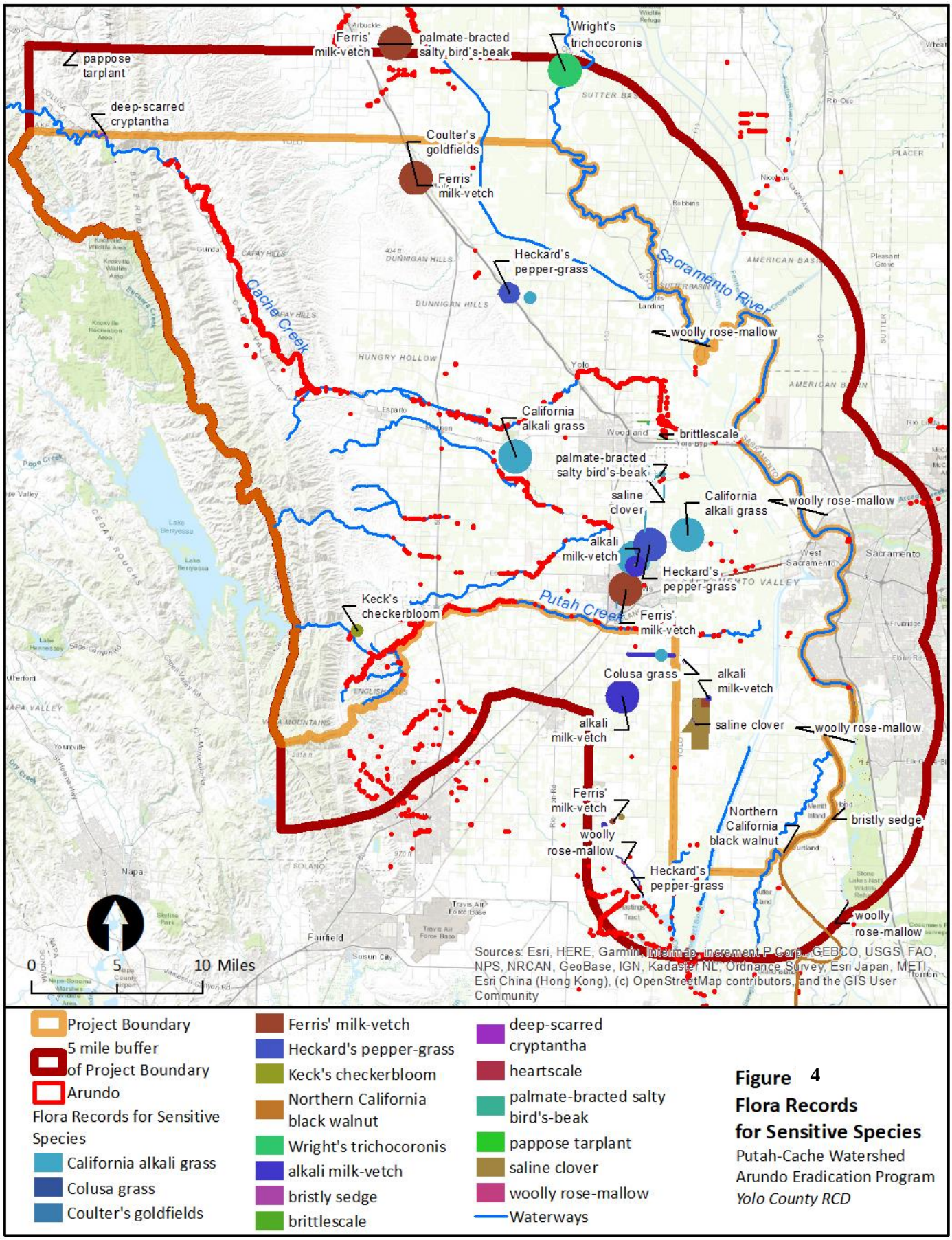

Figure 4
Flora Records for Sensitive Species
Putah-Cache Watershed Arundo Eradication Program
Yolo County RCD

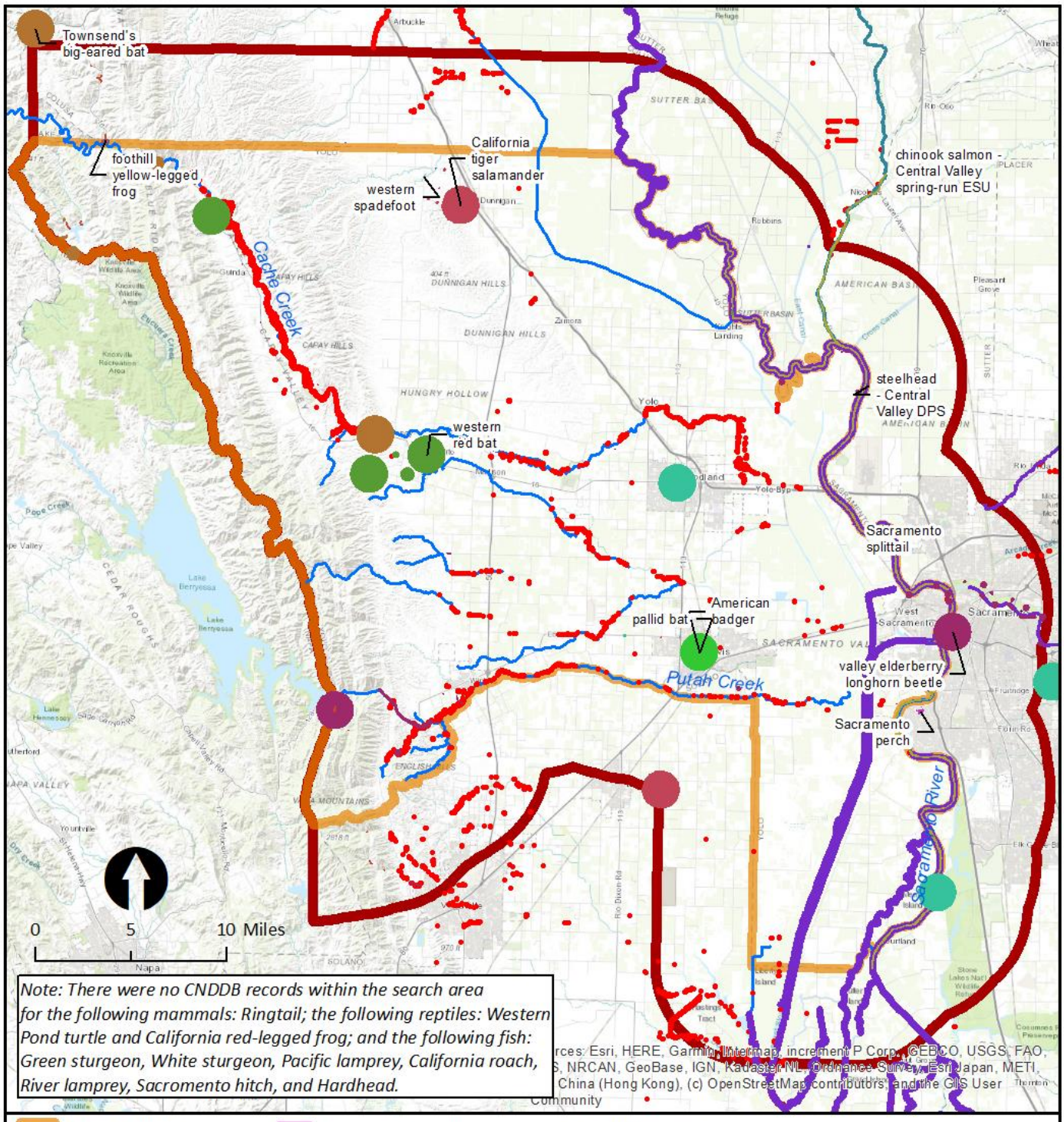

Figure 5
Fauna (Insects, Mammals, Reptiles & Fish) Records for Sensitive Species
Putah-Cache Watershed
Arundo Eradication Program
Yolo County RCD

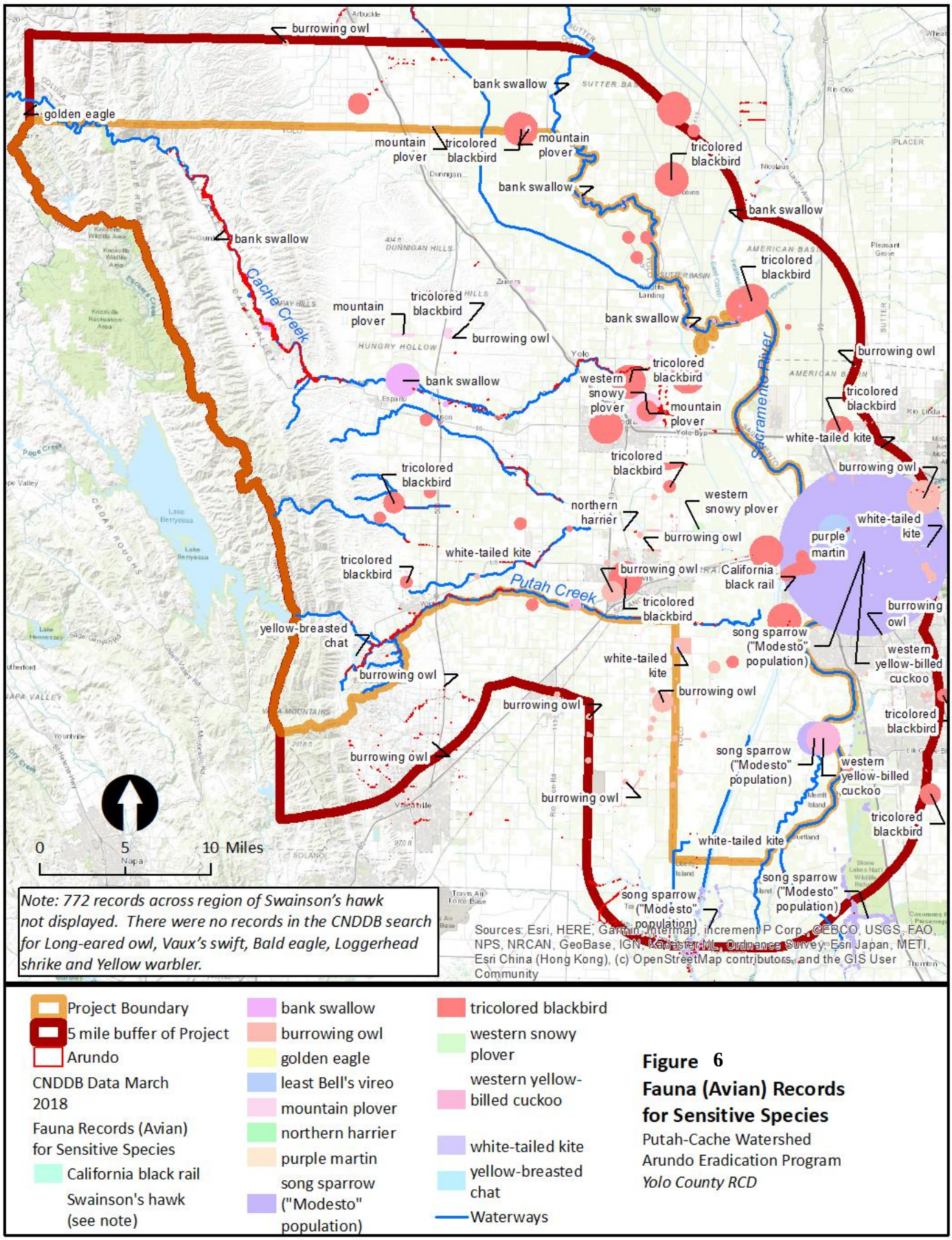

Figure 6
Fauna (Avian) Records for Sensitive Species
Putah-Cache Watershed
Arundo Eradication Program
Yolo County RCD

Table 3. Federally and/or State listed flora analyzed in the environmental checklist.

Plants		Listing		CNPS
Common Name	**Scientific Name**	**Fed**	**State**	
Ferris' milk-vetch	*Astragalus tener var. ferrisiae*			1B.1
alkali milk-vetch	*Astragalus tener var. tener*			1B.2
heartscale	*Atriplex cordulata var. cordulata*			1B.2
brittlescale	*Atriplex depressa*			1B.2
bristly sedge	*Carex comosa*			2B.1
pappose tarplant	*Centromadia parryi ssp. parryi*			1B.2
palmate-bracted bird's-beak	*Chloropyron palmatum*	FE	SE	1B.1
deep-scarred cryptantha	*Cryptantha excavata*			1B.1
woolly rose-mallow	*Hibiscus lasiocarpos var. occidentalis*			1B.2
Northern California black walnut	*Juglans hindsii*			1B.1
Coulter's goldfields	*Lasthenia glabrata ssp. coulteri*			1B.1
Heckard's pepper-grass	*Lepidium latipes var. heckardii*			1B.2
Colusa grass	*Neostapfia colusana*	FT	SE	1B.1
California alkali grass	*Puccinellia simplex*			1B.2
Keck's checkerbloom	*Sidalcea keckii*	FE		1B.1
Wright's trichocoronis	*Trichocoronis wrightii var. wrightii*			2B.1
saline clover	*Trifolium hydrophilum*			1B.2

Table 4. Federally and/or State listed fauna analyzed in the environmental check list.

			Listing	
Type	**Common Name**	**Scientific Name**	**Federal**	**State**
Fish	Central Valley fall-run Chinook salmon	*Oncorhynchus tshawytscha*		SSC
Fish	Steelhead - Central Valley DPS	*Oncorhynchus mykiss irideus*	FT	
Fish	Pacific lamprey	*Entosphenus tridentatus*		SSC
Fish	River lamprey	*Lampetra ayersi*		SSC
Fish	California roach	*Hesperoleucus symmetricus*		SSC
Fish	Sacramento hitch	*Lavinia exilicauda*		SSC
Fish	Sacramento splittail	*Pogonichthys macrolepidotus*		SSC
Fish	Hardhead	*Mylopharodon conocephalus*		SSC
Fish	Sacramento perch	*Archoplites interruptus*		SSC
Fish	White sturgeon	*Acipenser transmontanus*	FT	
Fish	Green sturgeon	*Acipenser medirostris*	FT	SSC
Mammal	American badger	*Taxidea taxus*		SSC
Mammal	Ringtail	*Bassariscus astutus*		CFP
Mammal	Pallid bat	*Antrozous pallidus*		SSC
Mammal	Townsend's big-eared bat	*Corynorhinus townsendii*		SSC
Mammal	Western red bat	*Lasiurus blossevilii*		SSC
Reptile	Western Pond turtle	*Actinemys marmorata*		SSC

			Listing	
Type	**Common Name**	**Scientific Name**	**Federal**	**State**
Reptile	Giant gartersnake	*Thamnophis gigas*	FT	ST
Reptile	California tiger salamander	*Ambystoma californiense*	FT	T
Reptile	California red- legged frog	*Rana aurora draytonii*	FT	SSC
Reptile	Western spadefoot	*Spea hammondii*		SSC
Reptile	foothill yellow-legged frog	*Rana boylii*		SCT
Insect	Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	SSC
Bird	Bald eagle	*Haliaeetus leucocephalus*		SFP
Bird	Golden eagle	*Aquila chrysaetos*		SFP
Bird	Swainson's hawk	*Buteo swainsoni*		ST
Bird	Northern harrier	*Circus cyaneu*		SSC
Bird	White-tailed kite	*Elanus leucurus*		SFP
Bird	Long-eared owl	*Asio otus*		SSC
Bird	Burrowing owl	*Athene cunicularia*		SSC
Bird	Bank swallow	*Riparia riparia*		ST
Bird	California black rail	*Laterallus jamaicensis coturniculus*		ST, FP
Bird	Least Bell's vireo	*Vireo bellii pusillus*	FE	E
Bird	Loggerhead shrike	*Lanius ludovicianus*		SSC
Bird	Mountain plover	*Charadrius montanus*		SSC
Bird	Purple martin	*Progne subis*		SSC
Bird	Song sparrow "Modesto population"	*Melospiza melodia*		SSC
Bird	Tricolored blackbird	*Aegelaius tricolor*		SSC, SPF
Bird	Vaux's swift	*Chaetura vauxi*		SSC
Bird	Western snowy plover	*Charadrius alexandrinus nivosus*		SSC
Bird	Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT	E
Bird	Yellow-breasted chat	*Icteria virens*		SSC
Bird	Yellow warbler	*Steophaga petechia*		SSC

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

General measures have been incorporated into the project design to protect and minimize impacts to all native flora and fauna (Section F). Specific mitigation measures to conserve biological resources are described below (Section III).

G. Measures to protect Tribal Cultural Resources

The Putah-Cache region has been an important area for settlement and subsistence for thousands of years. The Yocha Dehe Wintun Nation traditionally occupied lands in Yolo, Solano, Lake, Colusa and Napa Counties and are the historical inhabitants of California's Capay Valley.

Based on this records search (Figure 7) of the NWIC base maps, the Putah-Cache Watershed Arundo Eradication Program – Capay Valley records search area contains many cultural resources, showing the long and rich history of the Capay Valley area.

Yolo County RCD and the Yocha Dehe Wintun Nation will work together to protect and preserve cultural resources. Work activities will include Cultural Sensitivity Training for work crews based on the Yocha Dehe Cultural Resources Treatment Protocol for Inadvertent Discoveries of Human Remains and Cultural Items Affiliated with the Yocha Dehe Wintun Nation Ancestral Territory. Known sites will be pre-surveyed by qualified archaeologist and/or Yocha Dehe Tribal Monitors prior to mowing. TCR-1, TCR-2, TCR-3, TCR-4 and TCR-5 will be followed to avoid disturbance to cultural resources. If any cultural resources are inadvertently uncovered, mitigation measures TCR-2, TCR-3, TCR-4, TCR-5 will be followed.

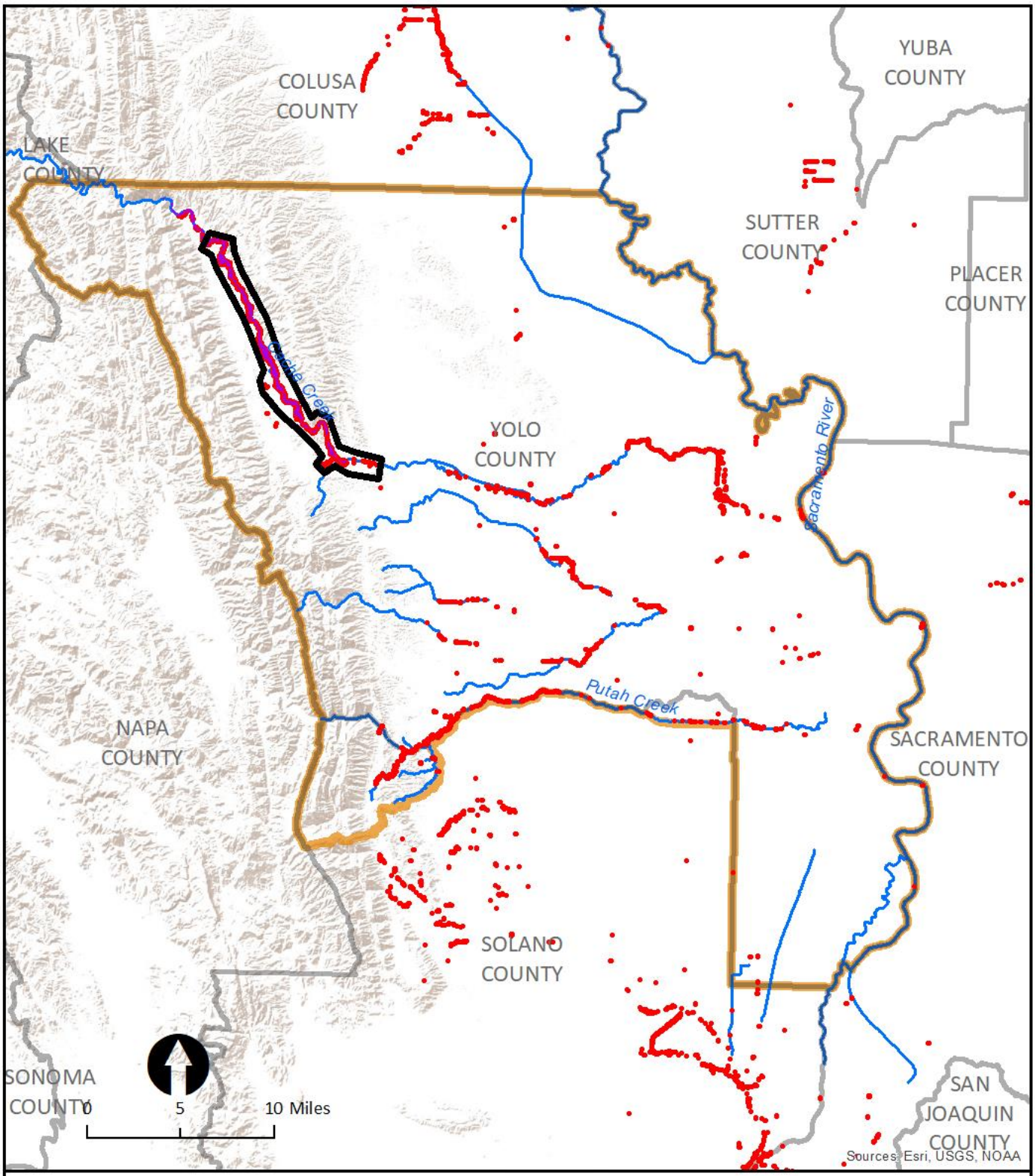

Figure 7
Cultural Record Search Area: Capay Valley (Cache Creek)
Putah-Cache Watershed
Arundo Eradication Program
Yolo County RCD

Table 5. Studies conducted within the Putah-Cache Watershed Arundo Eradication Program – Capay Valley Records Search Area

Author	Date	S#
Allred	2003	26925
Allred	2004	28767
Analytical Environmental Services	2011	45230
Arnold	1964	5207
Bass	1988	9881
Carper	2006	34285
ESA Associates	2009	35984
Greenway and Johnson	1978	945
Haydu	2008	35193
Heipel	1995	19110
JRP Historical Consulting	2004	30907
Leach-Palm *et al.*	2008	35042
McCann	2011	38609
McWilliams	2005	30899
Moratto *et al.*	1991	17298
Moratto *et al.*	1990	12300
Moratto *et al.*	1994	23674
Moratto *et al.*	1992	47656
Ostrogorsky *et al.*	1991	16212
Paullin	2010	43908
Peak & Associates, Inc.	1999	22267
Peak & Associates, Inc.	2000	22536
Praetzellis *et al.*	1991	16384
Price	1992	16207
Rash	2010	38273
Riddell *et al.*	1978	2949
Riddell *et al.*	1975	51509
Roybal	1994	16521
Sharp	2016	50062
Wirth Associates, Inc.	1980	4991
Yocha Dehe Wintun Nation	2017	50858

Table 6. Cultural Resources within the Putah-Cache Watershed Arundo Eradication Program – Capay Valley Records Search Area

Primary number	Resource Type	Citation
P-57-000018	Midden	Andolina and Darcangelo 2007
P-57-000019	Midden	Curtis n.d.
P-57-000031	Midden	Green and Newland 2014
P-57-000081	Midden	Whitaker 2018
P-57-000082	Bedrock mortar	Gerry and Peak 2002
P-57-000083	Midden	Johnson 1967
P-57-000085	Midden	Johnson 1967
P-57-000086	Midden	Origer 1992

P-57-000087	Bedrock mortar	Ritter and Kautz 1968
P-57-000091	Midden	Johnson 1968
P-57-000094	Midden	Johnson 1970
P-57-000095	Lithic scatter	Johnson 1970
P-57-000096	Lithic scatter	Johnson 1970
P-57-000097	Midden	Johnson 1967
P-57-000101	Midden	Johnson 1970
P-57-000103	Midden	Taggart *et al.* 2007
P-57-000104	Midden	Johnson 1970
P-57-000105	Midden	Anonymous n.d.
P-57-000132	Natural Trees	Tom Origer & Associates 2013
P-57-000185	Adams Canal	Tom Origer & Associates 2013
P-57-000461	24610 Main Street	Hope 2003
P-57-000463	24745 Main Street	Hope 2003
P-57-000464	Andy Summ's Smokehouse	Hope 2003
P-57-000465	24700 Main Street	Hope 2003
P-57-000511	Historical debris	Shapiro 2002
P-57-000512	23550 Hwy. 16	St. John and Wooten 2003
P-57-000589	Guinda Ditch	Larson and Freeman 2007
P-57-000590	Concrete culvert	Larson and Freeman 2007
P-57-000602	Guinda Hotel	Leach-Palm 2007
P-57-000612	Capay Dam	Anderson 2009
P-57-000674	Historical debris	Newland *et al.* 2012
P-57-000707	Tancred Community	Crull 2014
P-57-000708	Tancred sheds	Crull 2014
P-57-000709	Tancred barn	Crull 2014
P-57-000710	Tancred House #1	Crull 2014
P-57-000711	Tancred House #2	Crull 2014
P-57-000712	Privy	Crull 2014
P-57-000713	Lean-to	Crull 2014
P-57-000714	Tancred Colony Park	Crull 2014
P-57-000715	Vaca Valley Railroad	Crull 2014
P-57-000799	Tancred Scales	Crull and Paddock 2017
P-57-000800	Cañon School	Les 1986
P-57-001154	John Winter Ranch	Les 1986
P-57-001384	24560 Cache Street	Tom Origer & Associates 2013
P-57-001389	Winter Canal	Tom Origer & Associates 2013
P-57-001433	Amasanth	Crull 2018
P-57-001437	Cashmere	Crull 2018
P-57-001477	James Clark House	Les 1986
P-57-001480	Guinda Store	Les 1986

Review of the California Historical Resources Information System's Directory of Properties in the Historic Property Data (HPD) File for Yolo County showed that all of the resources within the records search area have been assigned Primary numbers and will not be relisted.

There are no Points of Historical Interest or California Historical Landmarks within the records search area.

Arundo has invaded over 175 acres along Cache Creek in the Capay Valley. Biomass reduction by mowing using tractors will occur on large contiguous stands where feasible. Equipment activity has the potential to cause soil disturbance and impact below ground Cultural Resources. With incorporation of mitigation measures to preserve and protect cultural resources, including use of an alternative to mowing using tractors, this impact will be reduced below a level of significance.

Consultation between lead agency (YCRCD) and Local Tribes:

YCRCD has completed a formal consultation with the Yocha Dehe Wintun Nation (Tribe) prior to the completion of the CEQA MND Initial Study and Checklist. The Tribe is the only known tribal stakeholder in the search area. Mitigation measures were developed under this consultation. Procedures for the treatment of Native American human remains, grave goods, ceremonial items, and items of cultural patrimony have formalized treatment protocol developed by the Yocha Dehe Cultural Resources Committee as part of their Treatment Protocol for Handling Human Remains and Cultural Items Affiliated with the Yocha Dehe Wintun Nation.

To protect Tribal and Cultural Resources, a records search and literature review was carried out for the Capay Valley area of the Project at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University. NWIC base maps showed 49 resources within the records search area. Less than 10% of the 13,149-acre Capay Valley record search area has been subjected to cultural resources surveys. The Yocha Dehe Wintun Nation has verified that there are culturally significant sites within the Capay Valley. To protect Tribal Cultural Resources, the record search was completed, crews will be trained and a ground-based survey will occur before and after mowing takes place (TCR-1). If any sites are determined to have culturally significant resources, an archaeological consultant and/or Tribal Contacts will be consulted to assure appropriate protection measures are taken (TCR-1 and TCR-2). No mowing or use of equipment that could disturb resources within the designated site will occur if there is a possibility of impacting the Tribal/Cultural resource.

If historical or archaeological resources are identified by the archaeologist before or after mowing, work will stop immediately in that area (TCR-1 and TCR-3). No historical or archaeological materials will be collected. Work will be diverted away from the sensitive areas, which will remain intact. If approved by the archaeological monitor and/or tribal monitor, hand cutting of arundo and other invasive plants may take place around identified historic site areas. Plant biomass will be carried to areas with no sensitive resources and mulching will occur at that location.

If any previously unevaluated cultural resources (i.e., burnt animal bone, midden soils, projectile points or other humanly-modified lithics, historical artifacts, etc.) are encountered, work will be stopped, and a qualified archaeologist or tribal expert will make an assessment of the discovery and recommend/implement mitigation measures as necessary (TCR-2). Notification of findings to the Tribal contact will occur.

If any human remains are encountered during any phase of work, work shall stop within 500 feet of the find (TCR-3). The county coroner shall be contacted to determine whether investigation of the cause of death is required as well as to determine whether the remains may be Native American in origin. Should Native American remains be discovered, the county coroner must contact the Native American Heritage Commission (NAHC). The NAHC will then determine those persons it believes to be most likely descended from the deceased Native American(s). Together with representatives of the people of most likely descent, a qualified archaeologist shall make an assessment of the discovered and recommend/implement mitigation measures as necessary.

These mitigation measures to protect and avoid disturbing Tribal and Cultural Resources are listed in Section I. Proposed Mitigation Measures TCR-1, TCR-2, TCR-3, TCR-4 and TCR-5.

III. Proposed Mitigation Measures

The following is a list of Mitigation Measures that shall be implemented by the YCRCD in order to avoid or minimize potential environmental impacts. Implementation of these Mitigation Measures would reduce the potential environmental impact of the proposed project to a less-than-significant level. These measures are based on previous CDFW and USFWS guidance. CDFW, USFWS and/or NOAA may modify these conditions under additional regulatory permits that may be required by the project. Any modifications to proposed mitigation measures will be followed to ensure protection of environmental resources.

Biological Mitigation Measures:

Bio-1: Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*): To mitigate potential physical or chemical impacts to elderberry (*Sambucus* spp.) plants potentially supporting valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), YCRCD will follow the following treatment protocols:

1) Treatment, biomass removal and mowing areas will be pre-checked for the presence of elderberry plants.
2) Any plants detected will be avoided with the following procedures as outlined under the: Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) May 2017, prepared by the USFWS. https://www.fws.gov/sacramento/documents/VELB_Framework.pdf.

   Visual surveys for the VELB, which includes looking for adults and/or exit holes, are currently the only approved method of surveying for the species and are not entirely reliable for determining presence or absence (see below). Visual surveys, habitat assessments, and mitigation site monitoring do not require a section 10(a)(1)(A) recovery permit.
   The following measures are incorporated into the proposed project to avoid and minimize effects to VELB and/or its habitat.

   - *Worker education.* A qualified biologist will provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.
   - *Work site monitoring.* A qualified biologist will monitor the work area at appropriate intervals to assure that all avoidance and minimization measures are implemented.
   - *Timing.* As much as feasible, all activities that could occur within 50 meters (165 feet) of an elderberry shrub, will be conducted outside of the flight season of the VELB (March - July).
   - *Chemical Usage.* Herbicides will not be used within the drip-line of the shrub. All chemicals will be applied using a backpack sprayer or similar direct application method.
   - *Manual.* Mechanical weed removal within the drip-line of the shrub will be limited to the season when adults are not active (August - February) and will avoid damaging the elderberry.
   - *20 ft to drip line of elderberry plant:* If any elderberry plants are present within work areas, the YCRCD Project Manager shall assure that all elderberry plants are protected from potential work activities, including herbicide overspray, by using these methods within a 20 ft buffer around elderberry plants, but outside the dripline of the elderberry plants: 1) directing the work crew to hand cut all target plants, 2) cut stumps will then be treated with glyphosate or triclopyr (imazapyr will not be used within 20 ft of elderberry plants), and 3) no power spraying equipment will be used within 50 ft of elderberry plants. Mowing (reduction of arundo and tamarisk) may occur outside the 20 ft buffer surrounding elderberry plants. Invasive species less than one inch in diameter may be removed using a weed wrench as long as roots of elderberry are not affected. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 each year that the project is implemented.
   - *Within drip line of elderberry plant:* Arundo canes within the drip line of elderberry plants should be treated, but this will not occur without explicit agreement from CDFW and FWS. The

treatment method would be glyphosate applied to cut arundo cane surface, as glyphosate herbicide is not mobile. Hand tools (loppers and pruners) would be used to cut arundo within the drip line of the elderberry plant (no chainsaws). No cutting or damage to elderberry stems greater than 1" would occur. A request for this work method approach will be made if any arundo patches are found to occur within the drip line of elderberry plants.

Bio-2: Giant Garter Snake (*Thamnophis gigas*): Suitable habitat will be surveyed no more than 72 hours before 'active' work (biomass reduction or cutting, biomass chipping, or initial treatment of sites). To reduce disturbance-related impacts the YCRCD project manager shall direct hand crews to minimize disturbances in areas where any individuals are observed. Treatment of these areas may proceed under the following circumstances: 1) areas occupied shall be treated later in the season after individuals have left the area; or 2) work may proceed with a biologist on site and crews avoid occupied areas (30 ft buffer), or 3) pursue an alternate plan that avoids harassment/mortality and minimizes other physical habitat disturbances in coordination with the written permission of the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program. 'Passive' treatments (backpack treatments with no use of powered equipment) are not required to pre-survey suitable habitat areas. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Hazards and Hazardous Materials Mitigation Measures:

Haz-1: To reduce potential impacts associated with fuel spills in riparian areas, the project manager shall ensure that gasoline at no time is transported across a flowing stream. Only existing roads shall be used to move personnel, equipment and materials into and out of the project site. The project manager shall select staging areas for fuel storage, refueling and maintenance of equipment on flat disturbed upland sites that are away from dry or wet waterways and areas that could potentially flow into a stream in the event of an accidental spill. Spill/fuel containment materials and equipment shall be made available and used at refueling and maintenance areas. Equipment shall be stored and maintained within properly cleared areas. The applicator shall be responsible for immediate containment and removal of any spilled material. The clean-up of all petroleum and/or chemical spills shall begin immediately and the appropriate authorities and CDFW shall be notified immediately if a spill occurs. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. The project manager or certified applicator shall make daily inspections for leaks, correcting and repairing any such leaks prior to resuming their use. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Northern Region Lake and Streambed Alteration Agreement Program no later than June 15th of each year that the project is implemented.

Haz-2: To reduce impacts associated with exposure of people or structures to wildland fires, the YCRCD project manager shall ensure that adequate fire protection equipment is available at work sites. This shall include fire extinguishers attached to all mechanized equipment. In addition, firefighting hand tools shall be made available at all areas where mechanical equipment is operated. The YCRCD project manager, Applicators, and all workers shall comply with all applicable fire safe standards as found in Public Resources Code Division 4, Chapter 6, (PRC's 4427, 4428, 4429, 4431, 4442, list not all inclusive). Vehicles shall not be

parked in tall grass or any other location where heat from the exhaust system could ignite a fire. All motorized equipment shall have approved spark arrestors. A dependable radio or phone communication shall be available on site to report any emergency which may occur. Treated invasive species that have the potential to cause a significant fire risk to surrounding vegetation and structures, or the potential to cause an obstruction to any structure, shall have canes, limbs or other vegetative material cut and chipped, or disposed of in a legal manner. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Northern Region Lake and Streambed Alteration Agreement Program no later than June 15th of each year that the project is implemented.

Tribal and Cultural Resources Mitigation Measures:

TCR-1: For mowed portions of the project area in Capay Valley (Cache Creek) a historic record search will occur prior to initiating work activities. Local Tribes have been contacted to identify if there are any culturally meaningful sites within project work areas. A ground survey before and after mowing will also occur. Any work activities near an identified site will be assessed by a qualified archaeologist prior to work activities occurring. The Tribal contact and the archaeologist will determine what invasive plant control methods are used at the site to protect any cultural resources, or if work cannot occur at the site.

TCR-2: If any previously unevaluated cultural resources (i.e., burnt animal bone, midden soils, projectile points or other humanly-modified lithics, historical artifacts, etc.) are encountered, work will be stopped, and a qualified archaeologist will make an assessment of the discovery and recommend/implement mitigation measures as necessary. Notification of findings to the Tribal contact will occur.

TCR-3: If any human remains are encountered during any phase of work, work shall stop within 500 feet of the find. The county coroner shall be contacted to determine whether investigation of the cause of death is required as well as to determine whether the remains may be Native American in origin. Should Native American remains be discovered, the county coroner must contact the Native American Heritage Commission (NAHC). The NAHC will then determine those persons it believes to be most likely descended from the deceased Native American(s). Together with representatives of the people of most likely descent, a qualified archaeologist shall make an assessment of the discovered and recommend/implement mitigation measures as necessary.

IV. SUMMARY OF FINDINGS

This Initial Study and Mitigated Negative Declaration (IS/MND) has been prepared to assess the project's potential effects on the environment and the significance of those effects. Potentially significant environmental effects could result from the proposed project. YCRCD revised its project plans and has agreed to implement Mitigation Measures, which will eliminate or reduce environmental impacts to a less-than-significant level. Based upon this IS/MND, YCRCD has determined that the proposed project would have no significant effects on the environment once Mitigation Measures are implemented. YCRCD has found, in consideration of the entire record, that there is no substantial evidence that the proposed project as currently revised and mitigated would result in a significant effect upon the environment. The IS/MND is therefore the appropriate document for CEQA compliance.

This conclusion is supported by the following findings:

- The project would result in no impacts to Agricultural Resources, Air Quality, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation, Transportation/Traffic, or Utilities and Service Systems.
- The project would have impacts below a level of significance to Aesthetics, Geology and Soils, Greenhouse Gas Emissions, Hydrology and Water Quality, and Noise.
- Mitigation Measures would be implemented to reduce potentially significant impacts to less-than-significant levels for Cultural Resources, Biological Resources, Hazards and Hazardous Materials, and Tribal Cultural Resources.
- The project would not substantially degrade the quality of the environment. It is anticipated that the project would benefit the habitat for riparian habitat and special status species.
- The project would not achieve short term environmental improvement to the disadvantage of long-term environmental improvement.
- The project would not have environmental effects that are individually limited but cumulatively considerable.
- The project would not have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly.
- The project incorporates all applicable Mitigation Measures as listed above and described in the initial study check list.
- The mitigated negative declaration reflects the independent judgment of the Lead Agency.

V. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED AND DETERMINATION

A. Factors

The environmental factors checked below would be potentially affected by this project, as discussed within the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
✔ Biological Resources	✔ Cultural Resources	☐ Geology/Soils
✔ Hazards/Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
✔ Tribal Cultural Resources	☐ Utilities/Service Systems	✔ Mandatory Findings of Significance

B. Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

✔ I find that although the proposed project could have a significant effect on the environment there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

August 20, 2019

Signature | Date

Heather Nichols | Executive Director

Printed Name | Title

VI. EVALUATION OF ENVIRONMENTAL IMPACTS

ENVIRONMENTAL CHECKLIST:
ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Aesthetics.				
Will the Project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which will adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Discussion: The project area has occurrences of arundo, tamarisk and other target non-native vegetation in riparian areas. In some areas these non-native plants have altered the natural visual character of riparian zones by both expanding into native riparian areas and in some instances eliminating native plant and animal species altogether. The project will not result in negative cumulative impacts on scenic vistas. The project would remove stands of arundo and other target non-native plants from riverine areas that have limited public access. Views of the river from most areas are from a distance of more than 100 feet. Changes in vegetation composition are not likely to significantly alter the view. Rock formations and river channel areas may have increased visibility after the project restoration has occurred – a benefit to the scenic view. Water bodies are typically considered positive visual features. Arundo removal will have the long-term effect of saving mature native trees by reducing the risk of wildland fires and catastrophic flooding throughout the system, which have negative effects on scenic vistas. The net effect will be neutral to beneficial for scenic riverine and coastal vistas by removing non-native vegetation that is impacting these resources.

There are no officially designated scenic highways in Yolo County or the project area. And the project does not propose any use of outdoor lighting and no buildings are proposed and thus there can be no associated light reflection/glare.

The project will control non-native vegetation within the waterways of Yolo County; however, visual impacts are expected to be temporary and minor as selected plants are being controlled and re-vegetation will occur. Therefore, the proposed project will not have any substantial adverse effect on a scenic resource within the Project area.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Agriculture and Forest Resources.				
Would the project:				

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Project of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code Section 12220(g)),timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion: Within the project vicinity there are lands designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance and grazing land. The project will not convert agricultural resources to non-agricultural use. Therefore, there will be no potentially significant impacts to or cumulative level conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance to a non-agricultural use as a result of this project.

The proposed project will not result in a conflict in zoning for agricultural use because none of the existing agricultural uses in the Watershed or project areas would be displaced nor would future agricultural uses be precluded as a result of project activities. Additionally, the project site is not under a Williamson Act Contract. Therefore, there will be no conflict with existing zoning for agricultural use, or a Williamson Act contract.

The proposed project area contains land designated as prime farmland; however, the proposed project would not result in significant adverse impacts related to the conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance or Farmland of Local Importance to a non-agricultural use because none of the existing agricultural uses in the watershed or project site would be displaced nor would future agricultural uses in the watershed or project site be precluded as a result of project activities. Therefore, no potentially significant project or cumulative level conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance to a non-agricultural use will occur as a result of this proposed project.

ENVIRONMENTAL ISSUES	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
C. Air Quality.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☐	☒
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☐	☒

Discussion: The project will use machinery to complete project activities. No grading will occur as part of project activities. Emissions from the use of any equipment would be minimal, temporary and localized, resulting in pollutant emissions below the screening-level criteria established by County guidelines for determining significance. The vehicle trips generated during project work will not exceed 50 Average Daily Trips (ADTs). According to the Bay Area Air Quality Management District CEQA Guidelines for Assessing the Air Quality Impacts of Projects and Plans, projects that generate less than 2,000 ADT are below the screening-level criteria established by the guidelines for criteria pollutants. As such, the project will not violate any air quality standard or contribute substantially to an existing or projected air quality violation.

Air quality emissions associated with the project include emissions of PM10, NOx and VOCs from project implementation (use of equipment and biomass reduction), and also as the result of temporary increases in traffic during project implementation. Emissions from the active work phase would be minimal, localized and temporary resulting in PM10 and VOC emissions below the screening-level criteria established by County guidelines for determining significance.

The proposed project as well as the past, present and future projects within the surrounding area, have emissions below the screening-level criteria established by County guidelines for determining significance, therefore, the emissions associated with the proposed project are not expected to create a cumulatively considerable impact nor a considerable net increase of PM10, or any O3 precursors.

Chemical treatments will be made in strict accordance with label instructions and State of California regulations by certified Applicators using only products registered for use in wetland habitats by the EPA and registered in CA. In order to prevent chemical drift, herbicide applications will be made only during daylight hours when winds velocities do not exceed ten miles per hour. Wind speeds will be monitored hourly when conditions warrant it. Herbicide treatments will not occur when there is a 30 percent forecast of rain within six hours of such treatment

ENVIRONMENTAL ISSUES	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
D. Biological Resources.				
Will the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans,	☐	☐	☒	☐

policies, or regulations or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?				
c) Have a substantial adverse effect on wetlands as defined by the Department of Fish and Wildlife (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion: A query of the California Natural Diversity Database (CNDDB) was carried out in March 2019 using CNDDB data from March 2018 for species in the project area defined as the County plus 5 miles, excluding foothills (Figure 3). Only species expected to occur in the project area (riparian vegetation, or ecotones) are included in this analysis. The Cal Fish database and numerous other references (Yolo County General Plan, HCP/NCCP, and including data from USFWS) were also reviewed in order to determine the possible occurrence of special status species.

The Invasive Species Control project will have an overall positive impact on riparian and aquatic habitats that benefit riparian dependent wildlife. Eradicating target non-native invasive plant species will allow native plants to reoccupy portions of the project area where they were eliminated by the encroachment of the target non-native invasive plant species, particularly arundo and salt cedar.

Potential Direct Impacts to Biological Resources:

Direct impacts to biological resources could occur through project restoration activities. Direct impacts could occur as physical take or harassment of species (flora and fauna). To avoid these impacts work methods and activities follow strict timing and activity restrictions (Table 1). The timing of work activities minimizes work when biological resources are actively reproducing and/or migrating through work areas. The type of work activity in a given timeframe is designed to minimize and avoid impacts. Measures to protect biological resources are presented in Section F of this Initial Study. These include general measures as well as task specific measures related to treatment, biomass reduction, planting and maintenance. Mitigation Measures are presented below for specific species to assure that impacts are avoided or minimized to a level that is not significant.

Herbicide Analysis for Biological Resources:

Risk assessments for the herbicides that will be used in this project are based on procedures used by the US Forest Service (Syracuse Environmental Research Associates SERA 2011&2014). Using this approach involves calculating a Hazard Quotient (HQ) by dividing exposure by standardized toxicity values (i.e. lethal dose 50- LD50 or, more preferably, No Observable Adverse Effect Level (NOAEL) values). The USFS uses an HQ value of 1.0 as the Level of Concern (LOC) for both terrestrial and aquatic species. **HQ values that are less than 1.0 are considered to pose no significant risk to non-target species.**

Glyphosate: Glyphosate is a non-selective systemic herbicide that can damage all groups or families of plants to varying degrees. Glyphosate inhibits the production of aromatic amino acids and certain phenolic compounds. This leads to a variety of toxic effects in plants, including the inhibition of photosynthesis,

respiration, and nucleic acid synthesis, thereby resulting in cellular disruption, decreased growth, and death at sufficiently high levels of exposure. Upland formulations may contain surfactants (additives) that can contribute additional toxicity to the formulation, principally to aquatic organisms. This project will use aquatic approved formulations of glyphosate for treatments. Research summarized by the United States Forest Service (USFS) assessed the toxicological impact of glyphosate-based herbicides on non-target flora and fauna using the HQ method (SERA 2011&2014). Toxicity values (NOAEL, preferably) derived from tests conducted with glyphosate formulations that contained surfactants were used. Because of the additional toxicity that may be contributed by surfactants, formulated product assessments are more conservative in their approach than assessments that use only the herbicide active ingredient. All assessments are based on spot spray terrestrial applications made by backpack applicators that result in an overall use rate of **1 lb/a.e./ac** (acid equivalent per acre). This is appropriate given the scattered distribution of target non-native plants across the landscape. Glyphosate's relatively brief environmental persistence and the low potential for repeat applications during a single season significantly reduce the potential for chronic exposure to non-target organisms. For that reason, this assessment is limited to acute exposure scenarios.

Imazapyr: Imazapyr is a broad-spectrum, non-selective systemic herbicide used for control of annual and perennial plants including grasses, sedges, broadleaf species, and woody plants. Imazapyr's mode of action works by inhibiting the synthesis of certain amino acids produced by plants (but not animals). Imazapyr is an amino acid synthesis inhibitor and kills plants by inhibiting the production of the branched-chain aliphatic amino acids which are required for DNA synthesis and growth. Upland formulations may contain surfactants that can contribute additional toxicity to the formulation, principally to aquatic organisms. This project will use aquatic approved formulations of imazapyr for treatments. Imazapyr based products are most frequently applied as foliar sprays, using a wide variety of application equipment including backpack sprayers and power hand-guns but may also be used on cut stem surfaces and as low volume applications of more concentrated material. Research summarized by the United States Forest Service (USFS) assessed the toxicological impact of imazapyr-based herbicides on non-target wildlife species using the HQ method (SERA 2011&2014). Toxicity values (NOAEL, preferably) derived from tests conducted with imazapyr formulations that contained surfactants were used. Because of the additional toxicity that may be contributed by surfactants, formulated product assessments are more conservative in their approach than assessments that use only the herbicide active ingredient. All assessments in this MND are based on spot spray terrestrial applications made by backpack applicators that result in an overall use **rate of 1 lb/a.e./ac** (acid equivalent per acre). This rate will not be exceeded. Label rates vary from 0.125 to 1.5 lb/ac depending on target vegetation and purpose of application. Imazapyr's low potential for repeat applications during a single season significantly reduce the potential for chronic exposure to non-target organisms. For that reason, this assessment is limited to acute exposure scenarios.

Triclopyr: Triclopyr is a selective, systemic herbicide effective only on broadleaf and woody species (grasses are not damaged by triclopyr). Triclopyr mimics auxin, a plant growth hormone, thus disrupting the normal growth and viability of plants. Amine formulations are water-soluble and, in general, pose lower toxicity risk to non-target wildlife species compared to products that contain the triclopyr ester. Triclopyr amine-based products are frequently applied as foliar sprays, using a wide variety of application equipment including backpack sprayers and power hand-guns but may also be used on cut stem surfaces and as low volume applications of more concentrated material. Research summarized by the United States Forest Service (USFS) assessed the toxicological impact of triclopyr amine-based herbicides on non-target wildlife species using the HQ method (SERA 2011&2014). All assessments are based on spot spray terrestrial applications made by backpack applicators that result in an overall use rate of 1 lb/a.e./ac. Triclopyr's relatively brief environmental persistence and the low potential for repeat applications during a single season significantly reduce the potential for chronic exposure to non-target organisms. For that reason, this assessment is limited to acute exposure scenarios.

Best management practices (BMPs) will be followed prior to and during herbicide application. The following list includes some, but not all, of the BMPs that will be followed. Additional measures to protect biological resources are presented in Section F of this Initial Study.

- Only licensed applicators will apply herbicide.
- Directions in the herbicide product label will be followed for use, storage, and personal protection.
- Herbicide products will be selected carefully to minimize additional impacts from degradants, adjuvants, inert ingredients, and tank mixtures.
- The least amount of herbicide needed to achieve the desired result will be applied.
- The effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risk will be considered for every application.
- Spraying will not occur when rain is forecasted. If weather conditions change to rain during an herbicide application session, the session will be terminated and resumed when precipitation ceases.
- Herbicides will only be applied when the wind speed is less than 10 mph to minimize drift.
- Site characteristics, environmental conditions, application equipment and system pressure will be considered in order to avoid and minimize damage to non-target vegetation.
- The applicator will develop a safety plan prior to herbicide use that includes an emergency spill plan, safety data sheets for each herbicide, and identification of appropriate personal protective equipment. All workers, including contractors, will receive training to carry out the safety plan and will have a copy of the plan in their possession during herbicide use. Toxicological risk information is provided below for each major taxonomic group.

Special Status Species

Resources discussed below include special status plants (CNPS Rare Plant Rank 1 or 2), invertebrates, fishes, amphibians, reptiles, birds, and mammals. "Special status species" include all species tracked by CNDDB potentially occurring in the project work area, and include all those which meet the CEQA definition of Endangered, Rare, or Threatened (Figures 3-5, see CEQA Guidelines, § 15380).

1.Special Status Plant Species:

The special-status plants discussed below are known from the vicinity of the project area. Only species expected to occur in the project area (riparian vegetation, or ecotones) are included in this analysis. Plants from upland habitats are presented in Appendix 1. California Rare Plant Rankings: 1A Plants presumed extirpated in California and either rare or extinct elsewhere; 1B Plants rare, threatened, or endangered in California and elsewhere; 2A Plants presumed extirpated in California but common elsewhere; 2B Plants rare, threatened, or endangered in California but more common elsewhere.

Seventeen special-status plants that occur in wetland, vernal pool or upland habitats were evaluated for their potential to occur in the work area. Fifteen of these plant species are restricted to vernal pool and saline habitats, areas where project activities are not occurring. Additional sensitive plants species that have CNDDB data records, but that occur in other habitat areas or even in the project, are included in Appendix 1 as well. These were not analyzed further.

Table 7 Special Status Plants

Plants				Listing		CNPS
Common Name	**Scientific Name**	**Habitat[a,b,c]**	**Distribution in project area**	**Fed**	**State**	
Alkali milk-vetch	*Astragalus tener var. tener*	Low ground, alkali flats, and flooded lands in alkali playas,	CNDDB records in vernal pool complexes north of Davis and south and west of Sacramento. Potential to			1B.2

Plants				Listing		CNPS
Common Name	**Scientific Name**	**Habitat[a,b,c]**	**Distribution in project area**	**Fed**	**State**	
		grasslands, and vernal pools. 1-170 meters. March-June	occur in other suitable alkaline habitat in the County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] **Unlikely to occur in project work areas.**			
Bristly sedge	*Carex comosa*	Freshwater Wetlands, wetland-riparian: lake margins, edges.	Outside of project area, east of the Sacramento River. **Unlikely to occur in project work areas.**			2B.1
Brittlescale	*Atriplex depressa*	Alkali scalds or alkaline clay meadows or annual grasslands in chenopod scrubs, playas, and valley and foothill grasslands, meadows and sometimes vernal pools. 1-320 meters. April-October	CNDDB records around Woodland and Davis. Potential to occur in other suitable alkaline habitat in the County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] **Unlikely to occur in project work areas.**			1B.2
California alkali grass	*Puccinellia simplex*	Valley Grassland, alkali-flats, wetland-riparian.	Several CNDDB records, mostly from 1950 all in alkali-flats. **Unlikely to occur in project work areas.**			1B.2
Colusa grass	*Neostapfia colusana*	Large or deep vernal pool bottoms with adobe soils. 5-200 meters. May-August	Two CNDDB records at Davis Air Force Communication Facility, which is now part of the adjacent Yolo County Grasslands Regional Park. **Unlikely to occur in project work areas.**	FT	SE	1B.1
Coulter's goldfields	*Lasthenia glabrata ssp. coulteri*	Alkali Sink, Coastal Salt Marsh, Freshwater Wetlands, wetland-riparian.	One CNDDB record 1927, near Dunnigan, extirpated. Possibly extirpated. **Unlikely to occur in project work areas.**			1B.1
Deep-scarred cryptantha	*Cryptantha excavata*	Cismontane woodland in sandy, gravelly, dry streambanks. 100-500meters. April-May	Two CNDDB records above Capay Valley, one in *Pinus sabiniana*-oak and the other on Fiske Creek on creek bank of grey shale substrate.			1B.1
Ferris' milk-vetch	*Astragalus tener var. ferrisiae*	Sub-alkaline flats on overflow land in meadows and valley and foothill grasslands. Usually seen in dry, adobe soil. 5-75 meters. April-May	CNDDB record at DPR Tule Elk Reserve. There are CNDDB records that are possibly extirpated near Dunnigan and one at CDFG Glide Tule Ranch. Potential to occur in other suitable habitat in other areas of the County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] **Unlikely to occur in project work areas.**			1B.1
Heartscale	*Atriplex cordulata var. cordulata*	Alkaline flats and scalds within chenopod scrub, grassland, and	One CNDDB extirpated record north of Davis. Potential to occur in other suitable alkaline habitat in the			1B.2

Plants				Listing		CNPS
Common Name	**Scientific Name**	**Habitat[a,b,c]**	**Distribution in project area**	**Fed**	**State**	
		meadows. Sandy soils. 1-150 meters. April-October	County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] **Unlikely to occur in project work areas.** [c,d]			
Heckard's pepper-grass	*Lepidium latipes var. heckardii*	Grasslands and vernal pools; prefers alkaline soils. 2-200 meters. March-May	CNDDB records between Davis and Woodland and near Zamora. Potential to occur in areas of suitable habitat in other areas of the County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] Vernal pool areas are located primarily in the southern areas of the County.[f] **Unlikely to occur in project work areas.**			1B.2
Keck's checkerbloom	*Sidalcea keckii*	Valley Grassland, Foothill Woodland	One CNDDB record from 1977 from foothill woodland, near Putah Creek. **Unlikely to occur in project work areas.**	FE		1B.1
Northern California black walnut	*Juglans hindsii*	Riparian forest and woodlands with deep alluvial soils. Few extant native stands remain. 0-440 meters. April-May	One CNDDB extirpated record along the Sacramento River, concentrated around Walnut Grove. Potential habitat occurs along riparian corridors, especially Cache Creek, Putah Creeks and the Sacramento River.[f]			1B.1
Palmate-bracted bird's-beak	*Chloropyron palmatum*	Alkaline soils in chenopod scrub and grassland. 5-155 meters. May-October	CNDDB record near Woodland and record at Alkali Grasslands Reserve. One extirpated CNDDB record east of Woodland. Potential to occur in areas of suitable alkaline habitat in other areas of the County. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento.[d,e] **Unlikely to occur in project work areas.**	FE	SE	1B.1
Pappose tarplant	*Centromadia parryi ssp. parryi*	Grassland, coastal salt marshes, alkaline springs, seeps.	One record in Colusa County, north of project area on west side of Bear Creek, in annual grassland with Valley Oaks. **Unlikely to occur in project work areas.**			1B.2
Saline clover	*Trifolium hydrophilum*	Vernal pool, wetland-riparian, grassland	Two CNDDB records in Yolo County, one in alkaline grassland on edge of vernal pool habitat, one in vernal pool grassland mosaic. **Unlikely to occur in project work areas.**			1B.2
Woolly rose-mallow	*Hibiscus lasiocarpos var. occidentalis*	Freshwater marshes along river banks and islands in sloughs. In California, known from the Delta watershed. 0-150 meters. June-September	CNDDB records south of Knights Landing to southern border of Yolo County along Sacramento River and canals leading to river.			1B.2

Plants				Listing		CNPS
Common Name	Scientific Name	Habitat[a,b,c]	Distribution in project area	Fed	State	
Wright's trichocoronis	*Trichocoronis wrightii var. wrightii*	Riparian, meadows, marsh, vernal-pools.	One CNDDB record from 1949 in Colusa County near Sacramento River. Possibly Extirpated. **Unlikely to occur in project work areas.**			2B.1

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

[a] Calflora: Information on California plants for education, research and conservation. 2014. Berkeley, California: The Calflora Database [a non-profit organization]. https://www.calflora.org/

[b] The Jepson Manual: vascular plants of California, second edition. B Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wildens, editors, 2012. University of California Press, Berkeley.

[c] California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v7-18d 3-19-2018). California Native Plant Society, Sacramento, California. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home

[d] H.T. Harvey & Associates. 2005. Yolo County Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) Ecological Baseline Report.

[e] County of Yolo. 2007. Yolo County Natural Heritage Program Regional Vegetation Dataset. Yolo County Regional Vegetation Geographical Information System (GIS) shapefile. Data prepared by Technology Associates.

[f] LSA Associates Inc. 2009. Yolo County 2030 Countywide General Plan EIR.

Work activities

Treatment methods using herbicides are being used in this invasive non-native plant control project. Application methods will assure that these chemicals are applied to target plants, and that special status plant species are not impacted/affected. Manual control methods (pulling/extraction) will be applied to target invasive non-native plants only. Biomass removal (cutting, hauling, and chipping) will occur in a manner that assures that special status plant species are not impacted/affected. Chipped biomass will be spread within the footprint of the removed non-native plants, or spread over degraded areas with no plant cover or non-native annual cover. Mowing of dense arundo and tamarisk stands will occur on Cache Creek (Capay Valley). Endemic plant species with narrow ecological ranges are unlikely to occur in the project work areas as these areas are dynamic flood zones with frequent disturbance.

Herbicide Analysis for Biological Resources

Glyphosate: Glyphosate affects both grass and broadleaf plant species. Glyphosate's strong soil adsorption potential greatly limits herbicide activity in soil. For that reason, only foliar uptake via direct spray or drift, (and not root uptake) is considered in this assessment. Using a sensitive plant NOEAC of 0.02 lbs a.e./ac will result in a HQ value of 50 when non-target plants are directly sprayed. However, the use of a 12.5 ft buffer zone around special status plant populations would reduce the HQ to 0.8. Additionally, annual sensitive plant species will be senesced or dormant during the herbicide application period, effectively eliminating any possibility of foliar absorption. The application timing will effectively reduce the risk to non-target plants to insignificance.

Imazapyr: Imazapyr affects both grass and broadleaf plant species. Imazapyr's weak soil adsorption, mobility, and persistence make this herbicide inappropriate to use near sensitive plant species. Using a sensitive plant NOEAC of 0.000064 lbs a.e./ac will result in a HQ value of 15,625 when non-target plants are directly sprayed. However, the use of a 150 ft buffer around sensitive plant species will be used to effectively reduce the risk to non-target plants to insignificance.

Triclopyr: Triclopyr affects broadleaf plant species. However, the herbicide is not readily taken into plants through the root system. For this reason, only foliar uptake via direct spray or drift (and not root uptake) is

considered in this assessment. Using a sensitive plant NOEAC of 0.0028 lbs a.e./ac will result in a HQ value of 357 when non-target plants are directly sprayed. However, the use of a 50 ft buffer zone around listed plant populations would reduce the HQ to 0.9. Additionally, some sensitive plant species may be senesced or dormant during the herbicide application period, effectively eliminating any possibility of foliar absorption. The application timing will effectively reduce the risk to non-target broadleaf plants to insignificance. Further, monocot species including grasses are tolerant of triclopyr exposure and will be unaffected by the use of this herbicide.

Impact: Impacts to special status plant species presented in Table 7 and Appendix 1 are below a level of significance.

Species accounts are given below for two plant species that could occur in work areas and for three Federal and State listed plants that are known to occur or likely to occur in Yolo County.

Deep-scarred cryptantha (*Cryptantha excavate*). Not listed, CNPS 1B.1. Annual 5-30 cm flowering Mar-May, growing in steep, sandy, gravelly slopes, soils, dry streambanks, and foothill woodland habitats. Two CNDDB records above Capay Valley, one in Pinus sabiniana-oak and the other on Fiske Creek on grey shale bank. This species prefers dryer slopes and ecotonal areas that are not the preferred habitat for arundo (active low gradient portions of the river, floodplain). This annual species will have completed its life cycle by the time that work crews carryout work activities (biomass cutting, invasive plant treatments). Mowing activities in Capay valley will occur in river bottom areas, which are low gradient active fluvial areas that are not habitat preferred by deep-scarred cryptantha. Any invasives control work, particularly tamarisk, in dryer riparian areas will occur in late season and biologists will pre-check sites for cryptantha. Any observed plants will be avoided.

Woolly rose-mallow (*Hibiscus lasiocarpos var. occidentalis*). Not listed, CNPS 1B.2. Perennial sub-shrub. Freshwater marshes along river banks and islands in sloughs. In California, known from the Delta watershed, 0-150 meters. June-September flowering. CNDDB records south of Knights Landing to southern border of Yolo County along Sacramento River and canals leading to the river. Woolly rose-mallow typically occurs in saturated soils adjacent to sedges and rushes. This habitat is too wet for arundo to typically occur, but arundo and other target vegetation could be in close proximity to woolly rose-mallow. Project mapping of arundo demonstrates a very scattered distribution of arundo throughout this area. Arundo and target plants treated in or adjacent to suitable habitat for woolly rose-mallow will be checked by the project biologist for the presence of plants. Any observed plants will be avoided.

Palmate-bracted Bird's Beak (*Cordylanthus palmatus*). Federally endangered, State endangered and CNPS 1B. Palmate bracted bird's-beak grows in saline-alkali soils in seasonally flooded lowland areas at elevations of approximately 20-900 meters. Like other members of the *Cordylanthus* genus, it is partially parasitic on the roots of host plants. This parasite-host relationship is often carried out with salt grass (*Distichlis spicata*). These highly specific habitat requirements, combined with the historically rare occurrence of saline-alkali environments in California, have made palmate bracted bird's beak highly susceptible to habitat destruction. The greatest threats to this species result from habitat degradation due to drainage of seasonal wetlands, conversion of land to agricultural and urban uses, livestock grazing, and off-road vehicle use. No critical habitat has been designated for this species. There is one CNDDB record near Woodland and a group of records at the Alkali Grasslands Reserve south east of Woodland. One extirpated CNDDB record east of Woodland. Alkaline areas are recorded northeast of Zamora, southeast of Woodland and in the Yolo Bypass south of West Sacramento. Staging and access areas adjacent to the Alkali Grasslands Reserve will be surveyed by the project biologist prior to work being initiated to assure that no plants are in work areas. Any observed plants will be avoided.

Colusa Grass (*Neostapfia colusana*). Listed as Federally threatened and State endangered. Colusa grass grows in large and deep vernal pools, often with high mud content. It is restricted exclusively to the Sacramento and San Joaquin Valleys, and has no more than 45 occurrences in the entirety of its range. The majority of vernal pool habitat in California has been destroyed or altered through drainage, invasive species, overgrazing, urban and agricultural expansion, and contamination; habitat loss and fragmentation that are the primary threats to the survival of this species. Critical Habitat has been designated for this species in Yolo, Merced, Tuolumne, and Stanislaus Counties. In Yolo County, there is a single area of Critical Habitat southeast of the City of Davis and south of the South Fork of Putah Creek. The western boundary coincides with the Solano/Yolo County line, and the site includes the former Davis Air Force Communication Facility (Davis Communications Annex) population of this species, which was recently added to the adjacent Yolo County Grasslands Regional Park. **Unlikely to occur in project work areas.**

Keck's checkerbloom (*Sidalcea keckii*). Listed as Federally endangered. CNPS 1B.1 Endemic to California. Annual herb in the mallow family growing 1.5 – 3.3 decimeters (6 – 13 inches tall. Flowers Apr-May. Grassy slopes in valley grassland and foothill woodland. One CNDDB record from 1977 from foothill woodland near Putah Creek, additional records on Calflora, but all in grasslands or foothills. **Unlikely to occur in project work areas.**

Impact: Impacts to these special status plant species are below a level of significance.

2. Special Status Invertebrates

Table 8 Special Status Invertebrates

Insects			Listing	
Common Name	**Scientific Name**	**Distribution in project area**	**Federal**	**State**
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Suitable habitat in many areas, particularly Putah and Cache Creeks and Sac River; confirmed in scattered locations across project area.	FT	SSC

Work activities

Treatment methods using herbicides are being used by the invasive non-native plant control project. Herbicides listed below are demonstrated to have very low toxicity to insects. The insect species of concern, Valley elderberry longhorn beetle, is dependent on its host plant for survival so protection measures below are focused on protecting elderberry plants. Application methods will assure that herbicides are applied to target plants only, but specific buffers are listed below along with herbicide type restrictions. Manual control methods (pulling/extraction) will be applied to target invasive non-native plants only. Buffers around elderberry plants are outlined below. Biomass removal (cutting, hauling, and chipping) will occur in a manner that assures that elderberry plants are not impacted/affected. Chipped biomass will be spread within the footprint of the removed non-native plants, or spread over degraded areas with no plant cover or non-native annual cover, work will maintain a buffer away from any elderberry plants. Mowing of dense arundo and tamarisk stands will occur along Cache Creek in the Capay Valley. These areas will be surveyed prior to mowing to assure that no elderberry plants are impacted.

Herbicide Analysis for Biological Resources

Glyphosate: The United States Environmental Protection Agency (USEPA) uses a honeybee contact toxicity test to estimate glyphosate toxicity to non-target insects. The toxicity value used in this assessment is 260 mg a.e./kg. Using an exposure scenario that involves direct application of the herbicide to bees

produces an HQ value of 0.3 (68.61/260). This value is below the LOC which indicates that the formulated herbicide poses no significant toxicity risk to invertebrates.

Imazapyr: The USEPA uses a honeybee contact toxicity test to estimate imazapyr toxicity to non-target insects. The toxicity value used in this assessment is NOAEL 860 mg a.e./kg. Using an exposure scenario that involves direct application of the herbicide to bees produces an HQ value of 0.08 (68.61/860). This value is below the LOC which indicates that the formulated herbicide poses no significant toxicity risk to invertebrates.

Triclopyr: The USEPA also uses a honeybee contact toxicity test to estimate triclopyr amine toxicity to non-target insects. The toxicity value used in this assessment is 620 mg a.e./kg. Using an exposure scenario that involves direct application of the herbicide to bees produces an HQ value of 0.1 (68.61/620). This value is below the LOC which indicates that the formulated herbicide poses no significant toxicity risk to non-target invertebrates.

Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus): The valley elderberry longhorn beetle (VELB) is listed as Threatened under the Federal Endangered Species Act (FESA). VELB is associated with elderberry trees (*Sambucus* spp.) in California's Central Valley during its entire life cycle. The complete life cycle of the valley elderberry longhorn beetle has four stages: egg, larva, pupa, and adult. The adult beetles are active, feeding and mating, from March until June. After mating, their eggs are deposited on live elderberry bushes in the crevices of the bark, at the stem/trunk junctions, or at the stem/ petiole junctions. After hatching the larvae bore through the bark into the pith of the elderberry stem where they tunnel and eat for up to two years. For the larvae to be successful in completing the cycle the stems of the elderberries must be at least 1.0 inch in diameter at ground level. In their last stage, larvae bore back out of the stem (thereby creating the "exit hole") and then return to the pith, closing the exit hole with a substance composed of wood shavings or chewed wood and excrement called "frass". The larvae then enter the pupal stage. After transformation, the adult beetle need only break through the frass plug at the exit hole to continue the cycle once again among the elderberries. Typically, adult valley elderberry longhorn beetles emerge at about the same time as the elderberry flowers bloom (between mid-March and mid-June). Lizards, European earwigs, and non-native Argentine ants prey upon the various life stages of the valley elderberry longhorn beetle.

Adult VELB males live for four to five days while adult females live up to three weeks between mid-March and mid-May with most records from late April to mid-May. Adults feed on elderberry leaves and possibly flowers. VELB are widespread, although rare, in suitable riparian habitat along the Sacramento River. The relatively small proportion of current-year emergence holes suggests that the population is limited at any one site by factors other than habitat availability. Within the Sacramento River floodplain, VELB does not appear to be restricted to particular kinds of riparian vegetation or floodplain topography. VELB emergence holes were found in nearly all situations, ranging from isolated elderberry clumps in savanna-like areas to continuous stands beneath tall overstories, areas with or without extensive woody understory vegetation, and on both low- and high-terrace floodplains. There are 41 recorded occurrences of VELB within the California Natural Diversity Database (CNDDB). Based upon this information, VELB can be assumed to be present in the project area.

Removal of the target non-native invasive species will have a long-term beneficial effect on habitat for VELB, particularly those riparian habitat features that are associated with higher quality VELB habitat (e.g. mature overstory and mixed understory). Reduction of bank erosion is expected to potentially occur as a result of removing arundo, in particular. This may indirectly benefit elderberries that are either subject to higher velocity flows (where they may be washed out) or occur near stream banks that may be lost to bank erosion events.

During work, adult VELB will not be present, but VELB in the pupa and/or larva stage may be burrowed inside of elderberry plants. Due to low herbicide toxicity values, negative effects are not expected. Therefore, VELB would not be directly impacted by herbicide application but instead could be indirectly impacted due to overspray on elderberries (i.e. the risk is to the habitat/host plant). Typically, elderberries observed in the project area are individual plants, as opposed to clusters. Similarly, target non-native invasive plants are also

typically scattered and are not clustered together. Elderberries can be damaged and/or killed by exposure to glyphosate, imazapyr and/or triclopyr. At the time of project work activities (fall), elderberries will be in the final or complete stages of fruit development, plants will not be dormant, or will be entering dormancy, and could be damaged or killed by glyphosate, imazapyr or triclopyr.

Impact Bio-1: Impacts to elderberry plants supporting valley elderberry longhorn beetle would be significant. Incorporation of Mitigation Measure Bio-1 will reduce this impact below a level of significance.

Bio-1: **Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*):** To mitigate potential physical or chemical impacts to elderberry (*Sambucus* spp.) plants potentially supporting valley elderberry longhorn beetle *(Desmocerus californicus dimorphus),* YCRCD will follow the following treatment protocols:

1) Treatment, biomass removal and mowing areas will be pre-checked for the presence of elderberry plants.
2) Any plants detected will be avoided with the following procedures as outlined under the: Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) May 2017, prepared by the USFWS. https://www.fws.gov/sacramento/documents/VELB_Framework.pdf.

   Visual surveys for the VELB, which includes looking for adults and/or exit holes, are currently the only approved method of surveying for the species and are not entirely reliable for determining presence or absence (see below). Visual surveys, habitat assessments, and mitigation site monitoring do not require a section 10(a)(1)(A) recovery permit.
   The following measures are incorporated into the proposed project to avoid and minimize effects to VELB and/or its habitat.

   - *Worker education.* A qualified biologist will provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.
   - *Work site monitoring.* A qualified biologist will monitor the work area at appropriate intervals to assure that all avoidance and minimization measures are implemented.
   - *Timing.* As much as feasible, all activities that could occur within 50 meters (165 feet) of an elderberry shrub, will be conducted outside of the flight season of the VELB, which is March - July.
   - *Chemical Usage.* Herbicides will not be used within the drip-line of the shrub. All chemicals will be applied using a backpack sprayer or similar direct application method.
   - *Manual.* Mechanical weed removal within the drip-line of the shrub will be limited to the season when adults are not active (August - February) and will avoid damaging the elderberry.
   - *20 ft to drip line of elder berry plant:* If any elderberry plants are present within work areas, the YCRCD Project Manager shall assure that all elderberry plants are protected from potential work activities, including herbicide overspray, by using these methods within a 20 ft buffer around elderberry plants, but outside the dripline of the elderberry plants: 1) directing the work crew to hand cut all target plants, 2) cut stumps will then be treated with glyphosate or triclopyr (imazapyr will not be used within 20 ft of elderberry plants), and 3) no power spraying equipment will be used within 50 ft of elderberry plants. Mowing (reduction of arundo and tamarisk) may occur outside the 20 ft buffer surrounding elderberry plants. Invasive species less than one inch in diameter may be removed using a weed wrench as long as roots of elderberry are not affected. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 each year that the project is implemented.

- *Within drip line of elderberry plant*: Arundo canes within the drip line of elderberry plants should be treated, but this will not occur without explicit agreement from CDFW and FWS. The treatment method would be glyphosate applied to cut arundo cane surface, as glyphosate herbicide is not mobile. Hand tools (loppers and pruners) would be used to cut arundo within the drip line of the elderberry plant (no chainsaws). No cutting or damage to elderberry stems greater than 1" would occur. A request for this work method approach will be made if any arundo patches are found to occur within the drip line of elderberry plants.

3. Special Status Fish Species:

Many sensitive fish species are restricted to the low flow main channel of the Sacramento River. These areas are outside of project work areas as they are devoid of any terrestrial vegetation and no impacts to surface waters will occur as water will not be entered or disturbed.

Table 9 Special Status Fish Species

Fish				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Fed**	**State**
Chinook salmon-Central Valley spring run ESU	*Oncorhynchus tshawytscha*	Cool, deep water pools for adult summer holding habitat; shallow streams with gravels and cold water for spawning and rearing habitat; rivers with complex edge habitats and vegetation for cover for downstream-migrating juveniles.[a]	Spring-run Chinook salmon use the Sacramento River as summer holding habitat, while they migrate to upstream tributaries to spawn, and also when juveniles migrate downstream to the ocean.[b,c] **Unlikely to occur in project work areas (Sacramento River only).**		SSC
Chinook salmon-Sacramento River winter run	*Oncorhynchus tshawytscha*	Upstream adult spawning migration December-August; shallow streams with gravels and cold water for spawning and rearing habitat; rivers with complex edge habitats and vegetation for cover for downstream-migrating juveniles during July-March. [a]	Winter-run Chinook salmon use the Sacramento River as habitat while they migrate to upstream tributaries to spawn, and also when juveniles migrate downstream to the ocean.[b,c] **Unlikely to occur in project work areas (Sacramento River only).**		SSC
Central Valley fall-run Chinook salmon	*Oncorhynchus tshawytscha*	Mature adults enter rivers in October-November moving quickly to spawning streams; juveniles stay in streams 1-7 mo. often out-migrating in turbid water during storms; forage on floodplains prior to entering San Francisco Bay estuary	Fall-run Chinook salmon use the Sacramento River as habitat while they migrate to upstream tributaries to spawn; juveniles use tributaries for out-migration and floodplains for foraging and growth before entering salt-water estuary and the ocean. Present in Putah Creek.[d]		SSC
Steelhead-Central Valley ESU	*Oncorhynchus mykiss irideus*	Deepwater river channel for upstream adult spawning migration; shallow streams with gravels and cold water for spawning and rearing habitat; rivers with complex edge habitats and vegetation for cover for downstream-migrating juveniles.[a]	Central Valley steelhead use the Sacramento River as migratory habitat; spend summer months resting in pools with consistent cool temperatures waiting for winter rains to spawn Dec-Feb.; adults migrate back to ocean in March; juveniles out-migrate April – June. Possibly found in Putah Creek, not confirmed.[d] **Unlikely to occur in project work areas (Sacramento River or no work period).**	FT	

Fish				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Fed**	**State**
California roach	*Hesperoleucus symmetricus*	Opportunistic omnivores, primarily benthic feeders. Inhabits rocky pools of headwaters, creeks and small to medium rivers. Intolerant of saline waters. Mature in 2-3 years with spawning in March through early July in riffles over small rock substrates. Eggs hatch in 2-3 days and larvae remain in gravel until large enough to swim.[e,f]	Found in tributaries to the Sacramento River. Present in Cache Creek; possibly in Putah Creek.[d] No CNDDB data.		SSC
Delta smelt	*Hypomesus transpacificus*	Inhabits estuarine environments with salinities between 2 parts per thousand and 14 parts per thousand. Spawns in freshwater.	CNDDB records from the Sacramento River as far upstream as the confluence with the American River. **Unlikely to occur in project work areas (Sacramento River only).**	FT	SE
Eulachon	*Thaleichthys pacificus*	Inhabits estuarine environments with salinities between 2 parts per thousand and 14 parts per thousand. Spawns in freshwater.	One CNDDB record from the Sacramento River between Knights Landing and Portuguese bend. **Unlikely to occur in project work areas (Sacramento River only).**	FT	
Green sturgeon	*Acipenser medirostris*	Green sturgeon are an anadromous fish. They have a relatively complex life history that includes spawning and juvenile rearing in rivers followed by migrating to saltwater to feed, grow, and mature before returning to freshwater to spawn. They are a long-lived, slow-growing fish.[g]	Possible in lowermost reaches but no records.[d] **Unlikely to occur in project work areas (Sacramento River only).**	FT	SSC
Hardhead	*Mylopharodon conocephalus*	Inhabits deep, rock- and sand-bottomed pools of small to large rivers.[e]	Present in Cache Creek.[d]		SSC
Longfin smelt	*Spirinchus thaleichthys*	Inhabits estuarine environments with salinities between 2 parts per thousand and 14 parts per thousand. Spawns in freshwater.	CNDDB records from the Sacramento River as far upstream as Knights Landing. **Unlikely to occur in project work areas (Sacramento River only).**	FC	ST, SSC
Pacific lamprey	*Entosphenus tridentatus*	Anadromous, but also a number of permanent freshwater resident populations. In fresh waters, ammocoetes and adults inhabit lakes, rivers, and creeks. Ammocoetes occur in soft sediments in shallow areas along stream banks in silt, mud, and sand of shallow eddies and backwaters of streams. Spawning adults are found in gravel riffles and runs of clear coastal streams; feeding adults usually in the ocean, but landlocked populations occur. After 1-3 years in the ocean, migrate to fresh water to spawn then die. Eggs hatch to ammocoete larvae in 19 days, drift downstream and live in silt, sand and detritus substrates 3-7	Present in Putah Creek.[d] No CNDDB data.		SSC

Fish				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Fed**	**State**
		years then transform to juvenile macropthalmia, which migrate downstream to the ocean.[e]			
River lamprey	*Lampetra ayresii*	Riffle and side channel habitats are important for spawning and for ammocoete rearing. Because lamprey ammocoetes colonize areas and are relatively immobile in the stream substrates, good water quality is essential for rearing. Adults feed in nearshore marine and estuarine habitat.	No recent records but possibly present in Putah.[d] No CNDDB data.		SSC
Sacramento hitch	*Lavinia exilicauda*	Occurs in lakes, ponds, sloughs, backwaters and sluggish sandy pools of small to large rivers.[e] Tolerates brackish water. Spawns in tributaries to lakes and rivers from February to July. Embryos hatch in 3 – 7 days and begin to swim freely in another 3-4 days.	Present in Putah and Cache Creeks[d] No CNDDB data.		
Sacramento splittail	*Pogonichthys macrolepidotus*	Slow moving rivers and sloughs with seasonal flooding for spawning.	CNDDB records from the lower sections of the Sacramento and Feather rivers. Possible in Lower Putah Creek in.[d] **Unlikely to occur in project work areas.**		SSC
Sacramento perch	*Archoplites interruptus*	Adults occur in vegetated sloughs, pools of sluggish rivers and lakes; now most common in ponds and impoundments.[e]	One CNDDB record from 1973 in a pond in Sacramento, East of Sacramento River. Present as escapees from ponds.[d] **Unlikely to occur in project work areas.**		SSC
White sturgeon	*Acipenser transmontanus*	Adult and subadult white sturgeon spend most of their lives in the San Francisco Estuary and the Delta. White sturgeon spawn mostly in the mainstem Sacramento River upstream of Knights Landing, which means the Sacramento River is an important migratory corridor for juvenile sturgeon.[h]	Possible in lowermost reaches; very old records of presence.[d] **(Sacramento River only).**	FT	

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

[a] LSA Associates Inc. 2009. Yolo County 2030 Countywide General Plan EIR.

[b] California Department of Fish and Wildlife (CDFG). 2019. California Natural Diversity Database (CNDDB). Last updated March 2018. Special-status species occurrences in Yolo County. Wildlife and Habitat Data Analysis Branch, California Department of Fish and Wildlife, Sacramento, California.

[c] Moyle, P.B., Yoshiyama, R.M., Williams, J.E., and Wikramanayake, E.D. 1995. Fish Species of Special Concern in California, Second Edition. California Department of Fish and Wildlife, Sacramento, California.

[d] Moyle and Young 2019. Personal communication.

[e] https://www.fishbase.org/

[f] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=104278

[g] National Oceanic and Atmospheric Administration, www.noaa.gov

[h] CalFish, https://www.calfish.org/FisheriesManagement/SpeciesPages/WhiteSturgeon.aspx

Work activities

Treatment methods using herbicides are being used by the invasive non-native plant control project. Herbicides listed below are demonstrated to have very low toxicity to fish. Application methods will assure that herbicides are applied to target plants only, with no application to surface waters. Biomass removal (cutting, hauling, and chipping) will occur in a manner that assures that no material is deposited into surface waters during work activities. Chipped biomass will be spread within the footprint of the removed non-native plants, or spread over degraded areas with no plant cover or non-native annual cover. Mowing of dense arundo and tamarisk stands will occur on Cache Creek (Capay Valley, above diversion dam). A buffer of 10 feet from standing water will assure that mowed material is not deposited in surface waters and mowers will not enter surface waters when mowing. Mowers will cross the low flow channel periodically to reach stands of non-native vegetation. Crossings will be the minimized to the fewest possible to complete work. Mowing occurs in the fall when flows are lowest and fish migration is not occurring.

Herbicide Analysis of Biological Resources

Glyphosate: Using a conservative glyphosate exposure estimate that involves substantial drift to water (0.011 mg/L) and a 96-h NOAEL value for sensitive fish species (0.04 mg/L) yields an HQ value of 0.3. This value is below the LOC which indicates that the herbicide formulation poses no significant risk to fish.

Imazapyr: Using a conservative imazapyr exposure estimate that involves substantial drift to water (0.011 mg/L) and a NOAEC value for sensitive fish species (10.4 mg a.e./L) yields an HQ value of 0.001. This value is below the LOC which indicates that the herbicide formulation poses no significant risk to fish.

Triclopyr: Using a conservative triclopyr amine exposure estimate that involves substantial drift to water (0.003 mg a.e./L) and a 96-h NOAEL value for sensitive fish species (20 mg a.e./L) yields an HQ value of 0.0002. This value is below the LOC which indicates that the herbicide formulation poses no significant risk to fish.

Chinook Salmon (*Oncorhynchus tshawytscha*) - Central Valley Spring Run, Sacramento River Winter Run, and Central Valley Fall and Late-fall Run ESUs: Chinook salmon are anadromous fish that require both oceanic habitat for the majority of their adult lives and freshwater riverine and stream habitat for migration, spawning, and juvenile rearing. The Central Valley of California has three distinct Evolutionarily Significant Units (ESUs), each with unique genetics and life history patterns, which are designated by the season that they migrate to spawn.

Central Valley spring run chinook salmon migrate upstream in the spring, where they then hold in deepwater pools during the summer months, finally traveling upstream to spawn during the fall. Although this ESU was once widely distributed in the Sacramento-San Joaquin River system, its current spawning range consists only of Butte, Mill, Deer, Antelope, and Beegum Creeks, tributaries to the Sacramento River. Threats to this ESU include loss of genetic integrity through hybridization with fall-run salmon, small non-hybridized population size, and loss of habitat through damming activities. Critical Habitat has been designated for this ESU, and is comprised of 37 watersheds in California. In Yolo County, Critical Habitat is found in the Sacramento Delta Watershed, excluding the Deep Water Ship Channel.

Central Valley fall and late fall-run chinook salmon migrate upstream in late summer and fall, and spawn in the late fall, with variations from stream to stream. This ESU is currently the most abundant in the Central Valley, and many smolts are released from hatchery programs each year. The influence of hatcheries on the genetics of this ESU is of concern, as is the general population size, which has decreased from its historic levels. Loss of habitat to damming activity is also a concern for this ESU. No Critical Habitat has been designated for this ESU.

Sacramento River winter run chinook salmon migrate upstream in the Sacramento River during winter and spring, and spawn spring through late summer. Historically, winter run Chinook spawned high upstream in Sacramento River tributaries, including the Pit, McCloud, and upper Sacramento Rivers. These areas are now inaccessible due to dams, which has negatively affected the population. Critical Habitat has been designated for this ESU, and is comprised of the Sacramento River from Keswick Dam (River Mile 302) to the margin of the Sacramento-San Joaquin Delta (River Mile 0) and all waters from Chipps Island westward to the Golden Gate Bridge. In Yolo County, Critical Habitat is located in the Sacramento River.

Active project work will be completed after spring and before winter run Chinook salmon occurs. Project work will occur in fall and late fall, but activities are unlikely to impact salmon habitat on the Sacramento river. Project work typically does not occur in the low flow channel, as this portion of the riparian habitat is un-vegetated. Project work does not occur in the wetted portions of the Sacramento River (flowing water). All herbicides used by the project in riparian areas are also approved for use in wetlands with demonstrated low toxicity, posing no risk to fish species. Mowing is restricted to Cache Creek, above the diversion dam. This area is outside the known range/habitat of salmon. Therefore, the project will not result in a significant direct impact to Chinook salmon.

Steelhead (*Onchorhynchus mykiss irideus*) – Central Valley ESU: Central Valley steelhead are anadromous trout that historically ranged throughout the Sacramento and San Joaquin River drainages. Their current range still encompasses these two river systems, but with less continuity and far fewer numbers. They have a polymorphic life history, whereby juvenile fish with either the anadromous steelhead trout or the coastal rainbow trout life history pattern can assume a life history different from their parents. This may be important in allowing them to survive fluctuating conditions in the Central Valley.84 Primary threats to the species include introduction of hatchery stock/loss of genetic integrity, a substantial loss of habitat for spawning and rearing due to dam construction, and water temperature and volume fluctuations. Critical Habitat has been designated for this species in 67 watersheds in California. In Yolo County, Critical Habitat is found in the Sacramento Delta watershed, excluding the Deep Water Ship Channel.

Adult steelhead migrate from the ocean into freshwater streams to spawn between December and April. Female steelhead dig a nest in a stream area with suitable gravel composition, water depth, and velocity. Females may deposit eggs in four to five nests. Steelhead eggs hatch three to four weeks after being deposited. Juvenile steelhead typically spend one to two years rearing in freshwater before migrating to estuarine areas as smolts and then into the ocean to feed and mature. The majority of smolts enter the ocean at age two in March and April. They migrate at night and seek refuge and feed during the day. Steelhead can then remain at sea for up to three years before returning to fresh water to spawn.
They are born in fresh water streams, where they spend their first 1-3 years of life. They then emigrate to the ocean where most of their growth occurs. After spending between one to four growing seasons in the ocean, steelhead return to their native fresh water stream to spawn. Unlike Pacific salmon, steelhead do not necessarily die after spawning and are able to spawn more than once.

project work will be completed after steelhead migration (both juvenile and adult life stages) occur. Program work will also occur prior to fall preciPitation which normally provides adequate water to support adult migration or neonatal rearing during the the following season. All herbicides used by the project in riparian areas are approved for use in wetlands with demonstrated low toxicity, posing no risk to fish species. Mowing is restricted to Cache Creek, above the diversion dam. This area is outside the known range/habitat of steelhead. Therefore, the project will not result in a significant direct impact to steelhead and no mitigation is required.

Delta Smelt (*Hypomesus transpacificus*). Delta smelt utilize brackish estuarine habitats exclusively in the Sacramento-San Joaquin Estuary, downstream to San Pablo Bay and upstream to the Sacramento River's confluence with the American River and the San Joaquin River's confluence with the Mossdale River. This species is anadromous and adults travel to freshwater to spawn from late winter to early summer and the majority of them die shortly thereafter. Their one year life cycle, unusually low fecundity (1,000-2,600 eggs

per female), and limited range make this species highly vulnerable to environmental fluctuations. Historically, the delta smelt was extremely common. However, the population has decreased dramatically in recent years. The primary threats to the species are reductions in outflow from the estuary, entrainment during water diversion, extremely high outflow, changes in food organisms, toxic substances, disease, competition, predation, and loss of genetic diversity. Critical Habitat for this species has been designated, and is comprised of the waters contained in Suisun Bay; Goodyear, Suisun, Cutoff, First mallard, and Montezuma sloughs; and the Sacramento-San Joaquin Delta. This Critical Habitat extends into Yolo County, including the Sacramento Deepwater Channel, the Sacramento River, and the Yolo Bypass Area. Work areas do not overlap with habitat of the species. Work will not occur in flowing water. Mowing is restricted to Cache Creek, outside the habitat of Delta smelt.

California roach (*Hesperoleucus symmetricus*). California roach are opportunistic omnivores whose diet varies greatly across watershed, habitat type and season. They graze on filamentous algae, ingest crustaceans and aquatic insects, and feed on drift and aquatic insects may dominate their diet year-round (Roscoe 1993). Juvenile roach consume large quantities of crustaceans and small chironomid midge larvae. Spawning activity is largely dependent on temperature and typically occurs in March through early July, when water temperatures exceed 16℃. Spawning occurs in riffles over small rock substrates, 3-5 cm in diameter. Roach spawn in large groups over coarse substrates where each female repeatedly deposits eggs, a few at a time, into the interstices between rocks which are immediately fertilized by one or more attendant males. Spawning aggregations can be quite conspicuous and spawning fish can splash so vigorously that, at times, the splashing can be heard at some distance**.** Central California roach are generally found in small streams and are particularly well adapted to life in intermittent watercourses; dense populations are frequently observed in isolated. In the tributary streams to the San Francisco Bay, roach occupy suitable habitats from headwaters to the mouth but are intolerant of saline. They have been recorded in salinities up to 3 ppt, but perish before salinities reach 9-10 ppt. The small streams that comprise the majority of roach habitat in their native range are acutely vulnerable to human alteration. Low elevation streams in the Sierra Nevada foothills are heavily altered by rural development, ranching and agriculture, while all populations face some degree of threat from water diversion, urban and suburban development, and introduced fishes (Moyle 2002). These factors work in conjunction with the isolation of most roach populations, especially small populations in intermittent streams, because they collectively prevent recolonization following local extirpation.

Hardhead (*Mylopharodon conocephalus*). Hardhead are primarily bottom feeders that forage on invertebrates and aquatic plant material from stream substrates, but they will also consume drifting insects and algae from the water column and occasionally, they will feed on plankton and surface insects. Hardhead mature following their second year and spawn in the spring, mainly in April and May. Estimates based on juvenile recruitment suggest that hardhead spawn by April-June in Central Valley streams, although the spawning season may occasionally extend into August in the foothill streams of the Sacramento-San Joaquin drainage. Spawning adults from larger rivers and reservoirs may migrate more than 75 km in April and May to spawn in tributary streams. In contrast, hardhead in small streams only migrate a short distance upstream or downstream of their home pool for spawning. Fertilized eggs presumably develop in the interstices of the gravel until hatching. Larvae and postlarvae most likely move into stream margins with abundant cover. They move into deeper habitats as they grow larger. Hardhead are often found at low to mid-elevations in relatively undisturbed habitats of larger streams with high water quality (clear, cool). In the Sacramento River, however, they are common in both the mainstem and tributaries up to 1500 m in elevation. They prefer pools and runs with deep (>80 cm), clear water, slow (20-40 cm/sec) velocities and sand-gravel-boulder substrates. Hardhead are usually absent from streams occupied by alien species, especially centrarchids, and streams that have been heavily altered. Because they are poor swimmers, hardhead may also be absent from stream reaches above barriers, even if ladders are in place to allow salmonid passage. Hardhead are widely distributed in streams at low to mid-elevations in the Sacramento-San Joaquin and Russian River drainages. They are absent from the Cosumnes River. In the Sacramento River drainage, hardhead are found in most large tributaries, as well as in

the Sacramento River itself. They are present in the northern Coast Ranges, in the larger tributaries to the Sacramento River, such as Cache Creek mainly in canyon reaches with deep pools.
The apparent ongoing declines in hardhead distribution and abundance are a result of combined impacts from habitat loss, decline in water quality, and invasions of alien species. The principal threats to hardhead include: (1) dams and diversions, (2) agriculture, (3) urbanization, (4) instream mining, (5) stream modification for transportation, (6) fisheries management ('harvest' associated with past eradication of 'rough fishes' to benefit recreational fisheries), and (7) alien species.

Sacramento hitch (*Lavinia exilicauda***).** Hitch occur in lakes, ponds, sloughs, backwaters and sluggish sandy pools of small to large rivers. They are most often found in slow warm water, including lakes and quiet stretches of rivers. Hitch are sometimes found in cool and clear, low-gradient streams, hiding among aquatic vegetation in sandy runs or pools. They are the most heat tolerant of the native Central Valley fishes and can withstand water temperatures greater than 30°C under some conditions. They have also been found living in brackish water with salinities as high as 9 ppt. The diet of a lake-dwelling hitch may include zooplankton, crustaceans, or various forms of insects. Spawning typically happens in the tributaries to lakes and rivers, and may begin as early as February and end as late as July. In 3-7 days the embryos hatch, and 3-4 days after the hatch the embryos begin to swim freely. The young hitch may swim downstream to a lake or slough, or reside within the stream under the cover of aquatic plants. Hitch generally live for a total of 4-6 years.

Impact: No adverse impacts to fish species are anticipated.

4.Special Status Amphibian Species

Table 10: Special Status Amphibians

				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Federal**	**State**
California tiger salamander	*Ambystoma californiense*	Vernal pools, seasonal wetlands and stock ponds for breeding with underground refuges, often ground squirrel burrows nearby.	CNDDB records in the Dunnigan Hills, the Capay Hills, and in Davis. Potential to occur in other areas of the County where there is suitable habitat, although not recorded.[a] May be found in foothills above project area. May be extirpated. **Unlikely to occur in project work areas.**	FT	T
California red- legged frog	*Rana draytonii*	Lowlands and foothills in or near permanent sources of deep water (generally 20 inches or deeper) with dense, shrubby or emergent riparian vegetation.	There are no known records of this species in Yolo County, but suitable habitat exists in ponds, lakes and reservoirs, permanent wetlands, and deep pools in streams in the western portions of the County. This could include foothill stock ponds, reservoirs such as the Davis reservoir, and riparian corridors along upper Cache and Putah Creeks and their tributaries.[a] **Unlikely to occur in project work areas.**	FT	SSC
Western spadefoot	*Spea hammondii*	Grasslands and open woodlands, with vernal pools, stock ponds, or other seasonal waterbodies for breeding. When not breeding lives underground in self constructed and/or small mammal burrows.	CNDDB records from the Buckeye Creek area near Dunnigan. Suitable habitat in vernal pool complexes north of Davis and south and west of Sacramento.[a] **Unlikely to occur in project work areas.**		SSC

				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Federal**	**State**
foothill yellow-legged frog	*Rana boylii*	Shallow streams with rocky substrates and partial shade in foothills.	CNDDB records from upper Cache and Davis Creeks in the western foothill portion of the County. Suitable habitat may also be found in larger tributaries to Cache Creek and Putah Creek with year-round water, most likely in this western foothill region.[a] **Unlikely to occur in project work areas.**		SCT

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, SCT= State Candidate Threatened, E= Endangered, T = Threatened

[a] LSA Associates Inc. 2009. Yolo County 2030 Countywide General Plan EIR.

Work activities

Treatment methods using herbicides are being used by the invasive non-native plant control project. Herbicides listed below are demonstrated to have very low toxicity to fish (which are used as surrogates for larval amphibians by the EPA). Application methods will assure that herbicides are applied to target plants only, with no application to surface waters. Biomass removal (cutting, hauling, and chipping) will occur in a manner that assures that no material is deposited into surface waters during work activities. Chipped biomass will be spread within the footprint of the removed non-native plants, or spread over degraded areas with no plant cover or non-native annual cover. Mowing of dense arundo and tamarisk stands will occur on Cache Creek (Capay Valley, above the diversion dam). A buffer of 10 feet from standing water will assure that mowed material is not deposited in surface waters and mowers will not enter surface waters when mowing. Mowers will cross the low flow channel periodically to reach stands of non-native vegetation. Crossings will be the minimized to the fewest possible to complete work. Mowing occurs in the fall outside of amphibian breeding season when flows are lowest.

Herbicide Analysis for Biological Resources (Fish are used as surrogates for larval amphibians by the EPA in pesticide risk assessment.)

Glyphosate: Using a conservative glyphosate exposure estimate that involves substantial drift to water (0.011 mg a.e./L) and a 96-h NOAEL value for sensitive fish species (0.04 mg a.e./L) yields an HQ value of 0.3 (0.011/0.04). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target amphibians.

Imazapyr: Using a conservative imazapyr exposure estimate that involves substantial drift to water (0.011 mg/L) and a NOAEC value for sensitive fish species (10.4 mg a.e./L) yields an HQ value of 0.001 (0.011/10.4). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to fish.

Triclopyr: Using a conservative triclopyr amine exposure estimate that involves substantial drift to water (0.003 mg a.e./L) and a 96-h NOAEL value for sensitive amphibian species (125 mg a.e./L) yields an HQ value of 0.00002 (0.003/125). This value is below the LOC which indicates that the herbicide poses no significant risk to non-target amphibians.

California Tiger Salamander (*Ambystoma californiense*): California tiger salamanders utilize grasslands and oak woodlands below 1,500 feet in elevation with ponds, intermittent streams, or vernal pools nearby. During the dry season, adults aestivate in abandoned ground squirrel and pocket gopher burrows. Large, turbid vernal pools provide ideal habitat for tiger salamander breeding and for the development of the aquatic larvae. This

species has declined significantly, due primarily to loss of habitat due to increased urbanization and loss of wetlands and native grasslands to agriculture. Other significant threats include predation of larvae by introduced predatory fishes and bullfrogs, reduced numbers of rodent burrows due to rodent control efforts, increased death by automobiles on roads, and introduction of other tiger salamander species which may hybridize with California tiger salamanders. Critical Habitat has been designated for this Central California population. Critical Habitat in Yolo County consists of a single unit, Unit 1, located near the Colusa-Yolo County line just west of Interstate 5. Work activities are not in habitat types preferred by salamanders (vernal pools, grasslands and oak woodlands). Work near ponds or intermittent streams will not occur in spring or early summer when salamanders could be active.

Western Spadefoot (Spea hammondii): Western spadefoot is a California species of special concern. This species is occasionally found Buckeye Creek area near Dunnigan, suitable habitat in vernal pool complexes north of Davis and south and west of Sacramento. The species may also occur in other types of seasonal aquatic habitats as well. At the time of active project work activities (biomass removal or treatments), they will already be in a state of aestivation, buried underneath soil in areas outside of the active channel and immediate floodplain, where most of the treatment is expected to occur, and so are not expected to be impacted. Work activities are not in habitat types preferred by western spadefoot (vernal pools, grasslands and oak woodlands). Work near ponds or intermittent streams will not occur in spring or early summer when western spadefoot could be active.

Foothill Yellow Legged frog (Rana boylii): Foothill yellow legged frog is a California species of special concern. Historically, this species was known to occur in most Pacific drainages from the Santiam River system in Oregon to the San Gabriel River system in California. Its known elevational range extends from near sea level to 2040 m. This frog has disappeared from much of its range in California (possibly up to 45 percent). Foothill yellow-legged frogs are known to occur on Cache and Davis Creeks in the western portion of the County. Suitable habitat may also be found in larger tributaries to Cache Creek and Putah Creek with year-round water, most likely in this western region.

The species requires shallow, flowing water, apparently preferentially in small to moderate-sized streams situations with at least some cobble-sized substrate. This type of habitat is probably best suited to oviposition and likely provides significant refuge habitat for larvae and post-metamorphs. Foothill yellow-legged frogs have been found in stream situations lacking a cobble or larger-sized substrate, but it is not clear whether such habitats are regularly utilized. Foothill yellow-legged frogs are infrequent or absent in habitats where introduced aquatic predators (i.e., various fishes and bullfrogs (*Rana catesbeiana*)) are present. Reproduction is aquatic. Fertilization is external. Mating and egg-laying occurs in streams and rivers (not ponds or lakes) from April until early July, after streams have slowed from winter runoff. In California, researchers have found egg masses between April 22 and July 6, with an average of May 3. Clusters of eggs are laid on the downstream side of rocks in shallow slow-moving water where they are attached to submerged rocks and pebbles and occasionally vegetation. Eggs can number from 300- 2,000, averaging 900. Egg masses are often covered with a layer of silt, which probably helps to hide them from predators. Eggs hatch within 5 - 37 days, depending on water temperature.

Tadpoles remain around the egg mass for a about a week, then they move away to feed, using rocks and gravel for cover. Tadpoles transform in 3 to 4 months, typically from July to October. Newly metamorphosed juveniles typically migrate upstream from the hatching site. Two years are thought to be required to reach adult size, but no data are available on longevity. Until data indicate otherwise, habitat critical to the survival of *R. boylii* should be identified in part by the presence of oviposition habitat having riffle areas with a substrate of cobble-sized or larger rocks.

Water released from reservoirs, that washes away eggs and tadpoles and forces adult frogs away from the streams leaving them more vulnerable to predators, is a serious problem for frogs in the Sierra Nevada foothills. Air-borne pesticides from agricultural fields of the Central Valley are also likely to be a primary threat. Recreational activities along streams that alter streambeds are also having a negative impact on frog populations

in the Sierra foothills. Introduced fish also stress frog populations by consuming eggs and tadpoles, and introduced bullfrogs compete for food and eat the frogs. Habitat loss, disease, introduced crayfish, stream alteration from dams, mining, logging, and grazing, are also threats to this frog.

Herbicide applications may alter the terrestrial vegetation and invertebrate communities on which ranid frogs depend, though any minor short-term impacts would be offset by a decrease in invasive plant species. Vegetation changes, as a result of nonnative plant removal, are anticipated to have a long term benefit to frog habitat. Plants such as giant reed and salt cedar, for example, do not contribute suitable woody debris to create habitat for amphibians that utilize deep pools or cover that could be created by woody debris and the food that comes from woody debris and (native vegetation) leaf litter. With the removal of giant reed, in particular, reduction in erosion and fine sediment will improve instream conditions for foothill yellow-legged frogs, which is composed of gravel, pebbles, and large rocks, not fine sediment. Normalization of flood processes and fire risk reduction will also benefit the species.

The project work activity period is in late summer/fall, the life phase most potentially affected by the project is the metamorphic period during which tadpoles obtain an adult frog form, and could be active portions of creeks that still have flowing water. However, direct impacts are unlikely as the foothill yellow legged frog are considered unlikely in the project area due to creek sizes, reservoir releases, and modified structure. Suitable habitat in upper watershed tributary creeks are not included in active work areas.

California Red-legged Frog (*Rana draytonii*): There are no records of this species in Yolo County, but potential habitat is located in the extreme western portion of the County (e.g., Blue Ridge, Little Blue Ridge, Rocky Ridge, and Capay Hills). Habitat for California red-legged frog consists of ponds, streams and wetlands with emergent vegetation and open water, typically of a meter or more in depth. This species requires permanent or semi-permanent water sources, as the adults breed during the winter and spring months, after which the aquatic tadpoles require up to 20 months to mature. Adults use rodent burrows as shelters and hibernacula. This species' range is found almost entirely in California, and has been considerably reduced through habitat destruction and competition/ predation by non-native bullfrogs and fish. It is currently found in 28 California counties, primarily in the Coast Ranges but with small populations found in the Sierras. Designated Critical Habitat occurs in California in Alameda, Butte, Calaveras, Contra Costa, El Dorado Kern, Kings, Los Angeles, Marin, Mendocino, Merced, Monterey, Napa, Nevada, Placer, Riverside, San Benito, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Ventura and Yuba Counties. The nearest Critical Habitat Units to Yolo County are located in Napa County, near the Napa-Solano border near the intersection of Route 121 and 128, and in Solano County, between Interstate 80 and Highway 680 east of the cities of American Canyon and Vallejo.

The California red-legged frog (CARLF) is listed as Threatened under by USFWS and is a California species of special concern. CARLF is threatened by human activities, many of which operate synergistically and cumulatively with each other and with natural disturbances (i.e., droughts or floods). Factors associated with declining populations of the frog include degradation and loss of its habitat through agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, non-native plants, impoundments, water diversions, degraded water quality, use of pesticides, and introduced predators. The reason for decline and degree of threats vary by geographic location. California red-legged frog populations are threatened by more than one factor in most streams.

Historically, CARLF was found in 46 counties. The range extended coastally from the vicinity of Point Reyes National Seashore, Marin County, and inland from the vicinity of Redding, Shasta County, south to northwestern Baja California, Mexico. The frog has sustained a 70 percent reduction in its geographic range in California as a result of habitat loss and alteration, overexploitation, and introduction of exotic predators. Today, only 26 counties support known populations. CARLF is found primarily in coastal drainages of central California. Monterey, San Luis Obispo and Santa Barbara counties support the greatest amount of currently

occupied habitat. Only four areas within the entire historic range of this species may currently harbor more than 350 adults (USFWS 2002).

CARLF is the largest native frog in the western United States, ranging in size from 1.5 to 5 inches long. The bodies of adult females are approximately one inch longer than those of adult males. CARLF has been found from sea level to about 5,000 feet and may be found in a variety of habitats. During wet weather, frogs may move through upland habitats. Frogs spend considerable time resting and feeding in riparian habitat. They eat mostly invertebrates, and they feed at night. CARLF is a relatively prolific breeder, usually laying egg masses during or shortly following heavy rainfall in late winter or early spring. The species breeds in aquatic habitats such as streams, ponds, marshes and stock ponds. Females can lay between 2,000 and 5,000 eggs in a single mass. The eggs are attached to bulrushes or cattails. CARLF breeds from November through March with earlier breeding records occurring in southern localities. Northern red-legged frogs (*Rana aurora aurora*) breed in January to March soon after the ice melts. It takes 6 to 14 days for the eggs to hatch and approximately 11-20 weeks of permanent water to reach metamorphosis into frogs. The highest rates of mortality for this species occur during the tadpole stage: less than one percent of eggs hatched reach adulthood.

CARLF is typically found in slow flowing portions of perennial streams and in intermittent streams that maintain water in the summer months. Suitable habitat is also characterized by dense, shrubby riparian vegetation associated with deep (< 0.7 m), still or slow-moving water (Jennings 1988, Hayes and Jennings 1988). This species is also found in ponds or in hillside seeps that maintain pool environments or saturated soils throughout the summer months. Shrubby riparian vegetation that structurally seems to be most suitable for CARLF is that which is provided by arroyo willow (*Salix lasiolepis*); cattails (*Typha* sp.) and bulrushes (*Scirpus* sp.) (Jennings 1988). Although California red-legged frogs can occur in ephemeral or permanent streams or ponds, populations probably cannot be maintained in ephemeral streams in which all surface water disappears. Water should have a salinity of < 4.5 ‰ to ensure the survival of embryonic stages (Jennings and Hayes 1988). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergent vegetation (YCRCD2008).

Populations of CARLF will be reduced or eliminated from aquatic habitats supporting non-native species such as bullfrogs (*Rana catesbeiana*), Centrarchid fish species (such as sunfish, blue gill, or large-mouth bass), and signal and red swamp crayfish, all of which are known CARLF predators. However, the presence of these non-native species does not preclude the presence of CARLF.

Existing records indicate CARLF has not been observed in the Central Valley since 1957, and a breeding population has not been found since 1947 (Jennings et al., 1992). Per Jennings and Hayes (1994), CARLF is assumed extirpated from the Central Valley.

No CARLF have been observed in Yolo County. Therefore, the potential for presence of CARLF in the project area, and particularly in areas with the highest level of project activity, is expected to be extremely low.

Removal of the target non-native invasive species will have a long-term beneficial effect on habitat for CARLF, particularly those riparian habitat features that provide cover (e.g. overhanging vegetation). Glyphosate, imazapyr and triclopyr application is an effective means of controlling invasive plant species that degrade CARLF habitat, while posing very low toxicity to amphibians (HQ <1),

Vegetation changes, as a result of non-native plant removal, is anticipated to have a long-term benefit to frog habitat. Plants such as arundo and salt cedar, for example, do not contribute suitable woody debris to create habitat for amphibians that utilize deep pools or cover that could be created by woody debris and the food that comes from woody debris and (native vegetation) leaf litter.

Impact: No Impacts to amphibians are anticipated.

5.Special Status Reptile Species

Table 11: Special status reptiles

Reptiles				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Federal**	**State**
Western Pond turtle	*Actinemys marmorata (Emys marmorata)*	Completely aquatic, lives in ponds, marshes, rivers, streams, and irrigation ditches with deep pools (about 2 feet or greater); also requires accessible upland habitat for egg laying. Permanent or nearly permanent lakes, ponds, marshes, rivers, streams, & irrigation ditches with aquatic veg. Needs basking sites such as partially submerged logs, vegetation mats, or open mud banks. Nests in suitable uplands, such as sandy banks or grassy, open fields on unshaded, south-facing slopes with less than 25% slope	CNDDB records on Putah and Cache Creeks, the Sacramento River, and numerous ponds and reservoirs throughout the County.		SSC
Giant gartersnake	*Thamnophis gigas*	Freshwater marsh, low-gradient streams, drainage canals, and irrigation ditches.	CNDDB records are concentrated in the area between Davis, Woodland, and the Sacramento River. Suitable habitat is present along lower Cache Creek, in irrigation ditches in the eastern portion of the County, the Yolo Bypass, and in the wetland areas in the southern portions of the County.[a] Potential habitat in Cache Creek settling basin.	FT	ST

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

[a] LSA Associates Inc. 2009. Yolo County 2030 Countywide General Plan EIR.

Work activities

Treatment methods using herbicides are being used by the invasive non-native plant control project. Herbicides listed below are demonstrated to have very low toxicity to birds (which are used as surrogates for reptiles by the EPA). Application methods will assure that herbicides are applied to target plants only, with no application to surface waters. Biomass removal (cutting, hauling, and chipping) will occur in a manner that assures that no material is deposited into surface waters during work activities. Chipped biomass will be spread within the footprint of the removed non-native plants, or spread over degraded areas with no plant cover or non-native annual cover. Mowing of dense arundo and tamarisk stands will occur on Cache Creek (Capay Valley, above diversion dam). A buffer of 10 feet from standing water will assure that mowed material is not deposited in surface waters and mowers will not enter surface waters when mowing. Mowers will cross the low flow channel periodically to reach stands of non-native vegetation. Crossings will be the minimized to the fewest possible to complete work. Mowing occurs in the fall outside of the reptile breeding season when flows are lowest.

Herbicide Analysis for Biological Resources (The USEPA generally uses birds as surrogates for reptiles in herbicide risk assessment):

Glyphosate: The NOAEL for birds is 540 mg a.e./kg. and an exposure estimate involving the consumption of contaminated vegetation (29.6 mg a.e./kg) are used, the resultant HQ is 0.05 (29.6/540). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target reptiles.

Imazapyr: The NOAEL for birds is above 2,510 mg a.e./kg (no signs of toxicity, higher rates not tested) and an exposure estimate involving the consumption of contaminated vegetation (29.6 mg a.e./kg) are used, the resultant HQ is 0.01 (29.6/2,510). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target reptiles.

Triclopyr: The NOAEL for birds is 126 mg a.e./kg and an exposure estimate involving the consumption of contaminated vegetation (40.5 mg a.e./kg) are used, the resultant HQ is 0.3 (40.5/126) . This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target reptiles.

Western Pond turtle (Emys marmorata): The western pond turtle is a California species of special concern. It historically occurred in Washington, Oregon, California, and Baja California, and had a relatively continuous distribution within California principally west of the Sierra-Cascade crest. Western pond turtle is the subspecies found in western United States. This species population is currently at a fraction of their historical levels. They nevertheless occur throughout much of their historical range. Although a USFWS determination in 1992 found that listing under the ESA was not warranted, and is considered a Species of Special Concern in California.

Within California, the Central Valley is thought to have supported the highest historical concentrations of western pond turtle. The conversion of native wetlands and floodplains for urban and agricultural uses has eliminated most of the turtle's habitat of the Central Valley. Western pond turtle numbers are greatly reduced, but the species is thought to still occur in rivers, backwaters, and wetlands of roughly 90 percent of its historical range, including perennially flowing rivers in the Central Valley. Expansion of agriculture and other development in upland areas has probably adversely affected nesting habitat and connectivity.

Although primarily an aquatic reptile, the western pond turtle needs terrestrial habitat for basking, overwintering, nesting, and traveling between ephemeral sources of water. Available data do not provide any clear indication of what percentage overwinters in the mud (i.e., underwater) versus on land. Breeding activity peaks in May through July but may occur throughout the year. Western pond turtles are philopatric, which implies that continuity of nesting habitat from year to year may be an important consideration. This turtle has a low fecundity, laying 1–14 eggs per clutch. The species incubation period averages 80 days (mainly starting in June–July), but in some cases may exceed 100 days in California. Incubating eggs are extremely sensitive to increased soil moisture, which can cause high mortality. In colder climates, hatchlings may often overwinter in their nests, emerging in the following spring. In warmer climates, such as southern and central California, hatchlings tend to emerge from the nest in the early fall. Hatchlings spend much of their time in shallow water, within dense vegetation of submergent or short emergent macrophytes. Hatchling and juvenile survivorship is considered to be low (Holland 1994). Western pond turtles in California reach sexual maturity in 7 to 11 years. Twenty-five years is generally considered to be the rough upper limit on age for most adults in natural settings.

The Western pond turtle inhabits a wide range of fresh or brackish water habitats including ponds, lakes, ditches, perennially filled pools of intermittent streams, and backwater and low-flow areas of perennial streams and rivers. A key requirement is proximity to potential nesting sites. Females build nests between 2.4 to 4.7 in (6 to 12 cm) deep, in dry clayey, loamy, or silty soils, on gentle (< 15 percent), south- or west-facing slopes, at distances ranging from 4.9 to 1,320 ft (1.5 to 402 m) (average=148 ft [45 m]) away from water. Nests are generally located in grassy meadows, away from trees and shrubs, with canopy cover commonly less than about 10 percent. Western pond turtles are not especially strong swimmers. Suitable aquatic habitats generally have standing (lentic) and slow-moving (lotic) water, which, on the Sacramento River and other large, lowland alluvial rivers typically occurs in off-channel areas, such as oxbows and sloughs. Overwintering in terrestrial

habitats may be an adaptation which helps Western pond turtles escape high winter flows in lotic waters. On the Trinity River, in un-dammed riverine habitat, Western pond turtles appear to prefer deep, lotic water, moderate amounts of riparian vegetation, warm water and/or ample basking sites, LWD and rocks which provide underwater cover from predators such as otters and minks. In addition to physical habitat conditions, predation pressure has been shown to influence the distribution of Western pond turtles. A case in point comes from studies in the San Simeon area of coastal California, in which fewer Western pond turtles were observed when raccoon numbers were high. Raccoons are an important predator of Western pond turtles and are known to prey on adults as well as juveniles.

Whereas adults and older juveniles are considered aquatic habitat generalists, hatchlings and young juveniles require specialized habitat for survival through their first few years. For example, in addition to requiring low-flow and backwater areas of rivers, hatchlings need to spend much of their time feeding in shallow water amongst dense submergent and short emergent vegetation, presumably to avoid predators. Habitats preferred by juveniles are generally scarce and may be especially sensitive to anthropogenic and natural disturbances.

Western pond turtle is poikilothermic ("cold-blooded") and generally must spend a portion of each day basking, either on land or in thermal aquatic refugia. Terrestrial basking sites may include rocks, logs, banks, emergent vegetation, root masses, open banks, and tree limbs. Deep (> 1.6 ft [0.5 m]), still water with emergent woody debris, overhanging vegetation, and rock outcrops provide optimal basking habitat for older Western pond turtle life stages. In addition to the large-scale loss of habitat, many other factors have likely contributed to declines in Western pond turtle populations. These include introduced predators and competitors, increased numbers of native predators, disease, reduced water quality, habitat fragmentation, permanent and seasonal barriers to movement and gene flow, along with habitat alterations caused by invasive plants. Another potentially important limiting factor for the Western pond turtle is the relationship between water level and flow in off-channel water bodies. This is because incubating eggs are extremely sensitive to increased soil moisture.

This turtle is known to exist within the project area. On upper Cache Creek there is a CNDDB record from 1956 in areas where bedrock forms the creek channel. This area is upstream of arundo stands in Capay Valley which are characterized by soft substrates in the channel and floodplain (sand and loose rock). The areas where arundo occurs are also characterized by fast moving waters with limited refugia (isolated pools). A record in CNDDB also occurs on Putah Creek near Winters from 1990 and a second population exits at the UC Davis Arboretum Waterway (2001).

Suitable habitat exists throughout the project area, so the potential for the presence of turtles, depending on life stage, is high. The timing of the project work (July 16 to Nov 15, or as dictated by CDFW under the Program's Streambed Alteration Permit) coincides with turtles of various ages being present in the water; nests in grasslands or terraces; and/or turtles moving into the areas near the stream to either sun themselves or potentially begin hibernating. Depending on air temperature, eggs laid in the summer may hatch by October, and the hatchlings will either (1) stay in the nest until spring, or (2) move out of the nest and into the water.

Impacts to Western pond turtle could result from trampling of nests, individuals, and exposure to herbicide (although as indicated above, all chemicals used have very low toxicity for reptiles).

Impacts to western pond turtle would be significant.
With incorporation of Mitigation Measures BIO-2 this impact will be reduced below a level of significance:

Bio-2: Suitable habitat will be surveyed no more than 72 hrs before 'active' work (biomass reduction or cutting, biomass chipping, or initial treatment of sites). To reduce disturbance-related impacts the YCRCD project manager shall direct hand crews to minimize disturbances in areas where any individuals are observed. Treatment of these areas may proceed under the following circumstances: 1) areas occupied shall be treated later in the season after individuals have left the area; or 2) work may proceed with a biologist on site and crews avoid occupied areas (30 ft buffer), or 3) pursue an alternate plan that avoids harassment/mortality and minimizes other physical habitat disturbances in coordination with the written permission of the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program. 'Passive' treatments

(backpack treatments with no use of powered equipment) are not required to pre-survey suitable habitat areas. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Giant Garter Snake (*Thamnophis gigas*): The giant garter snake is Federal and State Threatened species. Giant garter snakes inhabit wetlands, lowland low gradient streams, sloughs, ponds, flooded rice fields, irrigation ditches, and drainage canals during their active season in early spring through mid-fall. Giant garter snake habitat consists of aquatic water habitat such as wetlands, streams, sloughs, ponds, and irrigation and drainage canals during their active season in early spring through mid-fall. During their active period they require emergent vegetation for cover during escape and foraging and open grassy banks for basking. During their fall and winter dormant period, they require upland areas for refugia. Giant garter snakes are found only in the Central Valley of California. They have declined significantly due to habitat loss and fragmentation, which has been caused by flood control activities, expanding urbanization, changing agricultural and land management practices, predation by introduced species, parasites, and water pollution. Critical Habitat has not been designated for this species. Suitable habitat areas exist in the eastern portion of the County. Surveys of these areas will occur prior to work by hand crews.

Impacts to giant garter snake would be significant. With incorporation of Mitigation Measures BIO-2 this impact will be reduced below a level of significance:

Bio-2: Giant Garter Snake (*Thamnophis gigas*): Suitable habitat will be surveyed no more than 72 hrs before 'active' work (biomass reduction or cutting, biomass chipping, or initial treatment of sites). To reduce disturbance-related impacts the YCRCD project manager shall direct hand crews to minimize disturbances in areas where any individuals are observed. Treatment of these areas may proceed under the following circumstances: 1) areas occupied shall be treated later in the season after individuals have left the area; or 2) work may proceed with a biologist on site and crews avoid occupied areas (30 ft buffer), or 3) pursue an alternate plan that avoids harassment/mortality and minimizes other physical habitat disturbances in coordination with the written permission of the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program. 'Passive' treatments (backpack treatments with no use of powered equipment) are not required to pre-survey suitable habitat areas. The YCRCD project manager shall demonstrate compliance with this measure the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

6.Special Status Mammal Species:

Table 12: Special Status Mammals

Mammals				Listing	
Common Name	**Scientific Name**	**Habitat**	**Distribution in project area**	**Federal**	**State**
American badger	*Taxidea taxus*	Dry, open shrublands, forest, and grasslands with friable soils.	Two historic collection CNDDB records near Woodland and Davis. Potential to occur in suitable habitat in open-space grassland areas, especially in low-elevation central areas of the County.[a] Possibly observed at Cache Creek Nature Preserve; possibly found in Yolo County quads. **Unlikely to occur in project work areas.**		SSC
Ringtail	*Bassariscus astutus*	Rock outcrops, large hollow trees, in scrub and riparian areas. Restricted to montane and foothill areas.	No CNDDB records. Suitable habitat occurs in the rocky, montane areas in the western portions of the County, and in dense foothill riparian areas along Putah and upper Cache Creeks and their tributaries.[a] **Unlikely to occur in project work areas.**		CFP
Pallid bat	*Antrozous pallidus*	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Man-made roosts are also used.	CNDDB records in the vicinity of Woodland and Davis. Potential to occur in many other areas of the County with suitable habitat.[a]		SSC
Townsend's big-eared bat	*Corynorhinus townsendii*	Caves, tunnels, mines and bridges, most commonly near mesic sites.	CNDDB records from mines northwest of Knoxville. Potential to occur in suitable habitat in caves, mines, bridges or abandoned buildings throughout the County.[a]		SSC
Western red bat	*Lasiurus blossevilii*	Occurs in riparian woodland and forages over water and riparian vegetation. Roosts in foliage, does not form colonies.	Yolo County is within this species geographic range and it is expected to occur in high quality riparian habitats such as along Putah Creek.[a] In Yolo County near Cache Creek.		SSC

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

[a] LSA Associates Inc. 2009. Yolo County 2030 Countywide General Plan EIR.

Work activities

Biomass reduction and herbicide treatments will occur predominantly after most mammal species have completed reproduction (field work August 15 to Nov 15, or as dictated by CDFW under the Program's Streambed Alteration Permit). Some level of temporal disturbance will occur due to human presence and noise from equipment, but this is expected to be short in duration and low in intensity. Biomass reduction using tractors with mowing attachments in the Capay Valley (Cache Creek) will occur outside of the mammal breeding season (September 1st to Nov 30). A temporary loss of forage areas may occur either during non-native plant control work or when trimming native vegetation back in order to treat target non-native invasive plants. This temporal negative effect is offset by the control of non-native species and the increase of native vegetation in the treated areas which creates long term beneficial effects. Special-status mammal species are discussed below.

CARNIVOROUS MAMMALS

Herbicide Analysis for Biological Resources

Glyphosate: Using the glyphosate NOAEL value of 175 mg a.e./kg and an estimated exposure value of 2.1 mg a.e./kg produces an HQ value of 0.01 (2.1/175). This value is below the LOC and therefore indicates that the herbicide formulation poses no significant toxicological risk to carnivorous mammals that consume small mammal prey that have received direct applications of the herbicide.

Imazapyr: Using the imazapyr NOAEL value of 250 mg a.e./kg (canid data used) and an estimated exposure value of 2.1 mg a.e./kg produces an HQ value of 0.008 (2.1/250). This value is below the LOC and therefore indicates that the herbicide formulation poses no significant toxicological risk to carnivorous mammals that consume small mammal prey that have received direct applications of the herbicide.

Triclopyr: Using the triclopyr amine NOAEL for a 5-kg mammalian predator (20 mg a.e./kg) and an estimated exposure value of 2.72 mg a.e./kg/day produces an HQ value of 0.1 (2.72/20). This value is below the LOC and therefore indicates that the herbicide poses no significant toxicological risk to carnivorous mammals that consume small mammal prey that have received direct applications of the herbicide.

American badger (*Taxidea taxus*): State listed as a species of special concern. Dry, open shrublands, forest, and grasslands with friable soils. Most abundant in drier, open stages of most habitats; uses underground dens. Resident in suitable habitat throughout the state.

Impacts to American badger would be significant. With incorporation of Mitigation Measures BIO-3 this impact will be reduced below a level of significance:

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Ringtail (*Bassariscus astutus*): State listed as a fully protected species. Ringtails utilize a variety of habitats in montane and foothill areas. They prefer habitats with rocky outcroppings, canyons, or talus slopes and can be found in semi-arid country, deserts, chaparral, oak woodlands, pinyon pine woodlands, juniper woodlands and montane conifer forests. They also utilize riparian habitat due to the increased food availability (Poglayen-Neuwall, 1988; 1990). Females choose a den in a rock crevice, boulder pile, or tree hollow in which they bear their young. Ringtails typically give birth in May or June and begin to forage at about 2 months of age. Both mowing and work by hand crews avoids impacts to mature native trees. Target non-native woody species (tamarix, arundo,) are not large enough to form den hollows.

Impacts to ringtail would be significant. With incorporation of Mitigation Measures BIO-3 this impact will be reduced below a level of significance:

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with

this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

BATS, SMALL MAMMALS (20g):

Herbicide Analysis for Biological Resources

Glyphosate: The glyphosate NOAEL for mammals is 175 mg a.e./kg. An exposure scenario that involves the ingestion of contaminated water (0.00161 mg a.e./kg) yields a HQ value of 0.000009 (0.00161/175), and a scenario that involves the consumption of contaminated insects (23.1 mg a.e./kg) yields an HQ value of 0.1 (23.1/175). The most conservative exposure estimate for small mammals consuming contaminated vegetation (grass) is 14.3 mg a.e./kg/day. The calculated HQ value for this exposure scenario is 0.08 (14.3/175). These calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to small mammals via exposure to contaminated water, contaminated insect prey or contaminated vegetation.

Imazapyr: The imazapry NOAEL for mammals is 738 mg a.e./kg. An exposure scenario that involves the ingestion of contaminated water (0.00161 mg a.e./kg) yields a HQ value of 0.000002 (0.00161/738), and a scenario that involves the consumption of contaminated insects (23.1 mg a.e./kg) yields an HQ value of 0.03 (23.1/738). The most conservative exposure estimate for small mammals consuming contaminated vegetation (grass) is 14.3 mg a.e./kg/day. The calculated HQ value for this exposure scenario is 0.02 (14.3/738). These calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to small mammals via exposure to contaminated water, contaminated insect prey or contaminated vegetation.

Triclopyr: The triclopyr amine NOAEL for small mammals is 440 mg a.e./kg. An exposure scenario that involves the ingestion of contaminated water (0.000439 mg a.e./kg) yields a HQ value of 0.000001 (0.000439/440), and a scenario that involves the consumption of contaminated insects (19.3 mg a.e./kg) yields an HQ value of 0.04 (19.3/440). The most conservative exposure estimate for small mammals consuming contaminated vegetation (grass) is 144 mg a.e./kg/day. The calculated HQ value for this exposure scenario is 0.3 (144/440). These calculated HQ values are below the LOC which indicates that the herbicide poses no significant risk to small mammals via exposure to contaminated water, contaminated insect prey or contaminated vegetation.

The following bat species have special status and are known/suspected to occur within the project area:

Western Red Bat (*Lasiurus blossevillii*): State listed as a species of special concern. Roosts primarily in foliage of mature trees, especially willows, cottonwoods, sycamores, and walnuts, in edge habitats adjacent to streams, open fields, orchards, and sometimes urban areas. Females are riparian-dependent. Prefers edges or habitat mosaics with trees for roosting and open areas for foraging. Found throughout California from Sierra/Cascade foothills west to the coast.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*): State listed as a species of special concern. Can be found in a variety of habitats. Roosts in caves, mines, tunnels, and buildings, preferring sites with caves and cavernous features; also roosts in old-growth sycamore. Most common in mesic areas. Found in suitable habitats throughout California.

Pallid Bat (*Antrozous pallidus*): State listed as a species of special concern. Roosts in rocky outcrops, cliffs, caves, mines, trees (including orchards), bridges, barns, porches, bat boxes, occupied and vacant buildings, and even on or near the ground. Forages over open grasslands, oak savanna grasslands, open pine forests, talus slopes, gravel roads, orchards, and vineyards. Range includes all of California.

Project work will result in the elimination of nonnative species that block and degrade access (impede hunting) to sections of stream channel immediately adjacent to and within the stream flow of creeks and rivers in the project area. Not only do these plants impede access to surface water, they also consume large amounts of water that would otherwise be available to bats and those plants that make up bat habitat. Consequently it is anticipated that the project will improve habitat conditions for bats. The removal and control of these plants will also allow the development of riparian canopy species such as willows and cottonwoods which are utilize for night roosts. In addition, only hand removal treatments will occur adjacent to any abandoned structures or under bridges, which sometimes contain both bat and swallow nests. No caves or other geologic structures suitable for this species will be impacted by project work.

The calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to small mammals via exposure to contaminated water, contaminated insect prey or contaminated vegetation.

Impact: Impacts to special status bats are below a level of significance.

7.Special Status Avian Resources:

Table 13: Special Status Birds

Avian				**Listing**	
Common Name	**Scientific Name**	**Distribution in project area**	**Analysis Class**	**Federal**	**State**
Bald eagle	*Haliaeetus leucocephalus*	Yolo County quads. No CNDDB data.	Large, fish eating		SFP
Golden eagle	*Aquila chrysaetos*	Yolo County quads. No CNDDB data.	Large, carnivorous		SFP
Swainson's hawk	*Buteo swainsoni*	Yolo County quads. 772 CNDDB records across region.	Large, carnivorous		ST
Northern harrier	*Circus cyaneu*	One CNDDB record 2015, near Willow Slough.	Large, carnivorous		SSC
White-tailed kite	*Elanus leucurus*	Putah and Cache Creeks and surrounding ag land. Multiple CNDDB records near Davis.	Small, carnivorous		SFP
Long-eared owl	*Asio otus*	Yolo County quads. No CNDDB records.	Small, carnivorous		SSC
Burrowing owl	*Athene cunicularia*	116 CNDDB records around Davis up to foothills near Winters.	Small, carnivorous		SSC
Bank swallow	*Riparia riparia*	21 CNDDB records on Cache Creek and Sacramento River.	Small		ST
California black rail	*Laterallus jamaicensis coturniculus*	One CNDDB record in marsh between Sac River and Sac deep water channel (2017). **Unlikely to occur in project work areas.**	Small		ST, FP
Least Bell's vireo	*Vireo bellii pusillus*	One CNDDB record from 1877, Sacramento.	Small	FE	E
Loggerhead shrike	*Lanius ludovicianus*	Yolo County quads. No CNDDB data.	Small		SSC
Mountain plover	*Charadrius montanus*	11 CNDDB records, all agricultural fields from Woodland to Esparto. **Unlikely to occur in project work areas.**	Small		SSC
Purple martin	*Progne subis*	Yolo County quads. No CNDDB data in project area.	Small		SSC
Song sparrow "Modesto population"	*Melospiza melodia*	Yolo County quads. One CNDDB record lower Putah Creek by Yolo bypass, 2011. One historic record in Sac area.	Small		SSC

Avian				Listing	
Common Name	**Scientific Name**	**Distribution in project area**	**Analysis Class**	**Federal**	**State**
Tricolored blackbird	*Aegelaius tricolor*	Yolo County quads. 41 CNDDB records across project area.	Small		SSC, SPF
Vaux's swift	*Chaetura vauxi*	Yolo County quads. No CNDDB data.	Small		SSC
Western snowy plover	*Charadrius alexandrinus nivosus*	Two CNDDB records, one by Willow Slough bypass (1963), one by Woodland (1970), both sewage ponds. **Unlikely to occur in project work areas.**	Small		SSC
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Low abundance but have been observed in Yolo County. One CNDDB record from Putah Creek 2013.	Small	FT	E
Yellow-breasted chat	*Icteria virens*	Yolo County quads. One CNDDB record in foothills near Pleasants Creek, 1987.	Small		SSC
Yellow warbler	*Steophaga petechia*	Yolo County quads. No CNDDB data.	Small		SSC

Federal Listing: FT = Federally listed as Threatened, FE=Federally listed as Endangered
State Listing: SSC = Species of Special Concern, SFP = State Fully Protected, E= Endangered, T = Threatened

Work activities

Biomass reduction and herbicide treatments will occur predominantly after most avian species have completed nesting and/or fledged their young (field work August 15 to Nov 15, or as dictated by CDFW under the Program's Streambed Alteration Permit). Work may occur from July 16th to August 31st if avian pre-surveys have occurred, with nest buffers used to protect resources. Some level of temporal disturbance will occur due to human presence and noise from equipment, but this is expected to be short in duration and low in intensity. Biomass reduction using tractors with mowing attachments in the Capay Valley (Cache Creek) will occur outside of the avian breeding season (September 1st to Nov 30). A temporary loss of forage areas may occur either during non-native plant control work or when trimming native vegetation back in order to treat target non-native invasive plants. This temporal negative effect is offset by the control of non-native species and the increase of native vegetation in the treated areas which creates long term beneficial effects. Special-status avian species are discussed below.

SMALL BIRDS:

Herbicide Analysis for Biological Resources

Glyphosate: The NOAEL for birds is 540 mg a.e./kg. An exposure scenario that involves the ingestion of contaminated water (0.0029 mg a.e./kg/day) yields a HQ value of 0.000005 (0.0029/540), and a scenario that involves the consumption of contaminated insects (37.7 mg a.e./kg/day) yields an HQ value of 0.07 (37.7/540). While there is no exposure estimate available for small birds consuming contaminated vegetation, the large bird exposure scenario (29.6 mg a.e./kg/day) produces an HQ value of 0.05 (29.6/540). All of these calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to small birds via exposure to contaminated water, insects or vegetation.

Imazapyr: The NOAEL for birds is above 2,510 mg a.e./kg (no signs of toxicity, higher rates not tested). An exposure scenario that involves the ingestion of contaminated water (0.0029 mg a.e./kg/day) yields a HQ value of 0.000001 (0.0029/2,510), and a scenario that involves the consumption of contaminated insects (37.7 mg a.e./kg/day) yields an HQ value of 0.015 (37.7/2,510). While there is no exposure estimate available for small birds consuming contaminated vegetation, the large bird exposure scenario (29.6 mg a.e./kg/day) produces an HQ value of 0.01 (29.6/2,510). All of these calculated HQ values are below the

LOC which indicates that the herbicide formulation poses no significant risk to small birds via exposure to contaminated water, insects or vegetation.

Triclopyr: The NOAEL for birds is 126 mg a.e./kg and when an exposure estimate involving the consumption of contaminated vegetation (40.5 mg a.e./kg) is used, the resultant HQ is 0.3 (40.5/126). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to small birds.

LARGE BIRDS (>1 lb):

Herbicide Analysis for Biological Resources

Glyphosate: The NOAEL for birds is 540 mg a.e./kg. An exposure scenario that involves the ingestion of contaminated water (0.0004 mg a.e./kg/day) yields an HQ value of 0.0000007. (0.0004/540), and a scenario that involves the consumption of contaminated insects (37.7 mg a.e./kg/day) yields an HQ value of 0.07 (37.7/540). The consumption of contaminated vegetation (29.6 mg a.e.,/kg/day) produces an HQ value of 0.05 (29.6/540). All of these calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to large birds via exposure to contaminated water, insects or vegetation.

Imazapyr: The NOAEL for birds is above 2,510 mg a.e./kg (no signs of toxicity, higher rates not tested). An exposure scenario that involves the ingestion of contaminated water (0.0029 mg a.e./kg/day) yields a HQ value of 0.000001 (0.0029/2,510), and a scenario that involves the consumption of contaminated insects (37.7 mg a.e./kg/day) yields an HQ value of 0.015 (37.7/2,510). The consumption of contaminated vegetation (29.6 mg a.e.,/kg/day) produces an HQ value of 0.01 (29.6/2,510). All of these calculated HQ values are below the LOC which indicates that the herbicide formulation poses no significant risk to large birds via exposure to contaminated water, insects or vegetation.

Triclopyr: The NOAEL for birds is 126 mg a.e./kg and when an exposure estimate involving the consumption of contaminated vegetation (40.5 mg a.e./kg) is used, the resultant HQ is 0.3 (40.5/126) . This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target large birds.

CARNIVOROUS BIRDS:

Herbicide Analysis for Biological Resources

Glyphosate: Using the NOAEL value of 540 mg a.e./kg and an estimated exposure value of 3.23 mg a.e./kg produces an HQ value of 0.006. This value is below the LOC which indicates that the herbicide formulation poses no significant toxicological risk to carnivorous birds that consume small mammal prey that have received direct applications of the herbicide.

Imazapyr: Using the NOAEL value of 2,510 mg a.e./kg and an estimated exposure value of 3.23 mg a.e./kg produces an HQ value of 0.001. This value is below the LOC which indicates that the herbicide formulation poses no significant toxicological risk to carnivorous birds that consume small mammal prey that have received direct applications of the herbicide.

Triclopyr: The NOAEL for birds is 126 mg a.e./kg and when an exposure estimate involving the consumption of contaminated vegetation (40.5 mg a.e./kg) is used, the resultant HQ is 0.3 (40.5/126) . This

value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target carnivorous birds.

FISH EATING BIRDS:

Herbicide Analysis for Biological Resources

Glyphosate: Using the NOAEL value of 540 mg a.e./kg and an estimated exposure value of 0.000572 mg a.e./kg produces an HQ value of 0.000001. This value is below the LOC which indicates that the herbicide formulation poses no significant toxicological risk to fish-eating birds that consume herbicide-contaminated prey.

Imazapyr: Using the NOAEL value of 2,510 mg a.e./kg and an estimated exposure value of 0.000572 mg a.e./kg produces an HQ value of 0.0000002. This value is below the LOC which indicates that the herbicide formulation poses no significant toxicological risk to carnivorous birds that consume small mammal prey that have received direct applications of the herbicide.

Triclopyr: The NOAEL for birds is 126 mg a.e./kg and when an exposure estimate involving the consumption of contaminated vegetation (40.5 mg a.e./kg) is used, the resultant HQ is 0.3 (40.5/126). This value is below the LOC which indicates that the herbicide formulation poses no significant risk to non-target fish-eating birds.

Review of special status avian groups

RAPTORS AND OWLS:

The following raptor species have special status and are known/suspected to occur within the project area:

California Fully-Protected: White-tailed kite (*Elanus leucurus*), Bald eagle (*Haliaeetus leucocephalus*) (also state listed as California Endangered and protected by the Federal Eagle Protection Act) and Golden eagle (*Aquila chrysaetos*) (also state listed as California Endangered and protected by the Federal Eagle Protection Act)

California Threatened: Swainson's hawk (*Buteo swainsoni*)

Species of Special Concern: Northern harrier (*Circus cyaneus*)**,** Long-eared owl (*Asio otus*), and Burrowing owl (*Athene cunicularia*)

Special-status raptors and owls will not be nesting during the project implementation time frame (active field work Aug 16 to Nov 30, or as dictated by CDFW under the Programs Streambed Alteration Permit), thus avoiding disturbance). Work may occur from July 16 to August 15th if avian pre-surveys have occurred, with nest buffers used to protect resources. They do not typically nest in target non-native invasive plant stands and/or in vegetation potentially affected and will not lose any habitat as a result of target non-native invasive plant removal; and/or have been infrequently detected within the project area. During the latter period of project implementation, two of these species (Swainson's hawk and eagle) will likely be absent due to their migration patterns.
The indirect effect of loss of some herbaceous cover to their prey base (e.g. birds using vegetation for nesting or foraging) is expected to be minimal and widely distributed over the landscape. Bird species that are potential prey to raptors also do not prefer to use giant reed, salt cedar, or tree-of-heaven for foraging or nesting, so the loss of that vegetation is not expected to negatively affect these species.

Active bird nests are protected under the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Wildlife Code (CDFWC), which prohibits their disturbance or destruction, with certain exceptions. The Project will not disturb active nests of any bird.

Impact Bio-3: Impacts to raptors and owls would be significant.
With incorporation of Mitigation Measure BIO-3 this impact will be reduced below a level of significance:

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Bald eagle (*Haliaeetus leucocephalus*): The bald eagle is a fully protected species in California. A regular breeder in Yolo County, it is relatively uncommon. Bald eagles typically nest in forested areas adjacent to large bodies of water, staying away from heavily developed areas when possible. Bald eagles are tolerant of human activity when feeding, and may congregate around fish processing plants, dumps, and below dams where fish concentrate. For perching and nesting, bald eagles prefer tall, mature coniferous or deciduous trees that afford a wide view of the surroundings. Nests are typically built near the trunk, high up in the tree but below the crown. In winter, bald eagles can also be seen in dry, open uplands if there is access to open water for fishing. Fish of many kinds constitute the centerpiece of the diet (common examples include salmon, herring, shad, and catfish), but a wide variety of foods may be consumed including: birds, reptiles, amphibians, invertebrates such as crabs, and mammals including rabbits and muskrats.

Impact: Impacts to bald eagle are below a level of significance.

White-tailed kite (*Elanus leucurus*): The white-tailed kite is a fully protected species in California. A regular breeder in Yolo County, it is relatively uncommon. White-tailed kites nest in native (primarily willow, valley oak, cottonwood, and walnut) and some non-native trees and forage in grassland, seasonal wetland, and agricultural habitats. White-tailed kite is a resident species throughout central and coastal California (Stillwater Sciences, 2015). This species is found primarily in riparian corridors and prefer habitat with lowland grasslands, tree groves for perching and nesting, and open areas that support small mammals (Stillwater Sciences, 2015). This species is present within the Project Area.

Golden eagle (*Aquila chrysaetos*): Golden eagle is a fully protected species under California Fish and Wildlife Code and is protected under the federal Bald and Golden Eagle Protection Act. There are several golden eagle nests known to occur in the Coast Ranges in the western portion of the county and sightings of foraging golden eagles are relatively frequent in the pasturelands and grassland habitats within and immediately adjacent to the Coast Ranges. There are also several historic and one recent golden eagle nest in the Montezuma Hills in Solano County (Smith, 2012). However, there are no golden eagle nests known to occur in the open agricultural habitats of Yolo County or other neighboring lowland agricultural areas. Golden eagles typically nest and forage in hilly grassland or shrubland communities. However, they are occasionally observed on the valley floor, including in Yolo County, mainly during the non-breeding season.

Swainson's hawk (*Buteo swainsoni*): Federal and State listed as Threatened. It nests in mature native and nonnative trees and forages in grassland and agricultural habitats. Although it's a listed species, the Swainson's hawk is relatively common in Yolo County and in the vicinity of the project site due to the availability of nest trees and the agricultural crop patterns that are compatible with Swainson's hawk foraging. Yolo County has a dense nesting population of Swainson's hawk and the densest nesting population reported within the range of the species. Swainson's hawk primarily nest in a few species of trees, including oaks, cottonwoods, sycamores, or willows (Schlorff & Bloom 1983, CDFG 1994). These species of trees are found throughout the entire Project Area. While not necessarily a riparian species, nesting trees associated with Swainson's hawk are found

in riparian areas, usually associated with main river channels (Bloom 1980, Estep1989). This species has been observed within the Project Area.

Impact: Impacts to listed raptors would be significant.
With incorporation of Mitigation Measure BIO-3 this impact will be reduced below a level of significance.

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

NON-RAPTOR, MIGRATORY AND RESIDENTIAL BIRDS (PASSERINE):

The following passerine bird species have special status and are known/suspected to occur within the project area:

California Endangered: Willow flycatcher (*Empidonax traillii*), and Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

California Species of Special Concern: Black tern (*Chlidonias niger*), Vaux's swift (*Chaetura vauxi*), Olive-sided flycatcher (*Contopus cooperi*), Purple Martin (*Progne subis*), Loggerhead Shrike (*Lanius ludovicianus*), Yellow Warbler (*Dendroica petechia brewsteri*), Yellow-Breasted Chat (*Icteria virens*), Grasshopper Sparrow (*Ammodramus savannarum*), Tricolored Blackbird (*Agelaius tricolor*)

These species will likely not be nesting during the project implementation time frame (field work August 15 to Nov 30, or as dictated by CDFW under the Program's Streambed Alteration Permit), thereby avoiding disturbance. Work may occur from July 16 to August 15th if avian pre-surveys have occurred, with nest buffers used to protect resources. Indirect effects related to the loss of some herbaceous cover to the nesting, dispersal, or foraging habitat is expected to be minimal and widely distributed over the landscape, typically in areas with poor/sparse cover. The aforementioned bird species do not prefer to use giant reed, salt cedar, or tree-of-heaven for foraging or nesting, so the loss of that vegetation is not expected to negatively affect these species. In the unlikely event that late-season nests are encountered, impacts to nesting birds would be considered significant.

Active bird nests are protected under the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Wildlife Code (CDFWC), which prohibits their disturbance or destruction, with certain exceptions.

Impact Bio-3: Impacts to nesting birds would be significant.
With incorporation of Mitigation Measure BIO-3 this impact will be reduced below a level of significance.

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement project no later than June 15 of each year that the project is implemented.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*): Western yellow-billed cuckoo is federally threatened, and is state-listed as endangered (CDFW, 2016). On August 15, 2014, USFWS proposed to designate critical habitat in California, which does not include areas along Putah Creek (Stillwater Sciences, 2015). The western yellow-billed cuckoo is presently a rare migrant in Yolo County. Because individual western yellow-billed cuckoos have been documented within the Project Area, which overlaps with their historical range, this species has potential to occur, but is not expected to nest, within the Project Area.

Least Bell's vireo (*Vireo bellii pusillus*): Federally Endangered, State Endangered. Found in lowland riparian with willows and dense understory. Nests in a variety of plants that provide concealment with dense foliage. Current range primarily southern Calif but expanding back into historic range, which included Central Valley north to Red Bluff. 2005-2007 nest records at San Joaquin River National Wildlife Refuge, Stanislaus County; no recent nesting there. Least Bell's vireo prefer habitat that has dense riparian shrubs near flowing water or dry watercourses in the desert. The Project Area does contain riparian shrubs and habitat suitable for this species. However, the only observation of this species in the region of the Project Area was downstream of the most eastern reach of the Project Area. This species has the potential to be present downstream of I-80, but it is unlikely this species is present within the Project Area.

Tricolored blackbird (*Agelaius tricolor*): Tricolored blackbird is a state species of special concern that nests in colonies from several dozen to several thousand breeding pairs. They have three basic requirements for selecting their breeding colony sites: open accessible water; a protected nesting substrate, including either flooded or thorny/spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Meese et al., 2014). Nesting colonies are found in freshwater emergent marshes in willows, blackberry bramble, thistles, or nettles. Some of the largest recent colonies have been in silage and grain fields (Meese et al., 2014). This species is a year-round resident in California, where it is largely endemic. Nesting colonies of tricolored blackbirds are protected as a candidate species for listing under the CESA (CDFW, 2016). The large nesting colonies typically occur within protected stands of cattails, tules, blackberry brambles, or willows, and near open, accessible water (Beedy and Hamilton, 1997; Hamilton 2004). A total of 41 records are listed in CNDDB, occurring primarily in lowlands surrounding the Sacramento River, but extending up to the foothills. There may be suitable nesting habitat in expansive marsh vegetation or large blackberry thickets along Putah Creek. There have been eight documented sightings of tricolored blackbird during surveys reported by Truan et al. (2010) from 1997 to 2010, though their surveys were not designed to detect tricolored blackbird in numbers. Tricolored blackbirds were observed at Los Rios Farms, Putah Creek Sinks, Mace Boulevard, and the along Putah Creek Road east of Winters (Truan et al., 2010). However, no nesting colonies have been found within the riparian zone immediately adjacent to Putah Creek. Tri-colored backbirds will likely not be nesting during the project active work period (field work August 16 to Nov 15, or as dictated by CDFW under the Program's Streambed Alteration Permit), thereby avoiding disturbance. Avian pre-surveys would be conducted in suitable habitat for any active work between July 16 and August 15th. To assure no impacts occur, MM Bio-3 will be followed.

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15 of each year that the project is implemented.

Bank swallow *(Riparia riparia):* Bank swallow is listed as Threatened by CDFW. This neotropical migrant is found primarily in riparian and other lowland habitats of California during the spring-fall period. During the summer months the species is restricted to riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils, into which it digs nesting holes. In migration, bank swallow flocks with other swallows over many types of open habitat. It is estimated that approximately 75 percent of the current breeding population in California occurs along banks of the Sacramento and Feather rivers and some of its tributaries in the northern Central Valley. The Bank swallow feeds on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles predominantly over open riparian areas, but also over brushland, grassland, wetlands, water, and cropland. It uses burrows dug in cliffs and river banks for cover.

Predominantly a colonial breeder, Bank swallow nesting colonies are normally located on vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, and the ocean and contain between 100 and 200 nesting pairs. Feeding occurs over grassland, shrubland, savannah, and open riparian areas during breeding season and over grassland, brushland, wetlands, and cropland during migration. Burrows are 1" to 2.2" wide and up to 54" deep. A small chamber at the end of the burrow contains the nest. Burrows and nests are lined with grasses, other plant material and feathers. Breeding occurs from early May through July, with peak activity from mid-May to mid-June. Eggs and adults are preyed upon by rats, skunks, house cats, snakes, and some raptors. In California, however, gopher snakes (*Pituophis melanoleucus*) and American kestrels (*Falco sparverius*) are the most common predators. Channelization and stabilization of banks of nesting rivers, and other destruction and disturbance of nesting areas, are major factors causing the marked decline in numbers in recent decades. It is anticipated that the removal of arundo stands will reduce the amount of flood flows that are redirected to adjacent banks which cause cutting and erosion of bank structures suitable for bank swallow nesting sites, normalizing and benefiting bank swallow habitat. Bank swallows occur at multiple locations along the Sacramento River. Bank swallows will likely not be nesting during the project active work period (field work August 16 to Nov 15, or as dictated by CDFW under the Program's Streambed Alteration Permit), thereby avoiding disturbance. Avian pre-surveys would be conducted for any active work between July 16 and August 15th. To assure no impacts occur, MM Bio-3 will be followed.

Impact Bio-3: Impacts to bank swallow would be significant.
With incorporation of Mitigation Measure BIO-3 this impact will be reduced below a level of significance.

Bio-3: Wildlife: To reduce wildlife disturbance, the YCRCD project manager shall direct crews to avoid spraying in the presence of wildlife observed in the treatment areas. Areas that are not sprayed due to the presence of wildlife may be sprayed once wildlife have left the treatment area. Areas with suspected occupied nesting or denning habitats shall also be avoided and not treated using manual plant removal methods or herbicides until wildlife have left the area. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement Program no later than June 15of each year that the project is implemented.

8. Sensitive Habitats

The project will not have an adverse effect on any wetlands, riparian areas or riverine habitats. Although overspray from the foliar application of herbicide could be considered potentially significant in that it could harm or kill native plant species, all chemicals will be applied through focused sprayings in order to minimize potential impacts to native riparian vegetation or wetlands. To prevent herbicide related mortality on woody riparian vegetation such as willows, cottonwoods and scrub species (excluding elderberry) immediately adjacent to chemically treated target non-native invasive species, branches of riparian vegetation will be trimmed prior to herbicide applications in order to avoid the effects of overspray. No heavy equipment will be used to remove target non-native invasive plants and little ground disturbance will occur, except in Capay Valley in Cache Creek where arundo and tamarisk stands require reduction. Mowing will avoid impacts to

native woody vegetation. The project will benefit riparian systems by restoring flows, reducing fire risk and allowing native vegetation to establish in areas where arundo and tamarisk were removed.

Impact: Impacts to riparian habitats, sensitive natural communities, wetlands, are below a level of significance.

9. Wildlife Movement

The project will result in short term disturbances in small areas, and will not negatively affect wildlife movement. In many area overgrowth of arundo and tamarisk impedes wildlife movement. These areas will have enhanced function as wildlife corridors.

Impact: No impact to wildlife movement is anticipated.

10. Conservation Planning and Zoning

Yolo County adopted a Habitat Conservation Plan and a Natural Community Conservation Plan in 2019, and Solano County has implemented a Habitat Conservation Plan for their water resources. This project does not conflict with either the Yolo County HCP/NCCP or the Solano County HCP. This project will assist in achieving the goals of the Yolo and Solano County HCP/NCCP by improving riparian habitat. This project will remove invasive plant species that reduce habitat suitability and resource availability for threatened or endangered wildlife.

Impact: No Impacts to local policies or ordinances, or an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan are anticipated.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
E. Cultural Resources.				
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

Discussion: Hand cutting and removal of aboveground biomass and herbicide treatment of non-native plants are unlikely to disturb soil or impact belowground resources. Revegetation activities may cause minor soil disturbance. Significant disturbance of soil will not occur- no grading, grubbing or other mechanized movement of soil will take place. In the Capay Valley area, biomass reduction by mowing with tractors will occur on large contiguous stands. The tractor tires have the potential to cause some soil disturbance. To preserve and avoid Cultural Resources, mitigation measure CR-1 will be followed. If any Cultural Resources were inadvertently uncovered or observed during project work, mitigation measures CR-2, CR-3 and CR-4 would be followed. Consultation will be an ongoing process with both the YCRCD and the local Tribe working to protect and preserve cultural resources. With incorporation of Mitigation Measures CR-1, CR-2, CR-3 and CR-4, CR-5 this

impact will be reduced below a level of significance.

CR-1: Cultural Sensitivity Training sessions will be conducted for each field crew to inform them about the types of cultural resources that could be present within the Putah-Cache Watershed Arundo Eradication Program area and the steps to take in the event one is found. A ground survey before and after mowing will also occur.

CR-2: In the Capay Valley, a cultural resources study will be conducted by an archaeologist who meets the Secretary of the Interior's standards prior to ground disturbances. Work activities near identified sites will be assessed to determine what invasive plant control methods are used at the site to protect any cultural resources, or if work cannot occur at the site.

CR-3: If any previously unevaluated cultural resources such as mining tools or other historical artifacts, etc. are encountered, work will be stopped, and a qualified archaeologist will make an assessment of the discovery and recommend/implement mitigation measures as necessary.

CR-4: If any human remains are encountered during any phase of work, work will stop immediately within that area. The Yolo County Coroner's Office will be contacted to determine whether investigation of the cause of death is required as well as to determine whether the remains may be Native American in origin. Should Native American human remains be found, the determination of Most Likely Descendant (MLD) under California Public Resources Code Section 5097.98 will be made by the Native American Heritage Commission (NAHC). If the location of the site and the history and prehistory of the area is culturally-affiliated with the Yocha Dehe Wintun Nation (Tribe), the NAHC will contact the Tribe; and a tribal member will be designated by the Tribe to consult with the landowner and/or the RCD. Should the NAHC determine that a member of an Indian tribe other than Yocha Dehe Wintun Nation is the MLD, and the Tribe is in agreement with this determination, representatives of the people of the MLD and a qualified archaeologist would make an assessment of the discovered and recommend/implement mitigation measures as necessary.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
F. Energy.				
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	☒
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Discussion: The project uses standard industry restoration equipment maintained and operated to meet and exceed legal standards. Work activities do not conflict with local plans. Impacts related to energy use are below a level of significance.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
G. Geology and Soils.				

Would the project:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i.) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42).	☐	☐	☐	☒
ii.) Strong seismic ground shaking?	☐	☐	☐	☒
iii.) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv.) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be 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?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial director indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Discussion: All project work will be completed within the riparian zone of the project area. As proposed, the project will not result in hazardous conditions or exacerbate current conditions related to earthquake or ground rupture. Reduction and/or removal of arundo and tamarisk will improve flow conveyance reducing flooding and erosion. Areas with active bank erosion exist on some creeks, particularly Cache and Putah creeks. Arundo has week root structure (consists of rhizomes), offering poor long-term bank protection. It is anticipated that deeply rooted native riparian plants will quickly reestablish themselves within the project area greatly reducing rates of sediment production and stream bank erosion. Removing non-native vegetation from riparian banks will not negatively impact paleontological or geologic features.

ENVIRONMENTAL ISSUES	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
H. Greenhouse Gas Emissions.				
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion: The only source of greenhouse gas emissions for this project will come from transportation and equipment use. Impacts related to greenhouse gas emissions are below a level of significance. The proposed project would generate

greenhouse gas (GHG) emissions from: 1) the exhaust of vehicles used to transport crews, equipment, and materials; 2) powered hand tools (chainsaws) and sprayers; 3) chippers used to mulch biomass; and 4) tractors used to mow biomass in Capay Valley (Cache Creek). Reduced biomass of target non-native invasive species may also generate GHG emissions over time, through decomposition. The period of target non-native invasive treatment would be short-term and minor in nature. Furthermore, native riparian species that re-colonize the treatment sites will provide carbon sequestration services, require less management in the future, and be less susceptible to fire than arundo.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. Hazards and Hazardous Materials.				
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code§65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) 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 or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☒	☐	☐

Discussion: The herbicides selected for this project (glyphosate, imazapyr, and triclopyr) pose insignificant risks to non-target wildlife and their habitats and to persons who may be in the project area during and after the application period. This is due primarily to application methods being used (targeted, ground-based applications with hand-held equipment), the use of a certified applicator, the infrequent application (typically once per year), and the relatively small amounts of chemicals that will be used. The potential for off-target movement of the herbicide and surfactant products during and after the project period is very low for glyphosate and triclopyr. Imazapyr has a greater risk of mobility, so the project will closely monitor the rate (volume of material per acre) to assure that over application does not occur.

This project would not require long-term storage, use, disposal or transport of hazardous material in significant amounts. Only adequately trained and certified applicators will perform herbicide treatments. Daily herbicide treatment operations will be supervised by a California Department of Pesticide Regulation (DPR) Certified Applicator. Mixing herbicide only will only occur outside riparian areas at staging areas. Vegetation treatments will be conducted by hand including cutting

and daubing of plant stems and herbicide spraying on cut and standing vegetation. In order to minimize potential impacts to non-target vegetation, herbicide applications will involve applications made directly to weed targets. In some cases, native species such as willow, cottonwood and elderberry may be trimmed to reduce the potential for herbicide overspray.

Fueled equipment used in riparian areas within the project area will be powered hand tools, ATVs which will transport personnel, chemicals and equipment to treatment areas, and mowing equipment in Capay Valley (Cache Creek). Chippers, and tractors or trucks used to move the chipper, will only operate on pre-existing roads and access areas in riparian areas or in areas adjacent to the riparian zone. Chippers and tractors will not enter or cross standing or flowing water. Re-fueling vehicles, tractors and chippers will only occur outside of riparian areas. There is the possibility for gasoline to be spilled during refueling operations, but this is unlikely and the risk of a spill would be low. Though unlikely, a fuel spill is potentially significant. Fuel and hydraulic lines on equipment could also breach. This is also unlikely and the risk is low.

No mixing of chemicals will occur within one-quarter mile of a school. There are no sites which are included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 in the project area. The Project area does not lie within an airport land use plan. This Project would not interfere with an adopted emergency response plan or emergency evacuation plan.

It is anticipated that through the control of scattered stands of target non-native invasive plants, particularly arundo, within the watershed's riparian zone, native riparian forest, shrub, grass species and bare ground will replace flammable non-native vegetation reducing the threat of high intensity wildfire. Though unlikely, it is possible that the project activities could result in ignition of an accidental fire. This impact is potentially significant.

Impact Haz-1: Impacts associated with fuel spills in riparian areas are potentially significant.
With incorporation of Mitigation Measure HAZ-1 this impact will be reduced below a level of significance.
Haz-1: To reduce potential impacts associated with fuel spills in riparian areas, the project manager shall ensure that gasoline at no time is transported across a flowing stream. Only existing roads shall be used to move personnel, equipment and materials into and out of the project site. The project manager shall select staging areas for fuel storage, refueling and maintenance of equipment on flat disturbed upland sites that are away from dry or wet waterways and areas that could potentially flow into a stream in the event of an accidental spill. Spill/fuel containment materials and equipment shall be made available and used at refueling and maintenance areas. Equipment shall be stored and maintained within properly cleared areas. The applicator shall be responsible for immediate containment and removal of any spilled material. The clean-up of all petroleum and/or chemical spills shall begin immediately and the appropriate authorities and CDFW shall be notified immediately if a spill occurs. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. The project manager or certified applicator shall make daily equipment inspections for leaks, correcting and repairing any such leaks prior to resuming their use. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Northern Region Lake and Streambed Alteration Agreement Program no later than June 15th of each year that the project is implemented.

Impact Haz-2: Impacts associated with exposure of people or structures to wildland fires are potentially significant.

With incorporation of Mitigation Measure HAZ-2 this impact will be reduced below a level of significance.

Haz-2: To reduce impacts associated with exposure of people or structures to wildland fires, the YCRCD project manager shall ensure that adequate fire protection equipment is available at work sites. This shall include fire extinguishers attached to all mechanized equipment. In addition, firefighting hand tools shall be made available at all areas where mechanical equipment is operated. The YCRCD project manager, Applicators, and all workers shall comply with all applicable fire safe standards as found in Public Resources Code Division 4, Chapter 6, (PRC's 4427, 4428, 4429, 4431, 4442, list not all inclusive). Vehicles shall not be parked in tall grass or any other location where heat from the exhaust system could ignite a fire. All motorized equipment shall have approved spark arrestors. A dependable radio or phone communication shall be available on site to report any emergency which may occur. Treated invasive species that have the potential to cause a significant fire risk to surrounding vegetation and structures, or the potential to cause an obstruction to any

structure, shall have canes, limbs or other vegetative material cut and chipped, or disposed of in a legal manner. The YCRCD project manager shall demonstrate compliance with this measure through the submission of annual reports due to the California Department of Fish and Wildlife's Northern Region Lake and Streambed Alteration Agreement Program no later than June 15th of each year that the project is implemented.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
J. Hydrology and Water Quality.				
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i.) result in a substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii.) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☐	☒
iii.) 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; or	☐	☐	☐	☒
iv.) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

Discussion: The removal of giant reed, salt cedar and other invasive plants from active portions of the stream corridor will expose soil predominantly within the floodplain and active channel, which may lead to short-term accelerated erosion rates until native vegetation gets established. However, the aerial extent and rate of this type of erosion will fall within the range of natural background levels. Conversely, the removal of dense stands of non-native vegetation within the stream corridor will reduce erosion potential on terrace banks, but not eliminate natural stream corridor migration. Stands of vegetation within the stream corridor that currently block and redirect floodwaters to adjacent terrace banks will be reduced, if not removed, resulting in more natural flows and stream course conditions. As a result of these improved flow conditions, the threat of terrace bank erosion, siltation of stream flows and flooding will be reduced. It is anticipated that

through revegetation and maintenance efforts, deeply rooted native riparian plants will rapidly reestablish themselves within the project area reducing rates of sediment production and stream bank erosion. Although there may be a short-lived increase in erosion potential within the floodplain and active channel due to project actions, they will also result in more natural geomorphic processes (i.e., balanced erosion and deposition). When taken into consideration with the reduced erosion potential of terrace banks, the project will result in less than significant changes in erosion and/or deposition within the stream corridor. Groundwater supplies will be enhanced as control of arundo and tamarisk will result in significant water savings. Arundo uses three to four times more water than replacement native vegetation.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
K. Land Use Planning.				
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion: The project work is control of scattered infestations of target non-native plants in portions of Yolo and Solano Counties where the major land uses consist of residential parcels, farming, ranching, commercial activities, open space and wildlife habitat. The work will not divide a community or conflict with land use plans or policies. Work activities will reduce fire and flood risks, conserve water, and benefit flora and fauna, so there is no conflict with exiting or planed conservation plans.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
L. Mineral Resources.				
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion: Project work does not entail the extraction of mineral resources or the execution of subsurface materials. The project activities will not result in the loss of mineral resources or the availability of a locally important mineral resource recovery site.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
M. Noise.				
Would the project:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion: The only noise produced while implementing this project will come from equipment use at work sites. Noise will be intermittent and temporary. Equipment to be used within the Project area will be: vehicles to transport crews to work sites, chainsaws, chippers, and 4-wheel ATV's or quads used for transportation. Chippers, quads and chainsaws are commonly used on the properties within the Project area, therefore, use of this equipment during Project implementation is considered to be within the range of the ambient noise levels that are created in the area. Mowing will occur in Capay Valley on Cache Creek. Mowers will generate temporary elevated noise in the fall. Mowing only occurs once at any given site. Mowed sites are remote, far from structures and people. Mowing in Capay Valley on Cache Creek will cause some vibration and noise, but this will be temporary and minor. Noise levels will not be elevated within the vicinity of any airstrips. All equipment will be fitted with appropriate mufflers. Equipment will only be operated during daylight hours and only in a particular area for a short period of time. Once project work has been completed within a portion of the Project area, noise levels will return to ambient levels.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
N. Population and Housing.				
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion: The Project area is within rural and urban portions of Yolo and Solano Counties which have been zoned for farming, ranching, commercial, and residential development. Project work will occur within or immediately adjacent to riparian areas and will not impact development or population growth with the vicinity of the Project area. No population displacement will occur.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
O. Public Services.				
Would the project:				
a) 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?	☐	☐	☐	☒

Discussion: The project activities are in undeveloped riparian habitat and no construction is involved. There are no negative impacts to public services or facilities used to provide services. It is anticipated that project work will positively impact fire protection through the removal of dense highly flammable vegetation and replacing it with native species that are more fire resistant. Flood risk is also reduced, protecting public and private infrastructure.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
P. Recreation.				
Would the project:				
a) 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?	☐	☐	☐	☒
b) 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?	☐	☐	☐	☒

Discussion: The project area is located on public and private lands on floodplains and riparian areas. Project activities will have no impact on the use of parks or other recreational facilities. No facilities are being built or modified by the project.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Q. Transportation.				
Will the Project:				
a) Conflict with a project, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion: All project work will occur within floodplains and riparian areas. No impacts to transportation or traffic will occur. The execution of Project work will not increase traffic or delay traffic flows within the Project area.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
R. Tribal Cultural Resources.				
Would the project:				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is::				
i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section5020.1(k), or	☐	☒	☐	☐
ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Discussion: Hand cutting and removal of aboveground biomass and herbicide treatment of non-native plants are unlikely to disturb soil or impact belowground resources. Revegetation activities may cause minor soil disturbance. Significant disturbance of soil will not occur- no grading, grubbing or other mechanized movement of soil will take place. In the Capay Valley area, biomass reduction by mowing with tractors will occur on large contiguous stands. The tractor tires have the potential to cause some soil disturbance. To preserve and avoid Tribal Cultural Resources, mitigation measure TCR-1 will be followed. If any Cultural Resources were

inadvertently uncovered or observed during project work, mitigation measures TCR-2, TCR-3 and TCR-4 would be followed. Consultation will be an ongoing process with both the YCRCD and the local Tribe working to protect and preserve cultural resources. With incorporation of Mitigation Measures TCR-1, TCR-2, TCR-3, TCR-4, and TCR-5 this impact will be reduced below a level of significance.

TCR-1: Cultural Sensitivity Training sessions will be conducted for each field crew to inform them about the types of cultural resources that could be present within the Putah-Cache Watershed Arundo Eradication Program area and the steps to take in the event one is found. A ground survey before and after mowing will also occur.

TCR-2: In the Capay Valley, a cultural resources study will be conducted by an archaeologist who meets the Secretary of the Interior's standards prior to ground disturbances. Work activities near identified sites will be assessed to determine what invasive plant control methods are used at the site to protect any cultural resources, or if work cannot occur at the site.

TCR-3: If any previously unevaluated cultural resources (i.e., burnt animal bone, midden soils, projectile points or other humanly-modified lithics, are encountered, work will be stopped, and a qualified archaeologist will make an assessment of the discovery and recommend/implement mitigation measures as necessary. Notification of findings to the Tribal Contact will occur.

TCR-4: If any human remains are encountered during any phase of work, work will stop immediately within that area. The Yolo County Coroner's Office will be contacted to determine whether investigation of the cause of death is required as well as to determine whether the remains may be Native American in origin. Should Native American human remains be found, the determination of Most Likely Descendant (MLD) under California Public Resources Code Section 5097.98 will be made by the Native American Heritage Commission (NAHC). If the location of the site and the history and prehistory of the area is culturally-affiliated with the Yocha Dehe Wintun Nation (Tribe), the NAHC will contact the Tribe; and a tribal member will be designated by the Tribe to consult with the landowner and/or the RCD. Should the NAHC determine that a member of an Indian tribe other than Yocha Dehe Wintun Nation is the MLD, and the Tribe is in agreement with this determination, representatives of the people of the MLD and a qualified archaeologist would make an assessment of the discovered and recommend/implement mitigation measures as necessary.

TCR-5: In the event that Native American human remains are found during any phase of work, the Tribe or member of the Tribe is determined to be the MLD pursuant to CR-3. The Medical Examiner will immediately be notified, ground disturbing activities in that location will cease and the Tribe will be allowed, pursuant to California Public Resources Code Section 5097.98(a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and grave good should be treated and disposed of with appropriate dignityThe Tribe will complete its inspection and make its MLD recommendation within forty-eight (48) hours of obtaining access permissions to the site. In coordination and agreement with landowners, the Tribe will have the final determination as to the disposition and treatment of human remains and grave goods. Reburial of human remains will be accomplished in compliance with the California Public Resources Code Sections 5097.98(a) and (b)The term "human remains" encompasses more than human bones because the Tribe's traditions call for burial of associated cultural items with the deceased (funerary objects), and/or the ceremonial burning of Native American human remains, funerary objects, grave goods and animals. Ashes, soils and other remnants of these burning ceremonies, as well as associated funerary objects and unassociated funerary objects buried with or found near Native American remains are to be treated in the same manner as bones or bone fragments that remain intact. Procedures for the treatment of Native American human remains, grave goods, ceremonial items, and items of cultural patrimony have formalized treatment protocol developed by the Yocha Dehe Cultural Resources Committee as part of their Treatment Protocol for Handling Human Remains and Cultural Items Affiliated with the Yocha Dehe Wintun Nation.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
S. Utilities and Service Systems.				
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the waste water 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?	☐	☐	☐	☒
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion: The project will not create a wastewater discharge, require or result in the construction of new water or wastewater treatment facilities, or require or result in the construction of new storm water drainage facilities. All target non-native invasive biomass will either be treated and left on site (scattered patches) or cut and chipped (spread in footprint of stand or disturbed area). If there is not sufficient appropriate space on the project site (a rare occurrence in arundo management projects), chipped material may be transported to landfills where it will not substantially impact land fill space. Cut vegetative material will be removed from the stream channel and chipped and spread on site in consultation with landowners and using Yolo County approved methods. Although the volume of material that could be chipped is not known with certainty at this time, it is not expected to create a solid waste disposal issue. In Capay Valley, on Cache Creek, arundo and tamarisk stands will be mowed in place. No mowing will occur within 10 feet of the low flow channel.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
T. Wildfire.				
Would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

Discussion: The project will control non-native target species in riparian areas. Target stands of vegetation >1/4 acre will usually be cut and chipped. In Capay Valley, on Cache Creek, stands will be mowed. The control of this vegetation will not create a fire risk. Arundo is highly flammable and its reduction will significantly reduce fire risk. No roads or infrastructure will be built, and no wildfire emergency response or evacuation plans will be impacted. Downstream flooding risk should be reduced as flow capacity will be enhanced/restored by reducing biomass.

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
U. Mandatory Findings of Significance.				
Would the project:				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion:

a) Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?

Habitat quality of flora and fauna are protected by measures to protect natives outlined in Section F of the IS. Several special status species have the potential to occur in the Project area. Through the removal of invasive plant vegetation and the appropriate use of registered aquatic approved herbicides, impacts to some of these listed species could occur. Mitigation Measures were developed in order to reduce potentially significant impacts to special status species. As a result, the implementation of these Mitigation Measures Bio--1, Bio--2, and Bio--3 will reduce the impacts of Project work on native species found within the Project area to a below a level of significance.

b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Project.)

There are no known federal, state or private projects within the vicinity of this project other than normal land management operations on private land, along with County road maintenance. Within the Project areas, the land use is largely rural and agricultural such as orchards and row crops. Agriculture is one of the main economic industries in Yolo County, which produces approximately $650 million annually in agricultural commodities (Yolo County Agricultural Commissioner, 2017). Farming practices in the area usually include pesticide application to prevent crop loss from invasive weeds and pests. The herbicides used for this Project to remove arundo and other riparian non-native plants (glyphosate, imazapyr or triclopyr) are currently being used on agricultural land throughout Yolo and Solano County. Although this Project will also be using these herbicides, it is anticipated that the amount of chemicals applied will be small and localized compared to the large-scale use on orchards and farms. From a cumulative effect's perspective, the project is believed to be contributing an insignificant amount of herbicide exposure.

Importantly, the removal and control of non-native riparian plant species will improve the overall health, function and natural species diversity found within the creek and river system's riparian corridor. In order to prevent negative impacts during the execution of this watershed improvement project, an array of Mitigation Measures have been developed that will reduce such impacts to below a level of significance level. In addition, Project work will only occur within a small portion of the Project area and there are no other large-scale herbicide related invasive species control projects currently being completed or planned.

c) Would the Project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

The glyphosate, imazapyr and triclopyr herbicides selected for this project pose insignificant risks to persons who may be in the Project area during, and after, the application period. The potential for off-target movement of the herbicide and surfactant products during and after the project period is very low. This is due primarily to application methods being used (targeted ground-based applications with hand-held equipment), the use of certified applicators, and the relatively small amounts of chemicals that will be used.

VII. Appendix 1

Plants				Listing		
Common Name	**Scientific Name**	**Habitat**	**Distribution in Project Area**	**Fed**	**State**	**CNPS**
adobe-lily	Fritillaria pluriflora	Chaparral, Valley Grassland, Foothill Woodland	Dixon. Not in Project Area			1B.2
Baker's navarretia	Navarretia leucocephala ssp. bakeri	meadows, vernal-pools	Wolfskill Station, Northwest Solano County. Not in Project Area			1B.1
bearded popcornflower	Plagiobothrys hystriculus	vernal-pools	Two miles NE of Dozier Station, and the junction of Brown and Robben Roads. Not in Project Area.			1B.1
bent-flowered fiddleneck	Amsinckia lunaris	Valley Grassland, Foothill Woodland	Grade on Rumsey-Arbuckle Road. Not in Project Work Area.			1B.2
Brewer's western flax	Hesperolinon breweri	Chaparral, Valley Grassland, Foothill Woodland	Gates Canyon, Vaca Mountains. Not in Project Area.			1B.2
Colusa layia	Layia septentrionalis	Chaparral, Valley Grassland, Foothill Woodland	Near College City, Sacto Valley. Not in Project Area			1B.2
Crampton's tuctoria or Solano grass	Tuctoria mucronata	vernal-pools	Davis Air Force Communication Facility, East of Rd 104 between Rd 34 and 35, 4 miles S of I-80. Not in Project Work Area	FE	FE	1B.1
Delta tule pea	Lathyrus jepsonii var. jepsonii	freshwater-marsh, brackish-marsh	Barker Slough. Calhoun Cut and Lindsay Slough, about 1-1.5 miles up each slough from their mutual confluence. Not in Project Area.			1B.2
dwarf downingia	Downingia pusilla	Vernal pools	West of the I-5 Elk Grove Blvd interchange, Elk Grove. Not in Project Area.			2B.2
green jewelflower	Streptanthus hesperidis	Foothill, serpentine	Along Rieff-Rayhouse Road, 0.1 miles west of Yolo County Line, near Morgan Valley. Not in Project Area.			1B.2
Hall's harmonia	Harmonia hallii	Chaparral	North of Knoxville at the Southeast end of Little Blue Ridge. Two miles NE of Dozier Station, and the junction of Brown and Robben Roads. Not in Project Area.			1B.2
Jepson's coyote-thistle	Eryngium jepsonii	wetland-riparian, very wet areas	Glide-Tule Ranch, 2.5 miles SSE of intersection of Rd. 105 and Rd. 38, Yolo County. Not in Project work area.			1B.2
Jepson's leptosiphon	Leptosiphon jepsonii	Foothills	Tuleyome Ireland Ranch, between Salt Creek and Enos Creek, just north of Wild Cow Mtn., NW of Winters. Not in project Area.			1B.2
Jepson's milk-vetch	Astragalus rattanii var. jepsonianus	Valley Grassland, Foothill Woodland	0.5 mile NW of Knoxville. Not in Project Area.			1B.2

legenere	Legenere limosa	vernal-pools	About 1.5 miles E of Stone Lake, 1.4 miles SW of junction of Franklin Blvd. and Elk Grove Blvd. Not in Project Area.			1B.1
Mason's lilaeopsis	Lilaeopsis masonii	riparian, freshwater-marsh, brackish-marsh	Along the Sacramento Deep Water Channel from Prospet Island to North to the vicinity of Garcia Bend. Not in Project Area.		Rare	1B.1
Peruvian dodder	Cuscuta obtusiflora var. glandulosa		6104 Doubloon Ct., Laguna Lake, N of Elk Grove Blvd., W of Foulks Ranch Road, Elk Grove. Not in Project Area.			2B.2
pink creamsacs	Castilleja rubicundula var. rubicundula	High elevation, upland	Knoxville Ridge. Not in Project Area.			1B.2
recurved larkspur	Delphinium recurvatum	Shadscale Scrub, Valley Grassland, Foothill Woodland	North end of Browns Valley, N of Vacaville. Not in Project Area.			1B.2
San Joaquin spearscale	Extriplex joaquinana	Shadscale Scrub, Valley Grassland: Occurs usually in non wetlands, occasionally in wetlands	Near Dunnigan. Not in work area			1B.2
Sanford's arrowhead	Sagittaria sanfordii	freshwater-marsh	Slough along N side of American River, between Southern Pacific RR tracks and pumping station, Sacto. Not in project Area.			1B.2
Suisun Marsh aster	Symphyotrichum lentum	freshwater-marsh, brackish-marsh	Sacto River Deep Water Channel, approx. 2.2 to 4.5 miles NNE of junction with Cache Clough South end Yolo Bypass. Not in Project work area.			1B.2
two-fork clover	Trifolium amoenum	Valley Grassland, wetland-riparian	Vacaville. Not in Project Area.	FE		1B.1
watershield	Brasenia schreberi	Aquatic, floating	Stone Lake duck club, 1 mile N of Lambert Rd. near Courtland. Not in project work area.			2B.3

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