BUREAU OF RECLAMATION

Del Puerto Canyon Reservoir Project
Draft Environmental Impact Statement
California Great-Basin

U.S. Department of the Interior December 2025

BUREAU OF
RECLAMATION

Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Cover Photo – Artist rendering of the proposed Del Puerto Canyon Reservoir

Del Puerto Canyon Reservoir Project Draft Environmental Impact Statement

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California Great-Basin

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Bureau of Reclamation

Interior Region 10. California-Great Basin

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ES-1 Introduction

The Del Puerto Water District (DPWD) and the San Joaquin River Exchange Contractors Water Authority (SJRECWA) (Project Sponsors) propose to construct a new offstream storage reservoir in the foothills of the Coast Range Mountains west of Interstate 5 in Stanislaus County near Patterson, California.

Due to natural conditions in California, the amount of water available for Central Valley Project (CVP) water users south of Delta can be extremely variable year-to-year. Due to the variability in California's climate and consequent limitations on water availability in some water year types, the DPWD routinely receives less than its U.S. Department of the Interior, Bureau of Reclamation (Reclamation) contracted annual allocation of up to 140.21 thousand acre-feet (TAF) of CVP water. Similarly, the SJRECWA has a water rights exchange contract up to 840 TAF, and in critical water years, receives 75 percent of the contract amount. The limited availability of storage south of Delta for CVP supplies means that the Project Sponsors cannot fully realize their water conservation investments, which are most valuable when the water saved can be stored for use in drier years. Local water storage capacity would improve reliability of available CVP supplies, subject to CVP water rights and federal and state laws, by storing CVP water for beneficial use during drier water years.

The Project received Reclamation's Water Infrastructure Improvements for the Nation (WIIN) Act funding to complete a feasibility study. As a State-led project pursuant to the WIIN Act, a consistency determination from the California Water Commission and request for Federal support from the State of California Governor were required. In 2019, the California Water Commission determined that the Del Puerto Canyon Reservoir (DPCR) is consistent with the California Water Quality, Supply, and Infrastructure Improvement Act (Proposition 1), and the Governor of the State of California requested Federal support for the Project.

This Draft Environmental Impact Statement (DEIS) references the Del Puerto Canyon Reservoir Final Environmental Impact Report (DPCR FEIR) as appropriate. The FEIR was published in 2020 and certification of the EIR is pending.

ES-2 Purpose of and Need for Action

The purpose of the proposed Project is to develop additional South of Delta water storage to maximize the management and efficient use of existing water supplies in both DPWD and the SJRECWA service areas in a manner that is consistent with WIIN Act requirements and Reclamation law, as well as environmental purposes, including water supply for wildlife refuges designated under the Central Valley Project Improvement Act (CVPIA), and flood damage reduction.

The need for the Project is driven by persistent water supply challenges within the DPWD service area. This area is frequently allocated less than the full contracted CVP water amount which results in reduced agricultural activity, economic hardship for end water users, and increased reliance on groundwater pumping. These shortages routinely occur during dry and critically dry years, with an average annual water shortfall of 86 TAF (**Table 1.1-1)**. A broader, regional need exists for additional water storage to support the South of Delta Drought Plan, supported by the DPWD and SJRECWA. Additionally, subsidence reduces the capacity of the Delta-Mendota Canal (DMC) to convey water supply deliveries to contractors dependent on that supply. Increasing water storage capacity could alleviate some of the conveyance constraints caused by subsidence. The Project supports the need to diversify Level 2 refuge water sources in order to minimize possible adverse effects upon CVP contractors and further make available Incremental Level 4 refuge water to CVPIA refuges.

ES-3 Proposed Federal Actions

For DPWD and SJRECWA to construct and as authorized operate the proposed Project, Reclamation would need to complete several actions, including entering into a Partnership Agreement for the Project pursuant to the WIIN Act, adding a point of rediversion to storage to Reclamation's water rights, preparing and executing, as appropriate, any necessary agreements with DPWD and the SJRECWA for a new diversion point off of the DMC, management of refuge water, and approving use authorizations related to construction of a Diversion/Outfall facility and modifications to the DMC pursuant to 43 CFR 429- *Use of Bureau of Reclamation Land, Facilities, and Waterbodies*. In addition, Reclamation may provide an investment in the Project consistent with the authorities provided under the WIIN Act.

ES-4 Project Alternatives

This EIS assesses the potential environmental impacts of the five alternatives under consideration: The No Action Alternative and four Action Alternatives. The purpose of the No Action Alternative is to serve as a benchmark against which the effects of the Action Alternatives may be evaluated. No action is defined as those conditions that would result in no construction of a new off-stream surface water storage project. The No Action Alternative is further described below.

The DEIS considers the No Action Alternative and a reasonable range of practicable alternatives for the proposed Project/Action, including:

ES-4.1 Alternative 1 (No Action)

Alternative 1 is the No Action Alternative, under which a new reservoir would not be constructed. The No Action Alternative considers expected conditions in the vicinity of the Project site in the foreseeable future if the Project were not constructed, based on current plans and consistent with available information.

ES-4.2 Alternative 2 (DPCR 82 TAF)

Under this alternative, an 82-TAF reservoir would be constructed in Del Puerto Canyon, including diversion/outfall structure at DMC, conveyance from the DMC to the reservoir, main dam, two

saddle dams, spillway, and inlet/outlet works, with Reclamation investment of up to 25 percent of Project costs, commensurate with federal benefits.

ES-4.3 Alternative 3 (Limited Action)

Under this alternative, an 82-TAF reservoir would be constructed in Del Puerto Canyon, including diversion/outfall structure at DMC, conveyance from the DMC to the reservoir main dam, two saddle dams, spillway, and inlet/outlet works, without investment from Reclamation. Under this alternative, federal benefits would not be available as they are dependent on federal investment in the Project.

ES-4.4 Alternative 4 (DPCR 40 TAF)

Under this alternative a 40-TAF reservoir would be constructed in Del Puerto Canyon, including the main dam, any required saddle dams, spillway, and inlet/outlet works, with Reclamation investment in the Project consistent with the authorities provided under the WIIN Act, commensurate with federal benefits.

ES-4.5 Alternative 5 (Ingram Canyon)

Under this alternative, a 40-TAF reservoir would be constructed in Ingram Canyon, including a dam, spillway, and inlet/outlet works with Reclamation investment in the Project consistent with the authorities provided under the WIIN Act, commensurate with federal benefits.

In construction projects such as the one proposed, it is common to make refinements to final designs during construction. The alternatives contain sufficient information to capture all of the impacts of the alternatives; however, the elements analyzed in detail may evolve before construction design is finalized. Reclamation would conduct additional environmental analyses as needed to address the impacts of any design changes not analyzed in this EIS. For example, this documentation could include a determination of NEPA adequacy, a categorical exclusion, a supplemental environmental assessment, or a supplemental EIS. Reclamation may also combine elements from different alternatives into the final design, rather than implementing a single complete alternative analyzed in this EIS.

ES-5 Alternatives Considered but Eliminated

ES-5.1 Additional Conservation

The Project Sponsors have worked for years to conserve water resources and maximize efficiency of their irrigation practices. Nearly all permanent crops and many of the row crops grown in the DPWD service area are irrigated by high-efficiency sprinkler or drip irrigation systems. DPWD has supported conservation efforts by providing low interest loan funding for the installation of high efficiency irrigation systems, including both micro-sprinkler and drip emission systems. Similarly, the SJRECWA is dedicated to conservation and sustainable use of water. SJRECWA members invest in conservation programs, assist farmers undertaking conservation projects with low interest loans and grants, work to improve on-farm irrigation practices, and invest in new canal delivery technology to conserve water. Conservation efforts would continue absent the Project, but without access to local storage, additional conservation would not yield an increase in water supply reliability.

ES-5.2 Water Transfers

DPWD has used water transfers during times of water shortage, but buying enough water to keep crops growing through temporary transfers has become more difficult every year as the cost of water purchases increase and water availability decreases. The Project Sponsors will continue to use water transfers as appropriate, but transfers would not meet the objectives of the Project. Additional local storage is needed for optimal management of available water supplies and without storage, water transfers alone may not meet local needs regardless of availability and affordability.

ES-5.3 Groundwater Storage

Both Project Sponsors are pursuing groundwater recharge and storage projects; they have jointly developed a project for recharge and recovery on Orestimba Creek (which can capture up to 3.5 TAF of water each year and store up to 10 TAF, not all of which comes from the creek), and the SJRECWA are developing a similar much smaller project on Los Banos Creek. Groundwater storage projects do not provide sufficient storage to meet the Project purpose and need, so surface storage must be pursued in tandem to meet Project objectives to effectively manage existing supplies. The Project Sponsors experience an annual average shortfall in CVP water supply of 82 TAF, and they propose to construct up to 82 TAF of storage. The Project Sponsors will continue to pursue groundwater storage, but this would not replace the need for surface storage because recovery rates and acreage of farmland lost are substantial limiting factors.

ES-5.4 Alternative Reservoir Locations

The Project Sponsors considered 14 alternative storage locations potentially capable of achieving the Project purpose and need. Two reservoir locations were selected for inclusion in this EIS: Del Puerto Canyon and Ingram Canyon. The other reservoir locations were evaluated and screened out based on their suitability relative to the Project's purpose. A discussion of the screening process for reservoir sites is presented in Section 4.6 of the Del Puerto Canyon Reservoir EIR.

ES-6 Summary of Environmental Consequences

The purpose of the environmental consequences analysis is to describe the anticipated environmental and socioeconomic impacts that would result from each alternative, including the No Action Alternative. Chapter 3, Affected Environment and Environmental Consequences, presents the potential impacts on the human and natural environment that could occur from implementing the alternatives. Key findings of the impact analysis of the Action Alternatives are summarized in **Table ES-1.1-1**, below. Under the No Action Alternative, the Project Sponsors would seek to develop additional surface water resources but would expect continued water supply shortages, leading to land fallowing and associated visual and land use impacts.

ES-7 Preferred Alternative

Alternative 2 (DPCR 82 TAF) is the preferred alternative based on several factors evaluated in the engineering and economic study and this Draft EIS. Alternative 2 provides the needed storage capacity at a location that serves the needs of the Project Sponsors.

While Reclamation has identified a preferred alternative in this Draft EIS, final selection of an alternative will not occur until the Record of Decision. The decision on the alternative to implement will consider public comments and the full analysis in the Final EIS.

Table ES-1.1-1: Summary of Environmental Consequences from Action Alternatives

Resource	Key Findings
Aesthetics	All Action Alternatives would result in permanent changes to the visual landscape within the two canyons under consideration for the reservoir through flooding of the canyons compared to the No Action. Alternatives 2, 3, and 4 would result in a dam visible from Interstate 5 (I-5), a State Scenic Highway. Alternative 5 would result in a dam that would not be visible from I-5 or other public roadways. Lighting would be required for nighttime construction, expected during the dam construction and as-needed for construction of the other facilities, though Environmental Protection Measures (EPMs) would minimize impacts of lighting during construction. Permanent security lighting would be limited.
Agriculture	Although the Action Alternatives would result in a permanent loss of important farmland compared to the No Action, agriculture would remain the predominant land use in the area surrounding the proposed Project. The Action Alternatives would not induce residential, commercial, or industrial development in the surrounding area and would not cause conversion of adjacent sites to non-agricultural uses. Construction and operation of the proposed Project is also considered a compatible use for agricultural land in the county zoning code. The Project would benefit agricultural lands in Stanislaus County and elsewhere by improving water supply reliability which would reduce the potential for land conversion throughout the Project Sponsors' service areas. Therefore, the proposed Project would overall provide a benefit to agriculture compared to the No Action.
Air Quality	All of the Action Alternatives would have impacts on air quality, but Alternatives 2 and 3 would have higher construction-related emissions of fugitive dust and other criteria air pollutants such as carbon dioxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOC) and diesel particulate matter than Alternatives 4 and 5. NO_X emissions of Alternatives 2 and 3 would be 78 percent and 62 percent higher than Alternative 4 and 5, respectively. CO emissions of Alternatives 2 and 3 would be 61 percent and 54 percent higher than Alternative 4 and 5, respectively. NO_X and CO emissions would require implementation of EPMs to reduce emissions.
Biological Resources Terrestrial	All of the Action Alternatives could result in permanent and temporary habitat loss for special-status plant and wildlife species, but impacts would be minimized through implementation of EPMs. All Action Alternatives would result in permanent loss of riparian woodland and state or federally protected wetlands and other waters. All Action Alternatives would affect wildlife movement and wildlife corridors. Loss of habitat and effects on wildlife movement would be minimized by implementation of EPMs. Alternatives 2 and 3 would have greater impacts on terrestrial biological resources than Alternatives 4 and 5.
Biological Resources Aquatic	Under Alternatives 2, 3 and 4, potential long-term impacts on the supply of coarse-grained sediment to the San Joaquin River may occur, resulting in impacts on white sturgeon spawning habitat compared to the No Action. However, implementation of EPMs would reduce impacts on white sturgeon spawning habitat by augmenting gravel supplies as necessary to maintain existing contributions of gravel to the San Joaquin River. Implementation of Best Management Practices (BMPs) would minimize construction-related impacts for all Action Alternatives. Action alternatives would have minimal impacts on fish resources.
Cultural Resources	All Action Alternatives would result in adverse effects to previously identified archaeological sites. Although EPMs would be implemented to minimize adverse effects, the loss of these resources could not be avoided. The Action Alternatives would not result in adverse effects on architectural built-environment resources compared to the No Action.
Energy Resources	None of the Action Alternatives would have substantial impacts on energy resources compared to the No Action, but Alternative 5 would require more operational energy use than Alternatives 2, 3 and 4.
Geology and Soils	Impacts associated with geologic hazards would be localized and addressed with appropriate geotechnical design under all Action Alternatives. Because EPMs would reduce geology and soils impacts during construction and operation, the Action Alternatives would not result in unacceptable impacts associated with geotechnical risks compared to the No Action.
Hazards and Hazardous Materials	Impacts from hazards and hazardous materials would be short term under all Action Alternatives. EPMs would reduce hazards and hazardous materials impacts.

Hydrology and Water Quality	All Action Alternatives would implement a Stormwater Pollution Prevention Plan (SWPPP) to mitigate construction impacts to hydrology and water quality. Alternatives 2, 3 and 4 would reduce flows available for the City of Patterson's stormwater capture project and would prevent 100-year flow events from Del Puerto Creek. Operation of those alternatives would divert flow from Del Puerto Creek, which would reduce groundwater recharge from the creek, but would contribute to recharge from the stored water in the reservoir. Alternative 5 would not affect the City of Patterson stormwater capture project and would not reduce flooding on Del Puerto Creek. In the unlikely event of a dam breach, flooding would occur in areas downstream of any of the proposed dams. However, the dams would be designed and constructed to withstand seismic activity per the Division of Safety of Dam standards and applicable Federal guidelines, making dam failure extremely unlikely. None of the Action Alternatives would be expected to have a measurable impact on CVP or SWP operations.
Land Use and Recreation	Implementation of the Action Alternatives would be consistent with existing land use.
Traffic and Transportation	Impacts on traffic and transportation would include substantial short-term construction traffic that could cause an increase in vehicle delays during the evening peak hour at I-5 off ramps under all Action Alternatives. EPMs would ensure that traffic hazards during construction are minimized under all Action Alternatives. Alternatives 2-4 would reduce vehicle miles traveled for residents west of the Del Puerto Canyon reservoir site compared to the No Action. However, under the Alternative 5, residents west of Ingram Canyon would experience much greater travel distances, which would result in longer emergency response times compared to the No Action.
Utilities	Alternatives 2-4 require utility relocations, including relocation of high voltage transmission lines and a petroleum pipeline. This involves moving transmission line towers and adding new steel towers and wooden poles. PG&E is consulting on the relocations to avoid service disruption. Relocating utilities would have environmental impacts, including construction traffic and potential loss of agricultural lands. Alternative 5 would not require relocation of high voltage transmission lines.
Socioeconomics	All Action Alternatives are expected to provide substantial socioeconomic benefits to the service areas of the Project Sponsors by enhancing water supply reliability and supporting agricultural productivity. Benefits would be greatest for Alternatives 2,and 3, which provide the greatest amount of storage and water supply reliability.

1 Introduction

This Draft Environmental Impact Statement (DEIS) was conducted to fulfill National Environmental Policy Act (NEPA) requirements. Cooperating agencies pursuant to NEPA for the DEIS include the U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers (USACE).

1.1 Background

The Department of Interior, Bureau of Reclamation (Reclamation) owns the federal Central Valley Project (CVP), a complex, multi-purpose network of facilities managed to supply water to urban and agricultural users, produce electrical power, provide recreational opportunities, reduce flood risk, and provide water to restore and protect fish and wildlife and enhance water quality.

Due to natural conditions in California, the amount of water available for CVP users south of the Sacramento-San Joaquin Delta (Delta) can be extremely variable year-to-year. Water supplies are moved through the Trinity, Sacramento and American River basins and through the Delta in accordance with Central Valley Project permits and agreements. Regulatory restrictions require maintenance of Delta outflows. The resulting fluctuation in available water supply often results in less than 100 percent allocations to CVP Delta and south-of-Delta contractors. For this reason, most south-of-Delta CVP contractors have other water supplies to supplement their CVP contracts and the CVP is not considered to fully meet water needs south of Delta in any year. Shortages in water can result in land fallowing, crop damage and crop loss, increased groundwater pumping and associated land subsidence, and economic hardship for the region.

1.1.1 Current Status of CVP Water Deliveries for the DPWD and SJRECWA

The Del Puerto Water District (DPWD) and the San Joaquin River Exchange Contractors Water Authority (SJRECWA) are CVP contractors that supply agricultural users within their contract service areas. DPWD relies primarily on CVP supplies but also obtains water from groundwater and recycled water from the North Valley Regional Recycled Water Program. DPWD's contract with Reclamation allows for delivery of up to 140.21 thousand acre-feet (TAF) of CVP water each year. The SJRECWA also relies on CVP supplies in concert with groundwater. The SJRECWA's water rights settlement contract with Reclamation guarantees delivery of up to 840 TAF of CVP water each year (in exchange for their San Joaquin River entitlements) except in the driest of years. Due to the variability in California's climate and consequent limitations on water availability in some water year types, Reclamation frequently delivers less than the full contracted water amount to the DPWD. In the severe droughts of 2014, 2015, 2021, and 2022 when CVP water rights were curtailed, DPWD received no CVP water as water deliveries were limited to settlement contracts and public health and safety needs. The table below (**Table 1.1-1**) shows that for the 24-year period through 2024 there are many years when the Project Sponsors did not receive their full allocation of water. DPWD anticipates no more than 35 percent allocation of its CVP contract supply on average across all water years. Similarly, the SJRECWA's annual allocation is reduced to 75 percent, or 650 TAF in critically dry water years. **Table 1.1-1** shows the annual shortfall, which is the amount of each Project Sponsor's contractual amount that was not delivered each year.

Table 1.1-1: Historic Annual CVP Allocation and Shortfalls

Year	Water Year Type	% CVP Allocation to DPWD [a]	% CVP Allocation to SJRECWA	DPWD Annual Shortfall (TAF)	SJRECWA Annual Shortfall (TAF)	Total Annual Shortfall (TAF)
2001	Dry	49%	100%	72	0	72
2002	Dry	70%	100%	42	0	42
2003	Below Normal	75%	100%	35	0	35
2004	Dry	70%	100%	42	0	42
2005	Wet	85%	100%	21	0	21
2006	Wet	100%	100%	0	0	0
2007	Critically Dry	50%	100%	70	0	70
2008	Critically Dry	40%	100%	84	0	84
2009	Below Normal	10%	100%	126	0	126
2010	Above Normal	45%	100%	77	0	77
2011	Wet	80%	100%	28	0	28
2012	Dry	40%	100%	84	0	84
2013	Critically Dry	20%	100%	112	0	112
2014	Critically Dry	0%	65%	140	84	224
2015	Critically Dry	0%	54% [b]	140	176	317
2016	Dry	5%	100%	133	0	133
2017	Wet	100%	100%	0	0	0
2018	Below Normal	50%	100%	70	0	70
2019	Wet	75%	100%	35	0	35
2020	Dry	20%	100%	112	0	112
2021	Critically Dry	0%	71% [b]	140	34	174
2022	Critically Dry	0%	75%;	140	0	140
2023	Wet	100%	100%	0	0	0
2024	Above Normal	50%	100%	70	0	70
Average						86

Sources: [a] Source for most allocation data is https://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf.
[b] Source for percent allocation is SJRECWA end of year accounting records
DPWD shortfall is based on difference from receiving 100% of allocation, SJRECWA shortfall is based on difference from contracted amount, which is 75% of total allocation in critically dry years
Water Year Type is based on San Joaquin Valley Index.

1.1.2 Water Reliability in DPWD and SJRECWA CVP contracts

CVP Settlement contracts designate water years as critical or non-critical based on the amount of inflow into Lake Shasta. Critical water years or "Shasta critical" years are years in which inflow to Lake Shasta is at or below 3.2 million acre-feet. In those years the SJRECWA receives 75 percent of their contracted amount. This lack of CVP water resulted in fallowing of 11,410 acres in 2014 and

4,472 acres in 2015 in the SJECWA's service area. In 2021 and 2022, deliveries were also below the Shasta-critical 75 percent amount. In these critical water years, users within the SJRECWA pump up to 84 TAF more water from groundwater than in non-critical water years. Increased use in groundwater can lead to groundwater overdraft and land subsidence.

CVP repayment contracts, such DPWD's, contain a shortage provision linked to the priority of meeting CVP Settlement contracts and other legal requirements. CVP water shortages result in increased land fallowing, crop damage and crop loss, increased groundwater pumping, and higher water costs that create economic hardship for growers and negatively impact the economy of the DPWD service area (DPWD 2008). Extensive fallowing has occurred in recent years. Between 2001 and 2018, the fallowed acreage ranged from 5,600 acres in 2002 to a high of 15,000 acres in 2015, representing approximately 25 percent of the 45,000 acres of farmland within the DPWD service area.

1.1.3 Refuge Water Supply

Wildlife refuges require consistent water deliveries to ensure the success of optimal wetland habitat development. Reclamation currently funds water acquisitions for the refuges through the Central Valley Project Improvement Act (CVPIA) Restoration Fund. The CVPIA stipulates full water deliveries as 555,515 AF annually. Refuge water supplies are characterized as Level 2, Incremental Level 4 and Full Level 4. Level 2 represents the historical average amount of water deliveries prior to CVPIA enactment in 1992 and is the baseline water required for wildlife habitat management. Incremental Level 4 represents the additional increment of water required for optimal wetland habitat development. Full Level 4 water delivery is satisfied when both Level 2 and Incremental Level 4 supply requirements are met in full. Almost all Level 2 supplies are secured annually due to long-term water contracts mandated by the CVPIA with Reclamation. Incremental Level 4 purchases require willing sellers, with CVPIA being able to purchase around 43 percent between 2005 and 2014 (CDFWa 2021),

1.1.4 California Environmental Quality Act

DPWD and SJRECWA have identified a need to improve water supply reliability in critical water years to minimize the negative economic and environmental impacts of reduced CVP water deliveries in their service areas. DPWD and SJRECWA finalized a FEIR for the DPCR in October 2020. The FEIR described the rationale for rejecting several alternative methods to address the lack of water supply reliability, including additional conservation, water transfers, groundwater storage, and storage locations at fourteen different sites south of Delta and north of the San Luis Reservoir.

The EIR presented the construction of the 82-TAF DPCR as the proposed Project under California Environmental Quality Act (CEQA) regulations. The proposed Project would improve water supply reliability by allowing CVP water supply to be stored in wet years and subsequently released for use as needed in critically dry years.

1.1.5 Water Infrastructure Improvements for the Nation Act (WIIN Act)

DPWD and SJRECWA submitted a feasibility report seeking a determination from the Secretary of the Interior that the DPCR is "technically and financially feasible and provides Federal benefit in accordance with Reclamation laws" in accordance with Sections 4007(c)2(B) of the WIIN Act.

Reclamation evaluated the feasibility of the 82 TAF reservoir in Del Puerto Canyon in the November 2020 Del Puerto Canyon Reservoir Feasibility Report and the Secretary of the Interior

found the Project feasible. The DPWD and SJRECWA's Del Puerto Canyon EIR and Feasibility Report evaluated Reclamation receiving 11.3 TAF of water storage and use for CVPIA designated wildlife refuges, and an average of 9.8 TAF of Incremental Level 4 refuge water for storage or use.

Under the WIIN Act Section 4007, the Secretary of the Interior through Reclamation may fund up to 25 percent of the total project cost of State-led water storage projects if the project meets the following criteria: (1) Secretary of the Interior participation in the project has been requested by the Governor of the State in which the State-led storage project is located [WIIN § 4007 (c)(2)(A)], (2) the State determines and the Secretary of the Interior concurs that the project is technically and financially feasible, and provides a Federal benefit [WIIN § 4007 (c)(2)(B)(i)], (3) sufficient non-federal funding is available to complete the State-led storage project [WIIN § 4007 (c)(2)(B)(ii)], (4) the State-led storage project sponsors are financially solvent [WIIN § 4007 (c)(2)(B)(iii)], and a proportional share of the project benefits are Federal benefits, including water supplies dedicated to environmental purposes and wildlife refuges[WIIN § 4007 (c)(2)(C)].

1.2 Study Authority

Reclamation is authorized to conduct this study under the Reclamation Act of 1902 (Public Law [P.L.] 57-161, 32 Stat. 388, June 17, 1902). The Act, as amended and supplemented, authorizes Reclamation to manage and develop innovative water management tools and partnerships to meet the growing demand for water in the American West. Reclamation is also providing funding under the Water Infrastructure Improvements for the Nation (WIIN) Act.

1.3 Proposed Project

Del Puerto Water District (DPWD) and the San Joaquin River Exchange Contractors Water Authority (SJRECWA), have proposed to construct a reservoir in the foothills of the Coast Range Mountains west of Interstate 5 in Stanislaus County near Patterson, California (**Figure 1.5-1**). The figure shows the inundation areas of the two alternative locations for the proposed Project, one in Del Puerto Canyon and an alternative location in Ingram Canyon.

The proposed reservoir would provide locally owned off-stream storage south of Delta. Water would be diverted from the DMC and stored within the proposed reservoir when available under CVP water rights and withdrawn from the reservoir for use during dry periods. The DMC is a component of the CVP, operated and maintained by the San Luis & Delta-Mendota Water Authority under a contract with Reclamation. Components of the Project would include the main dam, saddle dams as needed (depending on size and location of the reservoir), conveyance facilities to transport water to and from the DMC, a pump station and related electrical facilities. Some alternatives would require relocation of a portion of Del Puerto Canyon Road, and relocation of utilities within the Project site.

The Project is a State-led effort under the Water Infrastructure Improvements for the Nation Act (WIIN Act) Public Law 114-332, Section 4007, discussed above. Reclamation's actions would include adding a point of rediversion to storage in the reservoir to Reclamation's water rights, preparing and executing, as appropriate, any necessary agreement with DPWD and the SRJECWA for a new diversion point off of the DMC, approving authorizations related to construction of a

Diversion / Outfall facility and modifications to the DMC pursuant to 43 CFR 429- *Use of Bureau of Reclamation Land, Facilities, and Waterbodies*, and providing an investment of up to 25 percent of total Project costs, commensurate with Federal benefits.

1.4 Purpose and Need for the Proposed Project

The purpose of the proposed Project is to develop additional South of Delta water storage to maximize the management and efficient use of existing water supplies in both DPWD and the SJRECWA service areas in a manner that is consistent with WIIN Act requirements and Reclamation law, as well as environmental purposes, including water supply for wildlife refuges designated under the Central Valley Project Improvement Act, and flood damage reduction.

The need for the Project is driven by persistent water supply challenges within the DPWD service area. This area is frequently allocated less than the full contracted CVP water amount which results in reduced agricultural activity, economic hardship for end water users, and increased reliance on groundwater pumping. These shortages routinely occur during dry and critically dry years, with an average annual total water shortfall of 86 TAF (**Table 1.1-1**) for both Project Sponsors combined. A broader, regional need exists for additional water storage to support the South of Delta Drought Plan, supported by the DPWD and SJECWA. Additionally, subsidence reduces the capacity of the DMC to convey water supply deliveries to contractors dependent on that supply. Increasing water storage capacity could alleviate some of the conveyance constraints caused by subsidence. The Project supports the need to diversify Level 2 refuge water sources in order to minimize possible adverse effects upon CVP contractors and further make available Incremental Level 4 refuge water to CVPIA refuges.

1.5 Scope of the Draft Environmental Impact Statement

1.5.1 Previous Environmental Documents

The Project Sponsors conducted an initial CEQA scoping hearing for the DPCR Project on July 24, 2019. After considering comments and concerns during the initial scoping meeting, the Project Sponsors published the DPCR Draft Environmental Impact Report (DEIR) to review the Project under the CEQA. The DEIR was published on December 12, 2019, for a 45-day public comment period, which ended on January 27, 2020. The DEIR assessed potential impacts to aesthetics, agriculture, air quality, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and recreation, traffic and transportation, tribal and cultural resources, utilities and service systems, and environmental justice. Effects to many of the resources discussed in the DEIR were mitigated, though the DEIR concluded that the Project would have substantial impacts to the following: aesthetics, cultural resources, greenhouse gas emissions, traffic and transportation, and utilities and services systems.

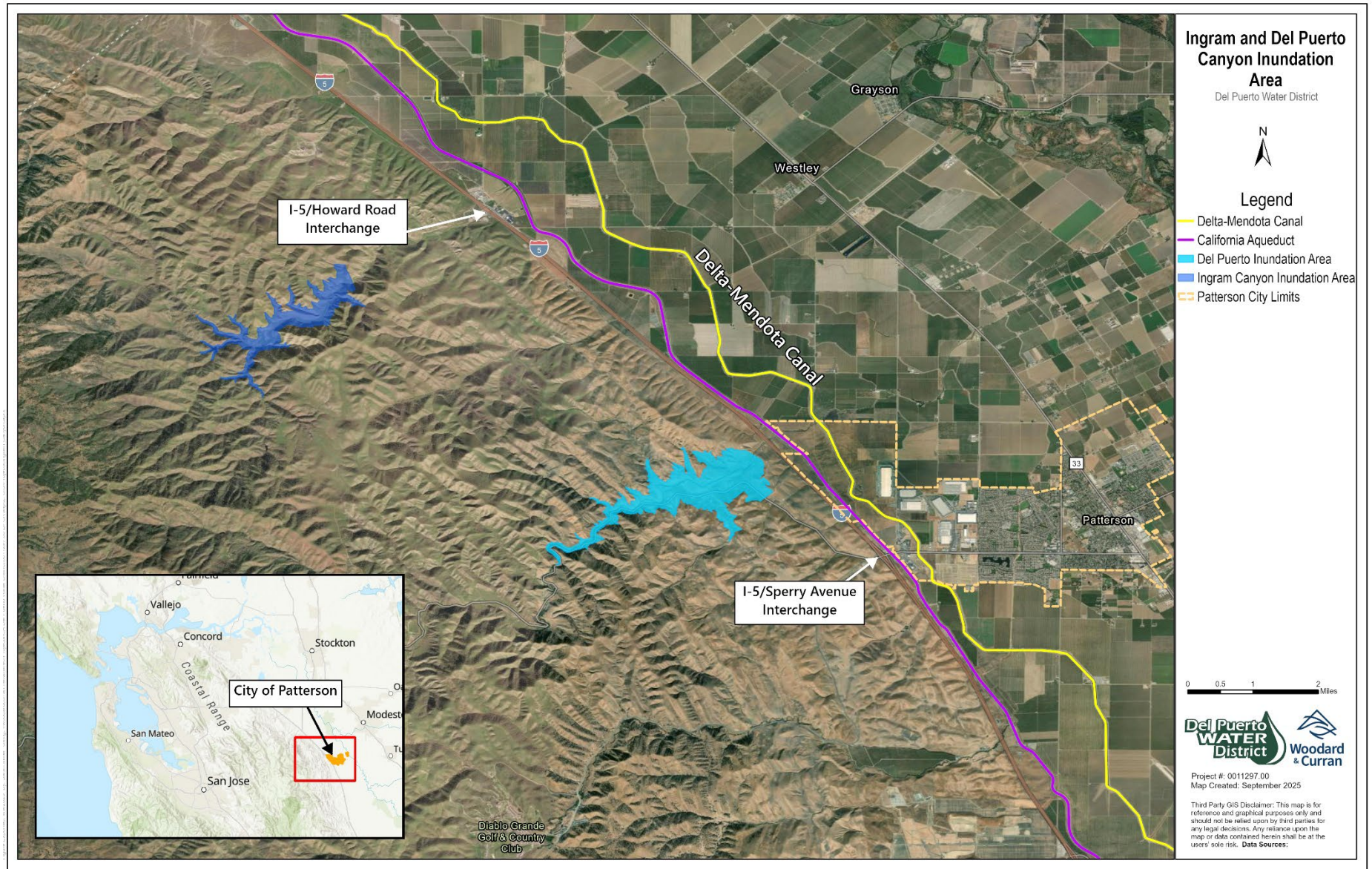

Figure 1.5-1: Location Map

On October 9, 2020, the Project Sponsors released the DPCR Final Environmental Impact Report (FEIR) addressing comments received on the DEIR. Consistent with the DEIR, the FEIR concluded that the DPCR Project would have unavoidable impacts to aesthetics, cultural resources, greenhouse gas emissions, traffic and transportation, and utility and service systems. The FEIR is hereby incorporated by reference.

The FEIR was challenged by the Sierra Club together with a consortium of other environmental groups (Sierra Club et al. v. DPWD; Stanislaus Superior Court Case No. No. CV-20-005193). The Superior Court's judgement was appealed, and the appellate court found that the EIR complied with CEQA in all respects but one. Specifically, the court found that the FEIR failed to adequately analyze the Project's potential impacts to terrestrial species associated with Del Puerto Creek downstream of the proposed reservoir. This Draft EIS incorporates by reference those portions of the EIR that were determined by the court to be adequate. The Draft EIS has been informed by comments provided by agencies and the public during the public review of the EIR.

Reclamation published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Project on April 29, 2020, initiating a 30-day scoping period. After reviewing previous environmental documents, and public comments from Reclamation's scoping period and comments provided on the Project Sponsors' CEQA documents, Reclamation has developed this DEIS for the DPCR Project. Comments received during the public comment period for the DEIS will be addressed in the Final EIS (FEIS).

1.6 Cooperating Agencies

Cooperating agencies pursuant to NEPA for the DEIS include the EPA, USFWS, and USACE.

1.7 Project Sponsor Public Outreach

1.7.1 Public Outreach

The Project Sponsors conducted public outreach while developing the 2020 EIR. A summary of the notification and process conducted under CEQA is included in Master Response 20 of the FEIR and is summarized **in Appendix N** with additional information about outreach conducted after publication of the FEIR. Outreach efforts far exceeded the public notification requirements under CEQA and included a variety of workshops, public meetings, and presentations to the Patterson City Council/County of Stanislaus and a wide array of other public agencies.

1.7.1.1 Media Information

Over the period from August 2019 to the present numerous articles, editorials and letters to the editor were published in local newspapers including the Modesto Bee, Patterson Irrigator and other local news outlets. Information was also posted on the Project website at https://delpuertocanyonreservoir.com/. A representative list of media information that was presented about the Project over the period from August 2019 through July 2025 is included in **Appendix N**.

1.7.1.2 Response to Public Input

Public input received during the CEQA scoping process described above was used to inform the scope of the environmental analysis conducted in preparation of the DEIR, and the DEIR was structured to address concerns that were expressed by the public during scoping. The alternatives evaluated in the DEIR were informed by public input, and Alternative 5 was selected for more detailed evaluation in the DEIR based on public input about alternatives. Comments on the DEIR were addressed in the FEIR Responses to Comments. Modifications were made to the FEIR to address substantive comments and provide additional clarifying information as appropriate. Certification of the FEIR was considered at a public meeting of the Del Puerto Water District Board of Directors held on October 21, 2020. Public comments were received at the Board meeting, and the Board members considered those comments in their decision about whether to approve the DPCR. Reclamation considered comments provided on the Project Sponsors' CEQA documents in its development of the DEIS.

1.7.2 Reclamation Public Outreach

Reclamation published a NOI to prepare an EIS in the Federal Register on April 29, 2020. Reclamation considered public comments from Reclamation's scoping period in its development of the DEIS.

1.7.3 Scoping Comments

Reclamation received 16 comment letters from Federal, state, and local public agencies, non-profit organizations, private organizations, and private individuals during the 30-day scoping period following the NOI. Comments were considered in the development of the DEIS.

Commenters focused on the following areas:

- Broad support for the DPCR to move forward and increase water supply reliability and water storage in the area.
- Concern for impacts to a broad range of environmental resources, particularly biological, cultural, traffic, and aesthetic resources.
- Requests to consider additional project alternatives.
- Concern for impacts to the CVP water supply and CVP contractors.

Beyond the analysis incorporated from the FEIR, Reclamation has also conducted additional analysis regarding alternatives and effects on air quality, aquatic resources, and energy.. The DEIS also includes new, updated evaluation of the potential impacts to the CVP and its associated potential environmental impacts and proposed mitigation.

1.8 Water Supplies, Demands, and Rights

The proposed Project would store CVP water allocated to and made available through equivalent conservation activities by the Project Sponsors within the developed water rights of the CVP, as well as other water for which the Project Sponsors obtain water rights. A point of rediversion to storage in the new reservoir (DPCR or Ingram Canyon Reservoir) would need to be added to Reclamation's existing water rights, and a change petition would be prepared in coordination with the Project Sponsors. The water would be pumped into the reservoir from the DMC and would be

subsequently pumped back into the DMC as needed by the Project Sponsors and CVPIA refuges. Conservation activities are further described in Section 2.11.1.2.

Consistent with Del Puerto Water District's Central Valley Project Repayment Contract and the San Joaquin River Exchange Contract, Reclamation would prepare and execute, as appropriate, any necessary agreements in support of the Project. If contract amendments are needed, a separate NEPA review would occur at that time.

The proposed Project would also capture and store water from Del Puerto Creek or Ingram Creek, which would require a new water right permit from the SWRCB's Division of Water Rights. Currently, there are no existing water rights on Del Puerto Creek or Ingram Creek. 2.4.2.1

2 Description of Alternatives

2.1 Introduction

NEPA and implementing regulations require that an agency evaluate a reasonable range of alternatives to a proposed action. This chapter describes the DPCR EIS alternatives development and proposed alternatives, including those considered and eliminated from further study. The Project Sponsor's preferred alternative is also described. The Project Sponsor's preferred alternative was evaluated as the proposed project in the CEQA documentation prepared for the project.

2.2 Alternatives Development Process

The alternatives development process was defined by the Project objectives and selected alternatives were developed for consideration and analysis to meet the purpose and need of the Project. Reclamation collaborated with the Project Sponsors to develop alternatives that would meet the sponsors' objectives.

2.3 Alternatives

This DEIS considers the No Action Alternative and a reasonable range of practicable alternatives for the proposed Project/action, which are briefly summarized below. A detailed description of each alternative including figures showing locations and text defining sizes of structures is provided in Sections 2.5 through 2.9. As noted in Section 1.10, under all Action Alternatives a water right permit would be needed to capture and store water from Del Puerto Creek or Ingram Creek.

Depending on the alternative selective, Reclamation would coordinate with the Project proponents on any required discretionary federal actions such as actions involving federal lands or facilities or other authorizations or agreements needed to construct or operate the appurtenant conveyance and pumping structures.

2.3.1 Alternative 1 (No Action)

Under this alternative, the Project Sponsors would not construct a new reservoir. Alternative 1 considers expected conditions in the vicinity of the Project site in the foreseeable future if a project were not constructed, based on current plans and consistent with available infrastructure. See Section 2.5 for a detailed description.

2.3.2 Alternative 2 (DPCR 82 TAF) (Project Sponsor's Preferred Project)

Under this alternative, an 82-TAF reservoir would be constructed in Del Puerto Canyon, including the main dam, two saddle dams, spillway, and inlet/outlet works. Reclamation would provide an

investment of up to 25 percent of total Project costs for the 82 TAF Del Puerto Reservoir Project under WIIN Act § 4007, commensurate with benefits. See Section 2.6 for a more detailed description of Alternative 2 and **Figure 2.6-1** on page 2-15 for a map showing facilities for Alternative 2.

2.3.3 Alternative 3 (Limited Action)

Under this alternative the Project Sponsors would construct an 82-TAF reservoir in Del Puerto Canyon, however Reclamation would not provide funding nor receive federal benefits for the 82 TAF Del Puerto Reservoir Project under WIIN Act § 4007. Reclamation would coordinate with the Project proponents on any required discretionary federal actions such as actions involving federal lands or facilities or other authorizations or agreements needed to construct or operate the appurtenant conveyance and pumping structures. See Section 2.7 for a more detailed description.

2.3.4 Alternative 4 (DPCR 40 TAF)

Under this alternative, a 40-TAF reservoir would be constructed in Del Puerto Canyon, including the main dam, any required saddle dams, spillway, and inlet/outlet works. Reclamation would provide an investment of up to 25 percent of total Project costs for Alternative 4 under WIIN Act § 4007, commensurate with benefits. See Section 2.8 for a more detailed description of Alternative 4 and **Figure 2.8-1** on page 2-17 for a map showing facilities.

2.3.5 Alternative 5 (Ingram Canyon)

Under this alternative a 40-TAF reservoir would be constructed in Ingram Canyon, including the main dam, spillway, and inlet/outlet works (see **Figure 1.5-1**). Reclamation would provide an investment of up to 25 percent of total project costs for the Ingram Canyon Reservoir Project under WIIN Act § 4007, commensurate with benefits. See Section 2.9 for a more detailed description and **Figure 2.9-1** on page 2-18 for a map showing facilities.

2.4 Elements Common to All Action Alternatives

All Action Alternatives would be constructed and operated in a similar fashion. A general description of the types of facilities that would be included in all of the Action Alternatives is provided below, with detailed descriptions of the facilities for each alternative in Sections 2.5 through 2.9.

2.4.1 Facilities to Be Constructed

2.4.1.1 Dam

All Action Alternatives would require a main dam, which would be constructed as a zoned earth fill dam. The main dam would consist of a battered vertical clay core supported by upstream and downstream shells. The core would be separated from the downstream shell by a chimney filter, which would prevent piping[1] of the core and drain. The locations of the main dam for each Action

[1] Soils can be eroded by flowing water, which occurs underground if there are cavities, cracks in bedrock, or other openings large enough that soil particles can be washed into them and transported away by seeping water. This type of underground erosion can progress and create an open path for flow, called "piping." Preventing piping is a prime consideration in the design of safe dams.

Alternative are shown in **Figure 2.6-1** (page 2-15), **Figure 2.8-1** (page 2-17), and **Figure 2.9-1** (page 2-18).

2.4.1.2 Saddle Dams

Saddle dams are needed when there are gaps in the surrounding hills that would allow water to escape. Because of the configuration of Del Puerto Canyon, Alternatives 2 and 3 would require two saddle dams, and Alternative 4 would require one saddle dam, with crest elevations the same as the main dam for each configuration (i.e. the Alternative 4 saddle dam would have the same height as the Alternative 4 main dam). No saddle dam would be needed for Alternative 5 because there are no gaps in the surrounding hills in Ingram Canyon. The locations of the saddle dams for Alternatives 2 and 3 are shown in **Figure 2.6-1** (page 2-15) and **Figure 2.8-1** (page 2-17).

2.4.1.3 Spillway

The main dam for all Action Alternatives would require a spillway, which would include an approach channel with an ungated chute to transfer water from behind the dam down a smooth decline into a stilling basin below the dam. The energy from flows over the spillway would be dissipated as water passed through the stilling basin prior to discharging downstream from the dam. The spillway would be proportioned to safely pass the spillway design flood. The locations of the spillway for each Action Alternative are shown in **Figure 2.6-1** (page 2-15), **Figure 2.8-1** (page 2-17), and **Figure 2.9-1** (page 2-18).

2.4.1.4 Inlet/Outlet Works

Water would be pumped into and released from the reservoir via the inlet/outlet works. The inlet/outlet works would consist of an inlet/outlet structure inclined to rest on the reservoir banks, outlet channel from the creek to the inlet/outlet structure, an inlet/outlet tunnel or buried pipeline, and an inlet/outlet bifurcation structure at the spillway stilling basin. The outlet conduit would bifurcate downstream of the new dam with one side connected to the conveyance system and the other side connected to valves that would allow for emergency releases, and environmental and other flow releases to the spillway stilling basin and Del Puerto Creek or Ingram Creek.

2.4.1.5 Conveyance Facilities

To convey water to and from the proposed reservoir, a pumping plant and a buried conveyance pipeline would be constructed. The conveyance system would deliver water from the DMC into the proposed reservoir and would withdraw water from the proposed reservoir and deliver it back into the DMC. The pumping plant is proposed to be located on the west side of the DMC on Reclamation's right-of-way directly along the west side of the canal and the conveyance pipeline would be located between the DMC and the reservoir inlet/outlet works at the base of each reservoir. The locations of the conveyance facilities for each Action Alternative are shown in **Figure 2.6-1** (page 2-15), **Figure 2.8-1** (page 2-17), and **Figure 2.9-1** (page 2-18).

Pipeline. Pipeline construction would require tunneling under Interstate-5, the California Aqueduct (Aqueduct), and the hills abutting the dam to connect the pipeline to the reservoir and the DMC.

Pumping Plant. The pumping plant would consist of a diversion/outfall structure at the DMC to divert (put) and release (take) water to and from the reservoir, pumps, surge control facilities,

metering station, return flow and energy dissipation facility, electrical and controls building, power substation, and yard piping to connect hydraulic components. The locations of the pumping plant for each Action Alternative are shown **Figure 2.6-1** (page 2-15), **Figure 2.8-1** (page 2-17), and **Figure 2.9-1** (page 2-18).

The pumps would be vertical turbine pumps located on a concrete slab within an enclosure. A concrete masonry unit (CMU) block wall would be constructed around the pumping plant site and surge tanks, with taller enclosures around other specific equipment as needed. Installed horsepower (HP) of the pumping plant would vary by alternative.

Electrical Facilities at Pumping Plant. The pumping plant site would include an electrical substation to supply power to the pumps. Primary power supply lines connecting the substation to existing power supply facilities would follow the conveyance alignment or an existing power line corridor to the north or south for Alternatives 2, 3 and 4. A new power supply line would have to be constructed for the Alternative 5 pump station. The electrical substation would consist of tower structures and transformer units on concrete pads, overhead cables, and security fencing. The locations of the power supply lines for each Action Alternative are shown in **Figure 2.6-1** (page 2-15), **Figure 2.8-1** (page 2-17), and **Figure 2.9-1** (page 2-18).

Access Roadways at Pumping Plant. Access to the diversion/outfall structure, pumping plant and ancillary facilities would be provided by a 16-foot wide partially paved and partially graveled all weather access road that would connect the site to the local public road network and allow vehicle circulation around the plant and to major equipment and structures. Access to Alternatives 2, 3 and 4 would be provided from Del Puerto Canyon Road (**Figure 2.8-1** on page 2-17). The location of the access road for Alternative 5 is shown in **Figure 2.9-1** (page 2-18).

2.4.2 Operation

The proposed Project operations include filling the reservoir by pumping water from the DMC and releasing water from the reservoir to the DMC. During the first year of operations, the initial fill of the reservoir would take up to 6 months depending on the size of the reservoir. In subsequent years of operation, the duration of pumping would be only that necessary to replenish depleted storage. Therefore, the fill operation might take less than four months in some years. Reservoir levels would fluctuate seasonally as the reservoir would be filled when water is available and drained to meet irrigation demands as needed. Fluctuations in water levels would be dependent on the CVP allocations each year, which are a function of the water year type. In successive wet years the water level might not change substantially, but in critically dry years the reservoir could be drained, and essentially empty at the end of the irrigation season.

The reservoir facilities would be operated and maintained by the Project Sponsors' local staff; an estimated three to five employees would be needed for operation and maintenance of the reservoir and conveyance facilities. Pumping plant facilities would convey and meter flows from the DMC to the reservoir, and the energy dissipation facility would control and meter return flow from the reservoir to the DMC. Water would not flow in both directions simultaneously; water would either be diverted from the DMC and pumped into the reservoir, or water would be released from the reservoir. A combined diversion/outfall structure would be constructed at the existing concrete wall/lining of the DMC. The structure would provide a flow stilling function to the extent needed to avoid hydraulic disruptions in the DMC.

The availability of water from the DMC would be dependent on annual CVP contract allocations available to the Project Sponsors. In addition to CVP supply, the reservoir would receive and store native creek flows. Both CVP and creek flows would enter the reservoir when the reservoir level is below the spillway crest. Losses from the reservoir would include evaporation and seepage. Releases from the reservoir would include water for delivery to the Project Sponsors through the DMC and environmental or regulatory releases. Operation of the Proposed Project would be coordinated with CVP operations.

2.4.2.1 Environmental Releases

For every flow event of 500 cubic feet per second (cfs) or greater, environmental releases would be made in a pattern that mimics the unimpeded flow in Del Puerto Creek or Ingram Creek based on a new stream gage that would be installed upstream of the proposed impoundment area. If the stream gauge measurement exceeds 500 cfs then releases would increase on the first day of the environmental release program mimicking the measured natural flow, with flows up to 600 cfs, or the peak natural flow (whichever is less). After the first day there would be up to six additional days of releases with a decreasing flow rate in each subsequent day, eventually returning to at or near zero releases after no more than 7 days.

2.4.2.2 Reservoir Management Plan

The Project Sponsors would develop a reservoir management plan to protect the water quality of the reservoir and to minimize potential conditions in the reservoir that would allow harmful algal blooms to occur. The plan would include reservoir water quality monitoring for effective early warning of the potential occurrence of algal blooms in the reservoir to ensure algal blooms are not exported from the reservoir. The Project Sponsors would implement water quality monitoring and implement necessary actions to manage water quality as follows:

1. **Water Quality Monitoring**

    a. Annual seasonal monitoring for cyanobacteria shall occur monthly, at a minimum, beginning April 15 and continuing through October. Monitoring shall begin earlier than April 15 if algal blooms are suspected. Initial early-season monitoring shall consist of visual inspection as well as water sampling. Visual monitoring shall be implemented consistent with the State Water Resources Control Board's (State Water Board's) Surface Water Ambient Monitoring Program (SWAMP), Visual Guide to Observing Blooms in the SWAMP HAB Field Guide (SWRCB 2017a). If visual inspection from several sites along the perimeter of the reservoir does not detect any signs of a bloom(s), then a single water sample both from a location near the reservoir's inlet/outlet and a location immediately downstream of the inlet/outlet would suffice. A qualified water quality specialist or otherwise appropriately trained person shall obtain grab samples of reservoir water from these locations.

    b. Qualified personnel conducting water sampling shall follow all applicable steps in the State Water Board's SWAMP standard operating procedures for sampling site reconnaissance from the SWAMP HAB Field Guide (SWRCB 2017b) or develop a similar protocol to maintain consistency in sampling and record keeping. This standard operating procedure is intended to describe general and specific methods,

procedures, and considerations on documenting the spatial and logistical aspects of each sampling site.

c. Water samples shall be taken and analyzed by trained personnel using field or laboratory methods to identify cyanobacteria cell density (cell counts) and cyanobacteria species (to identify whether cyanotoxin-producing species are present). In addition to water samples, water temperature, dissolved oxygen, pH, conductivity, and turbidity shall be recorded at each sampling location.

d. The state's recommended "caution action trigger" for cyanobacteria cell density of toxin producing cells is 4,000 cells per milliliter (cells/ml) (SWRCB 2018). When waters exceed this count, the State Water Board recommends caution signs be posted for recreational waters. Although recreation is not proposed for the Project, the Project Sponsors would either use this threshold or coordinate with the State Water Board to establish a higher threshold. Should the Project Sponsors choose to work with the State Water Board to establish a higher threshold, the Project Sponsors can use the World Health Organization guidance/action levels for cyanobacteria in recreational waters, which is less conservative—a cell density of less than 20,000 cells/ml corresponds to a low relative probability of acute health effects (USEPA 2017).

e. Visual and water quality reservoir monitoring would continue on a regular basis until cell density at any monitored location exceeds the established threshold and/or the reservoir surface elevation threshold (established in coordination with the State Water Board). An established elevation threshold is required to ensure that if there are algal blooms, there is a reasonable vertical margin within the water column relative to the water's surface in which cyanobacteria are not present and thus would not be drawn into the outlet with exported water. Although cyanobacteria mostly accumulate near the water's surface, they can be distributed throughout the photic zone in a bloom, the depth of which would vary. If water sampling results indicate that cyanobacterial cell density is approaching the established density threshold, the frequency of visual inspections shall increase.

f. If either the cell density is at or above the established density threshold, or the reservoir surface elevation drops below the established elevation threshold, the following action plan shall be implemented:

2. **Action Plan**

a. Reservoir monitoring and water sampling frequency shall increase to weekly.

b. Advisory warning signs noting the presence of algal blooms shall be placed in visible locations around the reservoir, and reservoir operations staff shall all be notified and be made aware of the potential health risks associated with cyanobacteria and cyanotoxins.

c. If cyanobacterial cell density continues to exceed the established threshold during the seasonal monitoring period and the reservoir surface elevation approaches the elevation of the inlet/outlet works), then the export of water from the reservoir shall be discontinued

until the reservoir surface elevation increases and the potential for drawing cyanobacteria into the outlet is no longer a concern or until cyanobacteria cell density has dropped below the established threshold.

d. Caution and safety procedures shall be used to prevent direct contact with a bloom. The State Water Board's SWAMP Health and Safety Guide (SWRCB 2017c) from the SWAMP HAB Field Guide can be consulted to provide information for personnel protection to minimize risks during water sampling.

2.4.3 Maintenance

Reservoir maintenance would include weekly inspection trips in the first year of operation. Inspection trips would be reduced in frequency over time with trips every two weeks in years two through five of operation and monthly trips starting in year six. Operation and maintenance of the pumping plant is estimated to require an average of one worker vehicle trip per day to conduct inspections and maintenance of pumping plant facilities.

Maintenance for proposed Project facilities would include debris removal, dredging to maintain reservoir capacity, vegetation control, rodent control, erosion mitigation, routine inspections (dams, tunnels, pipelines, pumping/generating plants, inlet/outlet works, fence, signs, gates), painting, cleaning, repairs, and other routine tasks to maintain facilities in accordance with design standards after construction and commissioning. Routine visual inspection of the facilities would be conducted to monitor performance and prevent mechanical and structural failures of proposed Project elements. The reservoir area would be inspected via utility and access roads, and if any trespassers are present, they would be reported to local law enforcement as appropriate. Bathymetric surveys of the reservoir bottom near the dam would inform any need for dredging. Typically, bathymetric surveys would be performed every 5 years. This rate would be adjusted based on the observed rate of sediment buildup.

Maintenance activities associated with the proposed inlet/outlet works could include cleaning and removal of sediments, debris, and biofouling materials. These maintenance actions could require suction dredging or mechanical excavation around intake structures; dewatering; or use of underwater diving crews, boom trucks or rubber wheel cranes, and raft- or barge-mounted equipment.

Maintenance activities associated with the proposed conveyance pipeline would likely occur once per year, with possible additional inspections and maintenance needed after storm or flood events. Dewatering for inspection will occur in 5-year cycles or more frequently if a pipeline problem is suspected.

2.4.4 Property Acquisition and Easements

Prior to initiation of construction activities, any necessary land acquisition or establishment of temporary or permanent easements on private properties would be acquired by the Project Sponsors having such authority consistent with all applicable federal, state and local laws and regulations.

2.4.5 Construction Considerations

Prior to initiation of construction activities, acquisition or establishment of temporary or permanent easements on private properties would be required. Overall, construction of the proposed Project is expected to take approximately six years for Alternatives 2 and 3; because Alternative 4 would still require relocation of Del Puerto Canyon Road and relocation of transmission lines, although construction of the smaller dam would take less time, the overall construction schedule would be similar to that for Alternatives 2 and 3. Construction of Alternative 5 is estimated to require about 4.5 years. Several factors would affect the schedule including funding, environmental compliance, contracting methods and strategies, material and construction equipment availability, lead time for fabrication of materials and equipment, labor force constraints, weather, and access road capacity limitations. Additional adjustments to the schedule would be addressed as required during Project development and implementation.

2.4.5.1 Geotechnical Investigations

To support the engineering and final design of reservoir facilities, preconstruction geological, geotechnical, and geophysical investigations and testing have been performed in the Del Puerto Canyon study area. NEPA documentation for this work was completed under a Categorical Exclusion Checklist. Because access is not available to the Ingram Canyon study area this testing has not been performed for the Ingram Canyon Dam. The geotechnical investigations and associated testing were required to support California Department of Water Resources Division of Safety of Dams (DSOD) permitting processes. The investigations were implemented in various locations in and around the footprints of the proposed facilities. Geotechnical investigations were focused in areas where additional or updated data are needed for engineering cost refinement, for design, and to prepare permit applications. Geotechnical borings and geophysical work areas included biological monitoring and appropriate pre-activity clearance assessment and surveys due to their proximity to sensitive biological resources. Geotechnical investigations included: borings, test pits, trenches, geophysical soundings and aquifer testing. Additional geotechnical investigations will be required to support design and may require a separate NEPA analysis.

2.4.5.2 Construction Timing and Sequencing

Construction of the pumping plant, conveyance, roads and powerlines would occur generally between 7:00 a.m. and 7:00 p.m. Nighttime and weekend construction would occur on an as-needed basis and would be coordinated with area residents. The portion of the conveyance pipeline that would be constructed by tunneling could require nighttime construction. If nighttime construction is needed, construction lighting and noise constraints consistent with applicable local requirements would be used. Nighttime construction would not be conducted between 10:00 p.m. and 7:00 a.m. within 1,000 feet of occupied residences.

Construction of the reservoir and dam facilities would require nighttime construction. Two 10-hour shifts are proposed, with construction taking place between roughly 5:00 a.m. and 1:00 a.m. five days a week. Weekend construction would occur on an as-needed basis, and weekends may be used for equipment maintenance, as necessary. Construction areas would be lighted to allow work to continue at night. Construction would be confined to designated construction disturbance areas. Construction vehicle parking and storage of equipment and materials would also occur within these construction disturbance areas which are shown in the figures in Section 2.5 through 2.9 describing each alternative.

Durations of construction were estimated for only the most critical path features of work based on quantities of that work and experience on other projects of similar magnitude. Estimated duration of construction also considered the logical sequence of work allowing for concurrent activities where possible. Construction may start as early as 2027 and would be dependent on the timing of funding, design and permitting. Some aspects of reservoir construction for Alternatives 2-4 can take place concurrently with road relocation, but existing roads would not be closed until a new road is ready for operation. Construction of the Project components for Alternatives 2-4 would be expected to occur in the sequence shown in **Figure 2.4-1.** Because Alternative 5 does not require relocation of a road or utilities the construction period would be slightly shorter as shown in **Figure 2.4-2**.

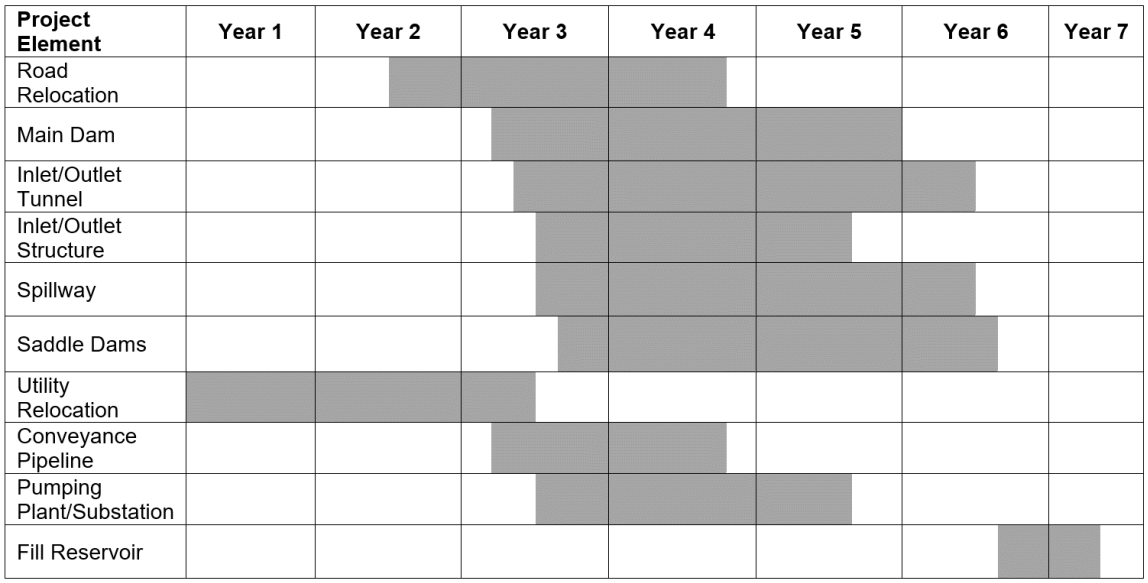

Figure 2.4-1: Construction Sequencing Alternatives 2-4

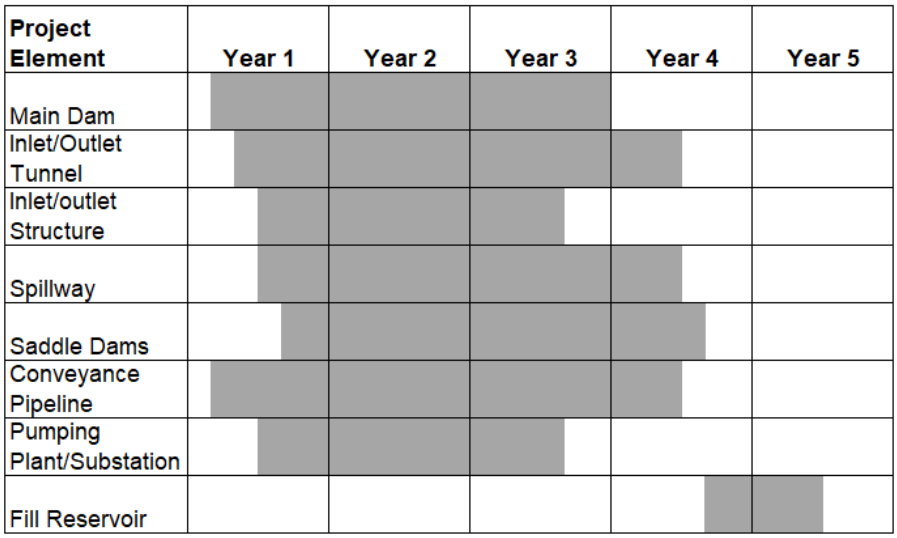

Figure 2.4-2: Construction Sequencing Alternative 5

2.4.5.3 Staging Areas

Staging areas would be within the designated construction area and would be set up in close proximity to work areas, including the main dam, saddle dams, inlet/outlet structures, conveyance pipelines, pumping plant, new roadway location, and utility relocation corridors. Staging areas would be required for the contractor's office trailers and construction materials storage.

2.4.5.4 Construction Spoil

Construction spoil would be generated from construction activities associated with both the dam facilities and the conveyance facilities including tunneling, pipeline, and excavation work. Excavation work would be conducted around the spillway, inlet/outlet works, and foundation of the main dams and saddle dams. Tunneling would occur in the area around the dam and for the Interstate-5 and California Aqueduct crossings. All excess spoil generated from dam construction would be deposited in the future inundation area after crews quarry the materials necessary for the dams.

2.4.5.5 Dam Facilities Construction

The reservoir includes the dam, spillway, and inlet/outlet pipe. Construction of these facilities is described in the following sections.

Sources of Construction Materials. Some construction materials for the dams would be sourced on-site. Clay core material would likely be on site. Shell material would be sourced from required on-site excavations for the dam foundation and borrow areas in the inundation area. Based on a preliminary review of commercial suppliers of natural aggregate materials for filter and drain, four potential sources were located within 27 miles of the site. Riprap bedding and riprap would be sourced from commercial hard rock quarries most likely in the Sierra foothills about 70 miles from the site.

Division of Safety of Dams Requirements. Design and construction of the reservoir would meet all requirements of the DSOD and applicable current Federal dam safety guidelines and criteria for a new dam, reservoir and appurtenant facilities.

Construction of the Dam. Dam construction would consist of the following activities:

- Site preparation, including creek diversion using a piped bypass into the inlet/outlet tunnel installed during the dry season so that the dam embankment can be constructed across the creek;
- Construction of the embankment, which includes foundation clearing and excavation; foundation preparation and grouting; excavation of borrow material within the reservoir; and fill placement and compaction;
- Construction of the inlet/outlet works;
- Construction of the spillway;
- Site restoration.

Construction of the Conveyance Facilities. The conveyance facilities include the pipeline, diversion/outfall structure at the DMC, pumping plant and electrical facilities.

Pipeline. The conveyance pipeline would be installed with 6 to 10 feet of cover in open trench cuts between the DMC and the Aqueduct, and an open trench cut west of I-5 to the bifurcation structure. The construction easement would be 100 feet wide.

In between these reaches, tunneling would be utilized for installing the pipeline where it would cross under the Aqueduct and I-5. The pipeline would be connected to the bifurcation of the outlet works. The pipeline diameter and flow would vary with each alternative (as described in the detailed descriptions of the facilities for each alternative in Sections 2.5 through 2.9.

Combined Diversion/Outfall Structure. Construction of the intake/outfall structure would entail installation of a temporary steel cofferdam inside of the DMC to facilitate excavation of ground adjacent to and outside of the DMC lining and removal of an approximately 24-foot section of the DMC lining. The cofferdam would allow for construction of the diversion/outfall structure to be completed without impact to normal operation of the DMC. The concrete intake/return structure would be constructed within the opening created by removal of the liner. Coarse trash racks would be installed within the structure to prevent large debris from entering the pumping plant intake (suction) piping, and slide gates would be installed to allow for isolation of the intake and suction piping. Cofferdams would be removed after the intake/return structure is completed.

Pumping Plant. Construction activities at the pumping plant site would entail mobilization and clearing of the site. Excavation for structures and pipelines would involve dewatering and temporary shoring of excavations. The pipe would be installed, and the trench would be backfilled. Concrete would be placed for slabs and structures. Above-grade buildings would be constructed (concrete masonry unit walls with metal trusses and roofs). Above grade mechanical piping and equipment, (including surge tanks, pumps and motors, valves and other piping appurtenances) would be installed. Work would conclude with final site grading, and installation of drainage, paved and graveled access roads, and fencing. The electrical substation would also be constructed (see description below).

Electrical Substation. Construction of the substation would begin with site grading, followed by construction of foundations for steel support structures including support busses, utility poles, overhead conductors, and instrumentation. Construction of the foundation (piers) would require augering of holes and placement of steel, setting forms and placement of concrete. A rectangular concrete pad would be constructed for spread footings.

Roadway Relocation. Relocation would only be needed for the Alternatives 2, 3 and 4. No roadway relocation would be needed for Alternative 5, but some improvements to existing roads would be implemented to ensure adequate access to properties west of the proposed reservoir site that currently use Ingram Creek Road.

Utility Relocation. Relocation would only be needed for the Alternatives 2, 3 and 4. No utility relocation would be needed for Alternative 5. Where necessary existing high voltage transmission lines and petroleum pipelines would be relocated. There are no telecommunications lines along Del Puerto Canyon Road. Design of the relocations and initial coordination with the various utility owners would determine the ultimate method of relocation.

Power Lines. Relocation of power lines for Alternatives 2, 3 and 4 would require grading of construction staging areas, grading of pads for new structures, drilling holes for new structure foundations, constructing and improving roads for vehicle and equipment access, and establishing pull sites for conductor installation. Most structures would have concrete foundations. Structure components would typically be transported to the sites by truck or helicopter. Structures would be assembled, erected with cranes, and then attached to the foundations. Conductor stringing would occur at designated pull and tensioning sites. Large reels of conductor would be transported to the staging areas or pulling sites on flatbed trucks.

Petroleum Pipeline. The pipeline relocation process for Alternatives 2, 3 and 4 would take place within an easement and would require tunneling or trenching down to about 8 feet or more, with bottom width of 3 feet, top width of 15 feet. Once in place and tested, the trench would be backfilled with native soils, and the construction easement restored to its original condition. Oil pipeline marker posts would be installed to facilitate future pipeline locations.

2.4.6 Construction Equipment

Details about construction equipment are contained in Appendix F, which presents air quality modeling for the Project.

2.4.7 Environmental Commitments and Best Management Practices

Construction contractors would follow standard construction best management practices including preparing and following a Stormwater Pollution Prevention Plan (SWPPP) and preparing and following a Hazardous Materials Plan. The SWPPP would list best management practices (BMPs) that would be used to avoid adverse effects from storm water runoff; a visual monitoring program; and a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs. BMPs to be implemented as part of the SWPPP would include, but are not limited to use of temporary erosion control measures, such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover for disturbed areas; and reestablishment of grass or other vegetative cover on unpaved areas of the construction site as soon as possible after disturbance.

Construction contractors for all Project components would be required to employ fire prevention measures. Contractors would be required to ensure that staging areas, welding areas, or areas slated for construction be cleared of dried vegetation or other materials that could ignite. Construction equipment that includes a spark arrestor would be maintained in good working order. In addition, construction crews would have a spotter during welding activities to look out for potentially dangerous situations, such as accidental sparks. Other construction equipment would be kept in good working order and used only within cleared construction zones. Construction contractors would require vehicles and crews working at the Project site to have access to functional fire extinguishers, and water trucks shall be present during all grading activities.

A detailed list of Environmental Protection Measures (EPMs) is presented at the beginning of Chapter 3, Affected Environment and Environmental Consequences. The Project Sponsors will adopt a Mitigation Monitoring and Reporting Program (MMRP), which would specify the mechanisms by which implementation of mitigation measures would be ensured during construction and operation of the Proposed Project. The MMRP would specify the environmental commitments that would be adopted as conditions of the Project Sponsors' approval.

2.5 Alternative 1 (No Action)

As noted above, Alternative 1 does not entail construction of a new reservoir. Alternative 1 considers expected conditions in the vicinity of the Project site in the foreseeable future if a project were not constructed, based on current plans and consistent with available infrastructure and community service. Because of the need for water supply, and because of the constraints on groundwater pumping placed by the Sustainable Groundwater Management Act, it is assumed that under Alternative 1 the Project Sponsors would have to pursue obtaining additional surface water resources to meet water demands, or portions of their service areas would continue to be fallowed due to a lack of water supply. Limitations on groundwater pumping are established under the Groundwater Sustainability Plan/Pumping Reduction Plan for the Delta-Mendota Subbasin, adopted to maintain compliance with the Sustainable Groundwater Management Act.

2.6 Alternative 2 (DPCR 82 TAF)

Alternative 2 is construction of a reservoir on Del Puerto Creek in the foothills of the Coast Range Mountains west of Patterson (**Figure 2.6-1**). Under Alternative 2, the proposed reservoir would provide approximately 82 TAF of new off-stream storage in the Central Valley. See **Figure 1.5-1** for the location of Alternative 2.

The Alternative 2 components consist of:

- Reservoir, including main dam and two (2) saddle dams, a spillway, and inlet/outlet works to/from the reservoir;
- Reservoir embankment for main dam approximately 260 feet high with an embankment volume of 7.9 million cubic yards (CY) and additional 2.3 CY of embankment volume for the two saddle dams described below;
- Primary saddle dam - about 153 feet high and 1,304 feet long located in the side canyon where Del Puerto Canyon road enters the main canyon that forms the reservoir;
- Smaller 22-foot-high saddle dam located west of the primary saddle dam;
- Inundation area of approximately 900 acres;
- Conveyance facilities, including diversion/outfall facility near the DMC, 12,000-HP pumping plant, 84-inch diameter pipeline conveying a flow of about 300 cfs, energy dissipation facilities at the DMC outfall, and related appurtenant components;
- Electrical facilities including power supply line constructed to connect the pumping plant to Turlock Irrigation Facilities and a new electrical substation to power the pumping plant;
- Relocation of a portion of Del Puerto Canyon Road, which currently runs east-west through the Project site, connecting the City of Patterson to Santa Clara County. The selected road alignment (see **Figure 2.6-1**) would depart from existing Del Puerto Canyon Road at approximately mile marker 1.4 and would head southwest and then west to connect with the existing road just west of the reservoir at mile marker 5.2. After the new road is complete, the existing portion of Del Puerto Canyon Road immediately in

front of the new saddle dam would be gated and would become a private road providing access to the reservoir.

As required by Stanislaus County, the road would be designed to the standard of a minor collector. Roadway design criteria were developed using relevant design codes, including Department of Public Works Stanislaus County Standards and Specifications 2014 Edition, California Department of Transportation (Caltrans) Highway Design Manual (HDM) – 7th Edition, and American Association of State Highway and Transportation Officials (AASHTO) Green Book – 7th Edition.

The design speed of the road would generally be 35 miles per hour, which is the posted speed on the existing road. The relocated road would have a total pavement width of 32 feet with one, 12-foot-wide travel lane in each direction with a paved 4-foot shoulder and a total right-of-way width of 60 feet. The road would be designed in accordance with requirements for rolling/mountainous terrain. The vertical grade would typically be 12 percent or less for stretches less than 1 mile and 10 percent for stretches greater than 1 mile. Road geometry would be designed to maintain acceptable sight distances for stopping at all locations and passing at most locations. Advanced warning no passage signing and striping would be introduced at locations where inadequate passing sight distance is present in accordance with the California Manual on Uniform Traffic Control Devices (CA MUTCD) 2014 Revision 8 (January 11, 2024).

Approximately half a mile east from the western end of the re-aligned roadway alignment, a 600-foot bridge structure is proposed to serve as a measure to avoid the need to place the existing creek into a long, large culvert, to reduce the placement of steep earthen fill embankment, and to provide improved wildlife connectivity. With a main span of 153 feet, a pier spacing configuration has been identified that would allow for the avoidance of the creek below. The superstructure of the bridge would be 36 feet total width, comprising of two 12-foot through lanes, two 4-foot shoulders and two 2-foot barriers. The proposed piers of the main span would use rectangular hollowed sections while the shorter approach spans shall utilize cast-in-drill-hole piles. Precast spans would be used.

Aerial

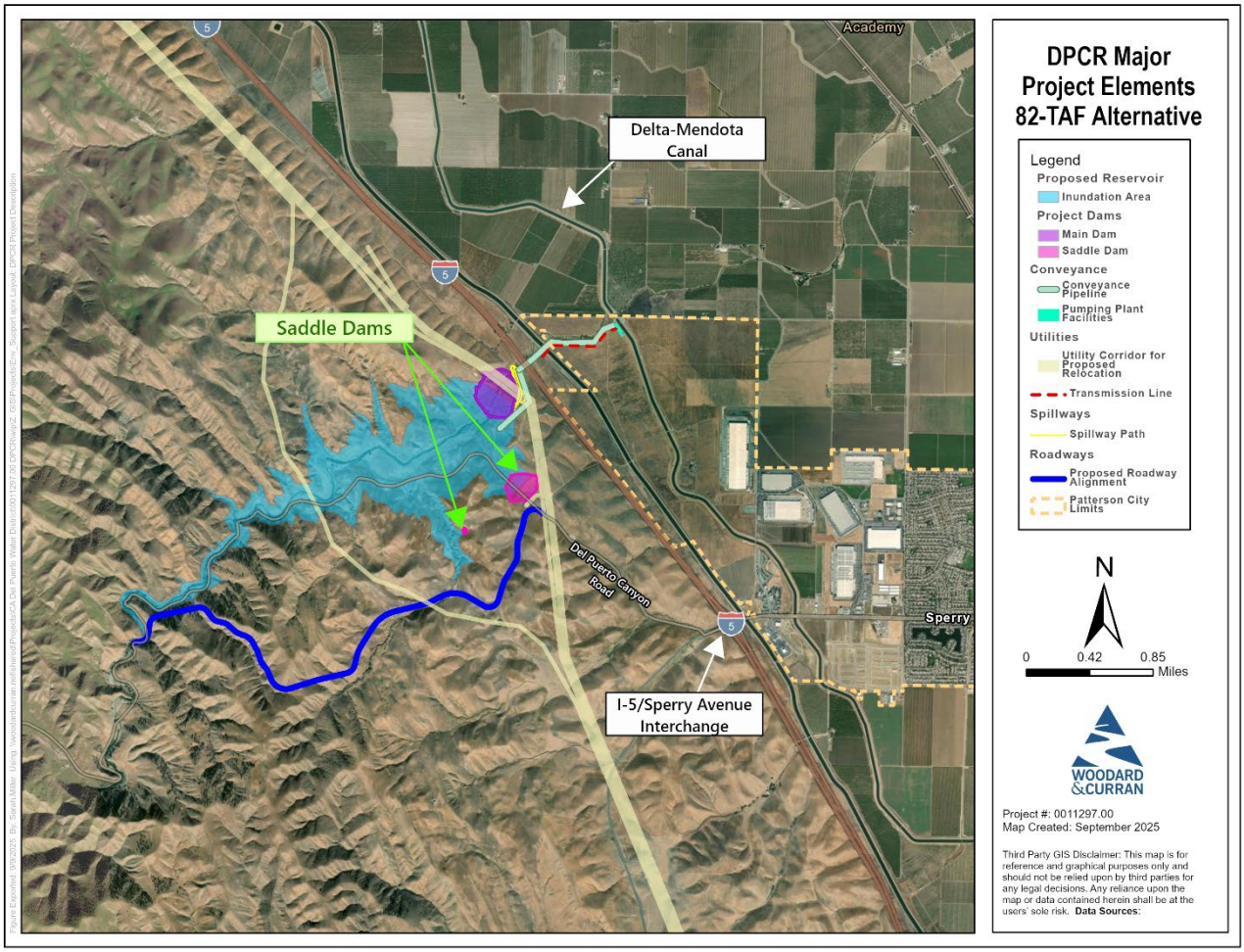

Figure 2.6-1: Alternative 2 (DPCR 82 TAF)

To keep excavations and fills reasonably narrow and to avoid impacts to potential waters of the U.S. and sensitive biological resources, retaining wall structures are proposed along the relocated roadway. In total, approximately 2,750 linear feet of soil nail cut walls, and 3,250 linear feet of mechanically stabilized earth fill walls would be introduced, with the locations of cut/fill walls often overlapping along the same stretch of roadway.

The relocated roadway traverses five watersheds, which requires the facilitation of drainageways under the proposed roadway. Eleven total culverts are anticipated, with the sizes ranging from 18 inches to 6 feet by 4 feet. Approximately 3,350 linear feet of pipe are anticipated as part of this culvert system. Triangular ditches with a depth of 1.5 feet are expected to be included at many locations along the roadway to direct roadway runoff. The proposed roadway would use best management practices and stormwater pollution protection through vegetated swales for natural stormwater storage and infiltration.

Roadway construction would involve earthmoving to establish an acceptable grade for a roadbed. The soil in the area is expected to be of adequate quality to use for embankment fill. Small radii horizontal curves would be avoided by excavating hillslope protrusions, and spoil from that excavation would be placed in hillslope recesses to create a more desirable road configuration. Road structural sections would be constructed with 6 inches of imported high quality crushed rock aggregate base topped with 5 inches of bituminous asphalt concrete for paved roadways.

- Relocation of existing utilities, including high-voltage electrical transmission lines and a petroleum pipeline that currently run north-south through the Project site. PG&E intends to consolidate five existing transmission lines into four by combining two 115kV lines on a single lattice tower line and would split off one 500kV line from the other three lines and route it west of the existing corridor, crossing the impoundment. The proposed locations for relocation of the existing transmission lines are shown in **Figure 2.6-1**.
- No relocation of residents or structures.

2.7 Alternative 3 (Limited Action)

The physical features of this alternative would be identical to Alternative 2. Reclamation would not provide funding for construction under Alternative 3 and thus storage and water supply for wildlife refuges would not be included in this alternative unless sources of funding other than WIIN Act funding could be identified.

2.8 Alternative 4 (DPCR 40 TAF)

Alternative 4 is a smaller reservoir in Del Puerto Canyon at a similar location to Alternative 2. Under Alternative 4, the proposed reservoir would provide approximately 40 TAF of new off-stream storage in the Central Valley. Figure 2.8-1 shows the configuration of a smaller reservoir in Del Puerto Canyon. See **Figure 1.5-1** for the location of Alternative 4.

Alternative 4 consists of:

- Reservoir, including main dam and one saddle dam, a spillway, and inlet/outlet works to/from the reservoir;
- Main dam embankment would be at same location as Alternatives 2 and 3 and would be about 190 feet high with an embankment volume of 3.5 million CY;
- A single large saddle dam would be about 100 feet high located within the side canyon where Del Puerto Canyon Road enters the main canyon that would form the reservoir, with an embankment volume of 0.6 CY;
- Inundation area of the reservoir would be about 617 acres, about 30 percent smaller than the footprint of Alternative 2;
- Conveyance facilities, including a diversion/outfall facility on the DMC, 5,000-HP pumping plant, 66-inch diameter pipeline conveying a flow of about 150 cfs, energy

dissipation facilities at the DMC outfall, along with related appurtenant components. All facilities would be at the same location as for Alternative 2;

- Electrical facilities including power supply line and electrical substation to power the pumping plant, located at same location as Alternative 2;
- Relocation of a portion of Del Puerto Canyon Road, which currently runs east-west through the Project site to the same alignment proposed for Alternative 2; and
- Relocation of existing utilities, including high-voltage electrical transmission lines and a petroleum pipeline that currently run north-south through the Project site to the same locations as Alternative 2;
- No relocation of residents or structures would be required.

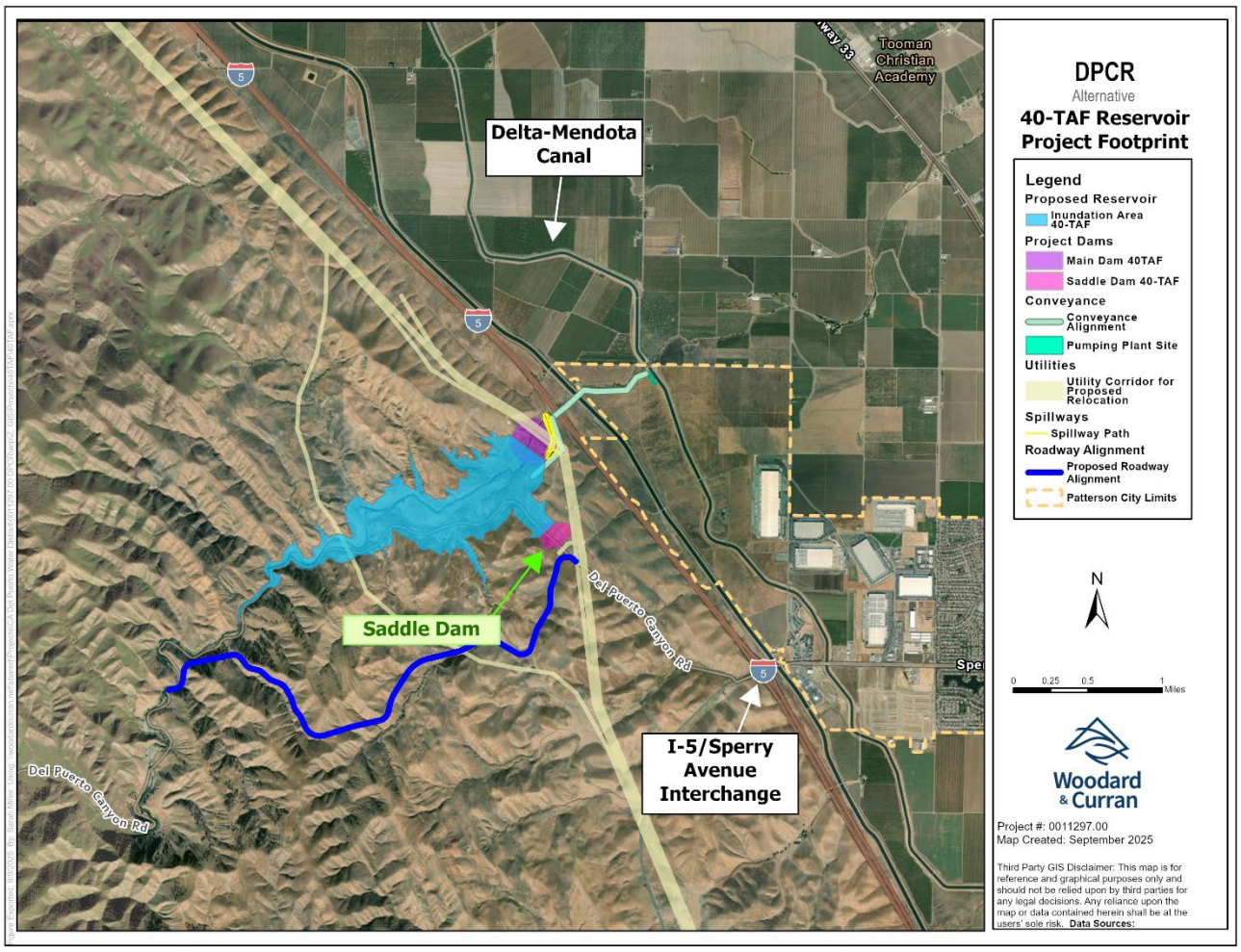

Figure 2.8-1: Alternative 4 (DPCR 40 TAF)

2.9 Alternative 5 (Ingram Canyon)

Alternative 5 is the construction of a reservoir on Ingram Creek located in the foothills of the Coast Range Mountains west of Westley. The proposed reservoir would provide approximately 40 TAF of new off-stream storage. **Figure 2.9-1** shows the elements associated with a reservoir in Ingram Canyon. See **Figure 1.5-1** for the location of Alternative 5.

Alternative 5 components consist of:

- Reservoir, including dam (no saddle dams would be needed), a spillway, and inlet/outlet works to/from the reservoir;
- Reservoir embankment, approximately 310 feet high with an embankment volume of about 8.4 million CY;
- Inundation area of approximately 435 acres;

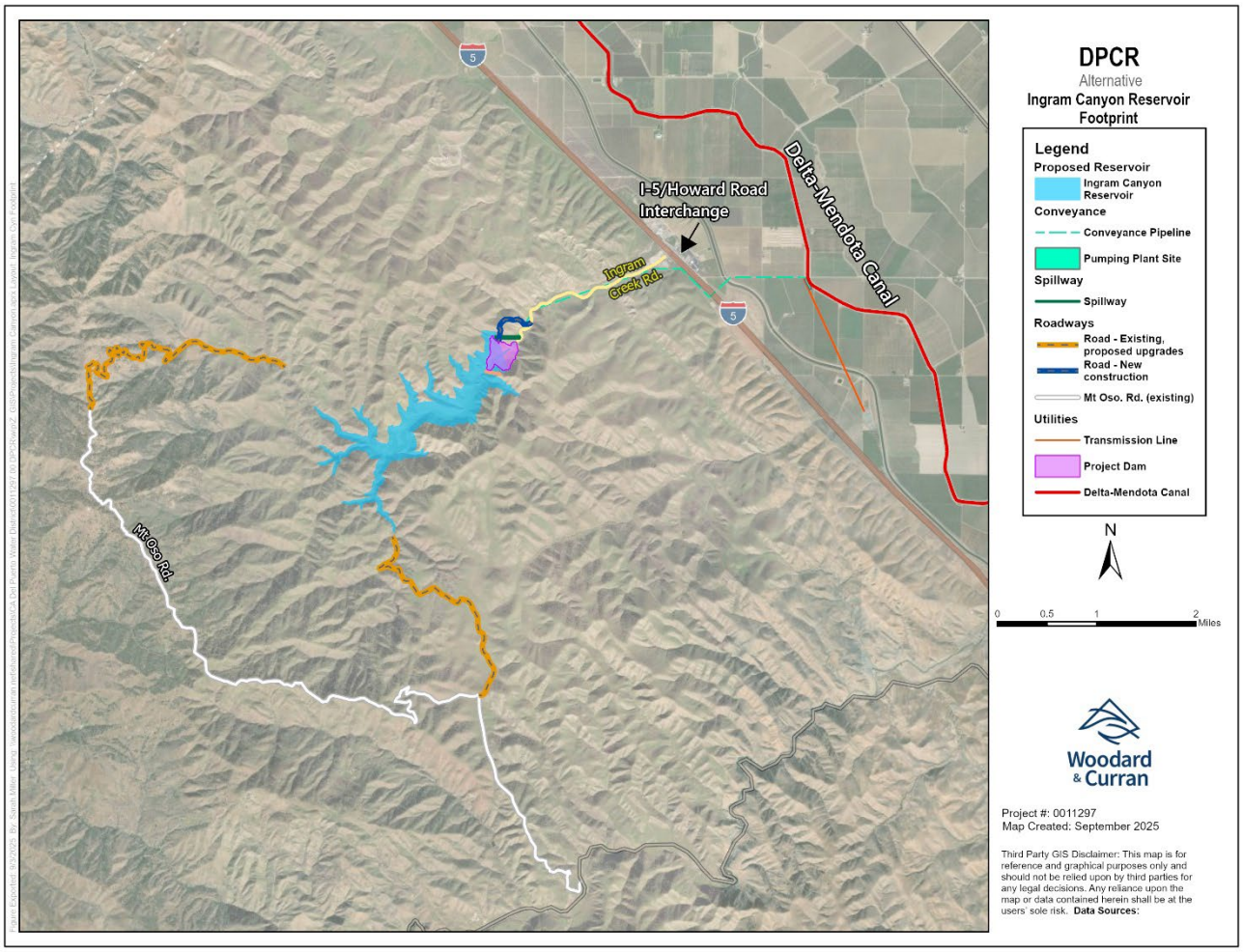

Figure 2.9-1: Alternative 5 (Ingram Canyon)

- Conveyance facilities, including a diversion/outfall facility on the DMC, a 12,000-HP pumping plant, an 84-inch diameter pipeline conveying a flow of about 150 cfs, energy dissipation facilities at the DMC outfall, along with related appurtenant components;
- Electrical facilities including power supply line constructed cross-country to connect the pumping plant to PG&E electrical facilities and a new electrical substation to power the pumping plant;
- Relocation of existing high-voltage electrical transmission lines and the petroleum pipeline that run north-south, west of I-5 would not be required because the dam and reservoir would be located west of those facilities. The conveyance facilities would cross the pipeline and electrical transmission lines, but relocation would not be needed.
- Relocation of residents living within the reservoir footprint. There are three permanent residences located within the reservoir footprint; homes and associated agricultural buildings would be demolished and residents would have to be relocated.
- Construction of access road from Ingram Creek Road to base of dam; and
- Upgrades to existing ranch roads that connect to Mt. Osos Road to provide access to rural residences west of the Alternative 5 reservoir footprint that would not be inundated by the reservoir.

2.10 Comparison of Physical Features of Alternatives

Table 2.10-1 shows the dimensions of the dam and reservoir for each alternative. Total embankment volume includes main dam and (where necessary) saddle dams.

Table 2.10-1: Comparison of Physical Features of Alternatives

	Capacity (TAF)	Surface Area (acres)	Total Dam Embankment Volume (million CY)	Main Dam Height (feet)	Dam Crest Elevation	Dam crest length (feet)	Distance to DMC (miles)	Max Pump Lift (feet)[1]
Alternatives 2 and 3 (DPCR 82 TAF)	82	783	10.2	260	480	1,409	0.9	283
Alternative 4 (DPCR 40 TAF)	40	474	4.1	190	410	950	0.9	213
Alternative 5 (Ingram Canyon)	40	435	8.4	310	800	1,510	3.3	600

[1] Maximum pump lift is the difference between the elevation of the DMC water level and the maximum reservoir operating level.

2.11 Alternatives Considered but Eliminated

2.11.1 Reclamation EIS Alternatives

NEPA requires Federal agencies to consider a range of reasonable alternatives, which must be rigorously explored and objectively evaluated. Other alternatives can be screened out and eliminated from detailed study with a brief discussion of the rationale for not including it in the EIS. Reclamation considered other reasonable alternatives that could potentially meet the Project's purpose and need (See Section 1.4).

2.11.1.1 Groundwater Storage Alternative

Many comments received on the NOI described groundwater storage as a non-structural alternative. However, groundwater storage cannot be accomplished without substantial construction of conveyance facilities to transport water to the storage site, large recharge ponds, or injection wells, and multiple extraction wells and conveyance facilities to recapture stored groundwater. For example, the B.F. Sisk Dam Safety Improvements EIS/EIR rejected groundwater banking as an alternative, concluding that "review of potential new groundwater banking sites determined that development of a new facility would require extensive geologic and environmental investigation, land acquisition, delivery infrastructure and new well development" (U.S. Department of the Interior, Bureau of Reclamation and California Department of Water Resources. 2019, page 2-5).

A review conducted by the Project sponsors of other storage projects concluded that groundwater storage would require extensive facilities (Woodard & Curran 2021). To develop groundwater storage on the scale of the other alternatives considered in this EIS, it would be necessary to take almost 3,000 acres of land out of production to develop recharge ponds. Other considerations include:

- **Recovery Rates**. Groundwater storage results in approximately 10 percent of the water left behind permanently within the aquifer, resulting in a 90 percent recovery rate.
- **Soil properties**. The soils within the DPWD and SJRECWA service areas are not highly permeable in most areas, which would increase the area of land required for aquifer recharge.
- **Rate of clogging**. Accumulated solids and precipitation of calcium carbonate and other salts can become entrapped within the soils in the bottom of percolation ponds.
- **Depth to groundwater**. The depth to groundwater limits the volume of water that can be replaced in the Upper Aquifer of the Delta-Mendota Subbasin in any given year (Bouwer 2004).
- **Timing**. Recharge rates are limited by the rate at which percolation can occur, which can result in needing to build temporary surface storage to hold excess flows until percolation can occur.
- **Land use**. Groundwater recharge requires large acreages of land, which would take local agricultural land out of production. This requirement is at odds with the Project purpose to increase water supply reliability for agriculture during dry years.

Reclamation's Project purpose is to provide surface water storage to improve agricultural and M&I water supply reliability within the DPWD and SJRECWA service areas. Therefore, because this alternative would not provide surface water storage and the issues listed above that affect the

suitability of a Groundwater Storage Alternative, Reclamation screened out groundwater storage as an alternative for the purposes of this DEIS.

2.11.1.2 Water Conservation Alternative

Several commenters on the NOI requested Reclamation consider water conservation as a Project alternative. The Project Sponsors actively engage in an extensive range of conservation efforts, which include investing in conservation programs, providing low interest loans and grants for the installation of high efficiency irrigation systems, and working to improve on-farm irrigation practices and new canal delivery technology to conserve water. In addition, conservation alone cannot meet the Project purpose of providing water supply reliability in dry years or to provide water storage south of Delta. In 2014 and 2015, and again in 2021 and 2022, the CVP allocation was 0 AF. In such years, water conservation efforts would not provide the water supply reliability that would be afforded by water storage south of the Delta.

Reclamation screened out additional water conservation as an alternative for the purposes of this EIS because water conservation would be unable to meet the Project need to improve agricultural and M&I water supply reliability within the DPWD and SJRECWA service areas, and water conservation efforts are already aggressively pursued by the Project Sponsors.

2.11.1.3 Water Transfers

Under this Alternative DPWD and the SJRECWA would pursue additional water through water transfers during times of water shortage. This alternative would not be feasible over the long term due to the continuing increase in cost of purchasing water when supply availability is low, which is not sustainable for the goals of the Project. In addition, even if water transfers are available and affordable, this alternative does not provide water supply reliability for local needs.

2.12 Preferred Alternative

Reclamation has identified Alternative 2 (DPCR 82 TAF) as the preferred alternative based on several factors evaluated in the engineering and economic study and this Draft EIS. Alternative 2 provides the needed amount of surface water storage and thus supplies more water for agriculture and wildlife refuges than other alternatives, while requiring less energy than Alternative 5. Differences in potential environmental impacts exist for each of the Action Alternatives and are described in Chapter 3.

Reclamation's decision on which alternative to implement will consider public comments and the full analysis in the Final EIS.

3 Affected Environment and Environmental Consequences

3.0 Introduction

This chapter includes a description of the affected environment and environmental consequences for each of the five Alternatives.

For each Action Alternative the "Project site" includes the footprint for all project facilities including the pumping plant on the DMC, conveyance facilities from the DMC to the reservoir, main dam and any required saddle dams, reservoir, and any required roadway and utility relocation. For each environmental resource a "study area" is defined for each alternative. For most resources there is a separate study area for facilities in Del Puerto Canyon and Ingram Canyon, but for some resources such as air quality there is a single larger study area that encompasses the Project sites for all Action Alternatives.

3.1 Aesthetics

3.1.1 Affected Environment

This chapter describes the environmental setting, methods of analysis, and impact analysis for visual resources that would be potentially affected by the Proposed Project. Baseline conditions for aesthetics were based on the Final EIR for the Del Puerto Canyon Reservoir Project.

3.1.1.1 Study Area

The Del Puerto Canyon study area includes Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPR 40 TAF) Project sites plus the surrounding area from which the Project site could be visible. The Ingram Canyon study area includes Alternative 5 (Ingram Canyon) Project site and the surrounding area from which the Project site could be visible. The Project sites are shown in **Figure 1.5-1** in Chapter 1.

3.1.1.2 Issues of Environmental Concern

Issues of environmental concern for aesthetics are changes to public views and scenic vistas as a result of the proposed Project, including changes to their quality or character, damages to scenic resources (natural features or historic structures), and lighting changes that could adversely affect views.

3.1.1.3 Characterization

Scenic Views. Both study areas are located within Stanislaus County in California's Central Valley. The County is characterized by the valley floor stretching east from the I-5 corridor and mountainous and hilly terrain west of the I-5 corridor. Visually this creates sweeping views to the east of agricultural lands, with occasional development in the form of small towns and industrial land uses. To the west, the Diablo Range rises above the valley floor, and the hills within the study areas are primarily grazing land and undeveloped hillsides. Terrain is generally flat in the eastern end of the study areas along the DMC transitioning into the foothills of the Diablo Range rising west of I-5. The Diablo Range is visible from the valley floor from a distance. Long-range visibility in the area is frequently limited by haze and particulate air quality contamination. The Diablo Range within the study area and west of I-5 features rolling grasslands and foothills, and to the east of I-5 includes agricultural operations and light industrial buildings. Agricultural land east of I-5 is planted predominantly with orchard and row crops, which can impede views from local roadways.

The stretch of I-5 adjacent to the proposed Project is a designated scenic highway under the California Streets and Highway Code, Division 1, Chapter 2, Article 2.5, Section 263.3(d). The scenic highway designation in the Project vicinity is "Route 5[1]" which begins at Highway 152/33 and extends approximately 45 miles north to Highway 132. There are two vista points along I-5 in Stanislaus County: one is located just south of Shiells Road Undercrossing, approximately 14 miles south of Del Puerto Creek and 19 miles south of Ingram Creek, and the other is approximately 0.5

[1] California Streets and Highway Code refers to I-5 as Route 5.

mile south of Salado Creek, or approximately 5 miles south of Del Puerto Creek and 10 mile south of Ingram Creek. Neither of these vista points is in the immediate vicinity of the study areas. Close-up views of the study areas are available from I-5, though only briefly while driving, due to the 70 mile-per-hour speed limit on this stretch of I-5.

Land Use. West of I-5 lies unincorporated Stanislaus County. Stanislaus County's General Plan identifies the portion of the study areas in the unincorporated county as agricultural land use (County of Stanislaus, 2016b). East of I-5 lies the City of Patterson. The portion of the Del Puerto Canyon study area within the City of Patterson is zoned as West Patterson Light Industrial (City of Patterson, 2014a). The City of Patterson's General Plan Map shows the study area west of I-5 and east of Del Puerto Canyon Road as mixed use, with a small area of Highway Services Commercial immediately north of Del Puerto Creek, adjacent to I-5 (City of Patterson, 2014e). Current land use is predominantly agriculture, with a few large commercial and industrial structures east of the DMC in the vicinity of the study areas. Ranching is the primary land use within Ingram Canyon. Ingram Canyon contains three permanent residences and associated agricultural buildings. The portion of the Ingram Canyon study area east of I-5 includes a commercial area and travel plaza located at the I-5 Howard Road interchange. The commercial area is surrounded on all sides by agricultural land.

3.1.2 Regulatory Setting

There are no federal regulations related to aesthetics that apply to the Project. A description of each state and local law or regulation is included in Appendix E.

3.1.3 Environmental Consequences

3.1.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) for aesthetics include:

1 **AES-1: Implement Color Palette Consistent with Existing Environment**

The pumping plant's above-grade structures shall be painted a matte color consistent with the area's visual aesthetic, generally matte tan or light brown. Roofing for above-grade structures shall be matte as well to minimize potential glare.

2 **AES-2: Nighttime Construction Lighting**

Nighttime construction lighting shall be shielded and oriented downward to minimize effects on any nearby receptors including habitat for wildlife species. Lighting shall be directed toward active construction areas only and shall have the minimum brightness necessary to ensure worker safety.

3 **AES-3: Directional Lighting for Dam Control Building, Inlet/Outlet Works Control Building and Bifurcation Structure in Unincorporated Stanislaus County**

Nighttime lighting for the main dam's control building, the inlet/outlet control building, and bifurcation structure shall be equipped with directional shields that aim light downward and away from adjacent roadways and adjacent undeveloped areas that may

provide habitat for wildlife species. In addition, the placement of lighting fixtures would be selected to concentrate light on-site to avoid spillover.

3.1.3.2 Alternative 1 (No Action)

The No Project Alternative would avoid aesthetic impacts associated with dam construction and would not result in any new light and glare. Although the Project Sponsors would pursue additional water supplies, it is expected that fallowing would increase and degrade the visual character of the agricultural land in their service areas as irrigated lands would be replaced with dried vegetation and possibly dead orchards. Some viewers from I-5 may perceive this change as visual degradation of the agricultural landscape.

3.1.3.3 Alternative 2 (DPCR 82 TAF)

Effects on Scenic Vistas. Project construction would be visible from I-5. Based on geography and height of the main dam, it is expected that the main dam and spillway would be partially visible from about one-quarter mile on either side of the culvert where Del Puerto Creek crosses under I-5. Construction of the two saddle dams would not be visible from I-5. Construction activities for the dam, spillway, and inlet/outlet works would be visible from further away than the completed structures, due to height of some equipment and location in relation to the dam. Construction activities that may be visible and alter the visual quality of this portion of the I-5 Scenic Highway include the presence of heavy equipment (excavators, backhoes, trucks, generators, tanks, drill rigs, and other equipment). Dust from construction may obscure views temporarily, though EPMs (see Air Quality section) and mandatory measures required by the San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 8011, General Requirements – Fugitive Dust Emission Sources (see Appendix E) would be implemented to minimize fugitive dust emissions. As dam construction progresses, views from I-5 into Del Puerto Canyon would be reduced until blocked completely by the main dam.

Staging areas would be located along I-5 and other access points to the site and would be visible from I-5 during the duration of construction. Equipment, materials such as pipes, stockpiled fill materials, concrete and masonry, worker vehicles, and construction trailers would be visible at the staging areas. Staging areas are typically fenced in and secured to prevent unauthorized access, but are not screened, and may temporarily alter visual quality in the study area for the duration of construction.

Once built, the main dam would be visible or partially visible for approximately half a mile on I-5, approximately one-quarter mile on either side of the culvert where Del Puerto Creek crosses I-5. As seen in **Figure 3.1-1** and **Figure 3.1-2** the main dam would eliminate existing views of Del Puerto Canyon. While driving at 70 miles per hour, existing views into Del Puerto Canyon are visible for less than one minute on I-5, and substantial view impacts would only be experienced for a portion of that time, generally as vehicles pass the mouth of the canyon at Del Puerto Creek.

Figure 3.1-1: Existing View from I-5 of Del Puerto Canyon, Looking West

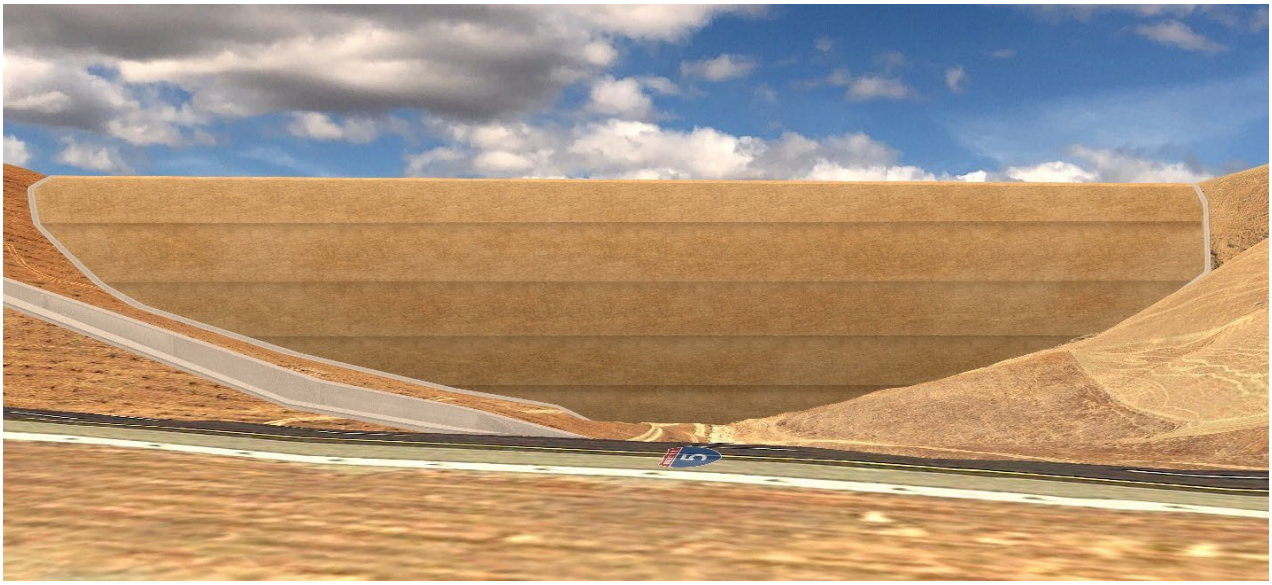

Figure 3.1-2: Visual Simulation of Alternative 2 Main Dam, as seen from I-5, Looking West

The primary saddle dam, located in the side canyon where the existing Del Puerto Canyon Road enters the main canyon, would be approximately one-half mile from I-5, and would have a vegetated slope on the outside of the dam, helping to blend it visually with the surrounding hillsides. The primary saddle dam would be visible from the short segment of the existing Del Puerto Canyon Road at the point where the existing road connects with the relocated portion of the road..

The pumping plant would be located east of and visible from I-5. It would be approximately 0.6 miles away from I-5, which is slightly further than other large, existing structures in the vicinity of

the study area. The pumping plant site is about 1,600 feet west of a proposed five-story warehouse building planned for construction on Zacharias Road. Aboveground structures associated with the pumping plant would be consistent in height with other existing nearby structures, with the exception of the antenna (50-feet tall) and anchor/terminal tower (40-feet tall). Both the antenna and terminal tower for the electrical substation are within the City's and County's height limit for communication facilities (County Zoning Ordinance 21.91.030 and City Zoning Ordinance 18.84.050). The City's Zoning Ordinance 18.84.080 requires that antenna be screened or disguised to reduce visual impacts and prohibits reflecting finishes or paints that are inconsistent with the visual character of the area.

Although the relocated utility lines would be closer to I-5 than the existing utility lines, views would remain consistent with views of the existing utility lines along this portion of I-5. The conveyance pipeline's construction activities would be visible from I-5 but the installed pipeline would be underground and would not have long term aesthetic impacts.

Damage to Scenic Resources. The primary scenic resource in the study area is the view of Del Puerto Canyon from I-5, as discussed above under "Effects on Scenic Vistas." The portion of the existing Del Puerto Canyon Road that would be relocated provides views of rolling hillsides, foothills, grazing land and agricultural operations. Construction of the reservoir would eliminate approximately four miles of the existing Del Puerto Canyon Road and replace it with a new route that would provide a limited view of the reservoir before rejoining the existing Del Puerto Canyon Road. The operation of the Project would involve the raising and lowering of water levels in the reservoir. As water levels change, the visual quality of the canyon may also change as a result of sedimentation and erosion of canyon sides due to water movement, as well as potential changes in plant palette that could result from changing availability of water and tolerance to variable water levels. However, the reservoir would only have limited visibility from the new roadway alignment and from existing service roads in the area. The relocated road would provide scenic views of the landscape along the new alignment.

The conveyance pipelines from the DMC to the reservoir would be buried as they are being constructed, thus, they would not have long-term operational impacts on the visual quality and character in the study area. The aboveground structures for the pumping plant and electrical facilities would be consistent with the visual character of other structures located along and within the DMC, such as diversion structures, gates and pumps and commercial and industrial warehouses. Relocation of the utility lines would not alter the visual character because utility lines are already visible in the area and the relocated lines would remain consistent with the existing views of utility lines.

Degradation of Public Views. Public views are those from publicly accessible vantage points. Public views of the Project would be available from I-5 and the proposed roadway realignment. During construction, public views would be affected in the same ways as described in "Effects on Scenic Vistas" above. During construction of the dam, the existing roadway would generally remain the same as current conditions until the new roadway was completed and the original roadway closed. The Project would eliminate public views from the existing Del Puerto Canyon Road. Views of construction activities would not be available from the new roadway, which would open during construction. Once the reservoir fills, it may be possible to see the reservoir from the small portions

of the new roadway, depending on water levels and location along the roadway. Views are not currently available along the new roadway alignment so the Project would not impact existing public views from the new roadway.

New Sources of Light and Glare that Affects Views. As described in Section 2.4.5.2, Construction Timing and Sequencing, nighttime construction would be required for the reservoir and dam facilities, with construction taking place between roughly 5:00 a.m. and 1:00 a.m. five days a week. Weekend construction would occur on an as-needed basis, and weekends may be used for equipment maintenance, as necessary. Construction areas would be lighted to allow work to continue at night. Nighttime and weekend construction for the pumping plant, conveyance, roadway, and powerlines would occur on an as-needed basis, though the portions of the conveyance pipeline that requires tunneling would include nighttime construction. If nighttime construction is needed, construction lighting constraints consistent with applicable local requirements (including Stanislaus County policy to shield lighting and City of Patterson Zoning Ordinance section 18.80.060 regarding lighting requirements) would be used. Consistent with EPM 2, any required nighttime lighting during construction would be oriented downward and shielded, minimizing lighting impacts on views. Although nighttime lighting during construction may be visible when used, it would be aimed at the construction area and shielded to minimize spillover.

During operation, security lighting would be turned on as-needed and could be visible from I-5 or the community across I-5 from the dam. Security lighting would also be angled downward and shielded. Because it would be used infrequently and would be shielded, security lighting would not have a substantial adverse impact on views.

3.1.3.4 Alternative 3 (Limited Action)

Alternative 3 would affect views from I-5 and would require nighttime construction lighting. Aesthetic impacts would be the same as described above for Alternative 2.

3.1.3.5 Alternative 4 (DPCR 40 TAF)

Alternative 4 would affect views from I-5 and would require nighttime construction lighting. Aesthetic impacts under Alternative 4 would be similar to those described above Alternative 2. Although the height of the main dam would be about 70 feet lower, with a crest about 450 feet shorter than Alternative 2, it would still be visible from I-5 and the dam would obstruct existing views of Del Puerto Canyon west of I-5 (see **Figure 3.1-3**). Views of the dam would still be fleeting for passing motorists. There would be less opportunity for public views of the reservoir from the new roadway alignment because the roadway would follow the same alignment as under Alternative 2, but the reservoir would be smaller, with a footprint of 617 acres as compared to 897 acres for Alternative 2, and therefore less visible behind the hills between the roadway and Alternative 4.

Figure 3.1-3: Visual Simulation of Alternative 4 Main Dam, as seen from I-5, Looking West

3.1.3.6 Alternative 5 (Ingram Canyon)

Effects on Scenic Vistas. The Alternative 5 dam would not be visible from the I-5 scenic highway. Construction activities for portions of the conveyance pipeline would be visible from I-5 but would be temporary in nature and the installed pipeline would be buried, avoiding long-term or operational visual impacts from the pipeline. The pumping plant would be located east of and visible from I-5, approximately 0.8 miles away, slightly further from I-5 than the pumping plant for Alternatives 2, 3, and 4. Additionally, traffic along I-5 travels with a speed limit of 70 mph, and would therefore limit the amount of time that any construction activities would be visible. Construction vehicles and equipment traveling to and from the dam site would be visible during construction but would not be substantially different from existing views along I-5 because Ingram Creek Road east of I-5 includes a travel plaza that serves large semi-trailers and trucks, and a truck tire repair business and gas station west of I-5.

Damage to Scenic Resources. Alternative 5 would flood a natural canyon, creating a permanent change in existing landscape at the Project site. These changes would not be visible from publicly accessible roadways but would represent an unavoidable change to a scenic resource. The aboveground structures for the pumping plant and electrical facilities would be consistent with the visual character of other structures located along and within the DMC right-of-way, such as diversion structures, gates and pumps. The conveyance pipeline construction activities would be temporarily visible from I-5 during construction until the pipeline is buried.

Degradation of Public Views. Alternative 5 would not be visible from public roadways other than limited views of the pump station and the temporary conveyance pipeline construction activities near I-5. Therefore, Alternative 5 would not degrade public views.

New Sources of Light and Glare that Affects Views. Similar to Alternative 2, Alternative 5 would have nighttime lighting during construction, as needed. The dam would include regular

nighttime construction similar to Alternative 2, but would be far enough from major roadways and development to not be visible from such areas. There may be some nighttime construction for the conveyance pipeline when tunneling is required that could be visible from I-5 and from the travel plaza east of I-5 at Ingram Canyon Road, which includes hotels, fast food restaurants and gas stations. As with Alternative 2, if nighttime construction is needed, construction lighting constraints consistent with applicable local requirements would be used. Consistent with EPM 2, any required nighttime lighting during construction would be oriented downward and shielded, minimizing lighting impacts on views. Although nighttime lighting during construction may be visible when used, it would be aimed at the construction area and shielded to minimize spillover**.**

3.2 Agriculture

3.2.1 Affected Environment

This section describes the agricultural resources and the potential impacts the Project Alternatives may have on these resources. Baseline conditions for agriculture were based on the Final EIR for the Del Puerto Canyon Reservoir Project.

3.2.1.1 Study Area

The Project sites for all alternatives are located in California's Central Valley entirely in Stanislaus County. The Del Puerto Canyon study area (see **Figure 3.2-1)** includes the Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF) Project sites. The Ingram Canyon study area (see **Figure 3.2-2**) includes the Alternative 5 (Ingram Canyon) Project site. While all construction would take place in Stanislaus County, the Project would benefit agricultural areas in the Project Sponsors' service areas, which include parts of San Joaquin, Stanislaus, Merced, Madera, and Fresno counties.

3.2.1.2 Issues of Environmental Concern

Issues of environmental concern for agricultural resources are conversion of farmland to non-agricultural uses, either temporarily or permanently; an action's consistency with existing agricultural uses; and conflicts with Williamson Act contracts.

3.2.1.3 Characterization

DPWD provides agricultural irrigation water to about 45,000 acres of productive farmland in Stanislaus, San Joaquin, and Merced counties. DPWD's primary source of water is from a contract with Reclamation that provides for delivery of up to 140.21 TAF of CVP water annually. DPWD's CVP water allocations have been substantially reduced during the last decade. In 2014, 2015, 2021, and 2022, due to severe drought DPWD received no CVP water at all, and DPWD expects that restrictions in CVP operations will result in DPWD receiving no more than an average of 35 percent of its contractual allocation on an annual basis under non-drought conditions (DPWD, 2025). The Exchange Contractors serve 255,500 acres of farmland in Stanislaus, Merced, Fresno, and Madera counties, and have a contractual water allotment to receive 840 TAF of surface water each year. In critically dry years the allocation is reduced to 75 percent, or 650 TAF.

Crops and Production.

*Stanislaus County***.** According to the California Department of Food and Agriculture (2023), Stanislaus County consistently ranks among the top ten agricultural counties in the state, producing a wide range of agricultural commodities. Agriculture is the County's leading industry, generating $4.2 billion in production value in 2022 (Stanislaus County Agricultural Commissioner's Office, 2022).

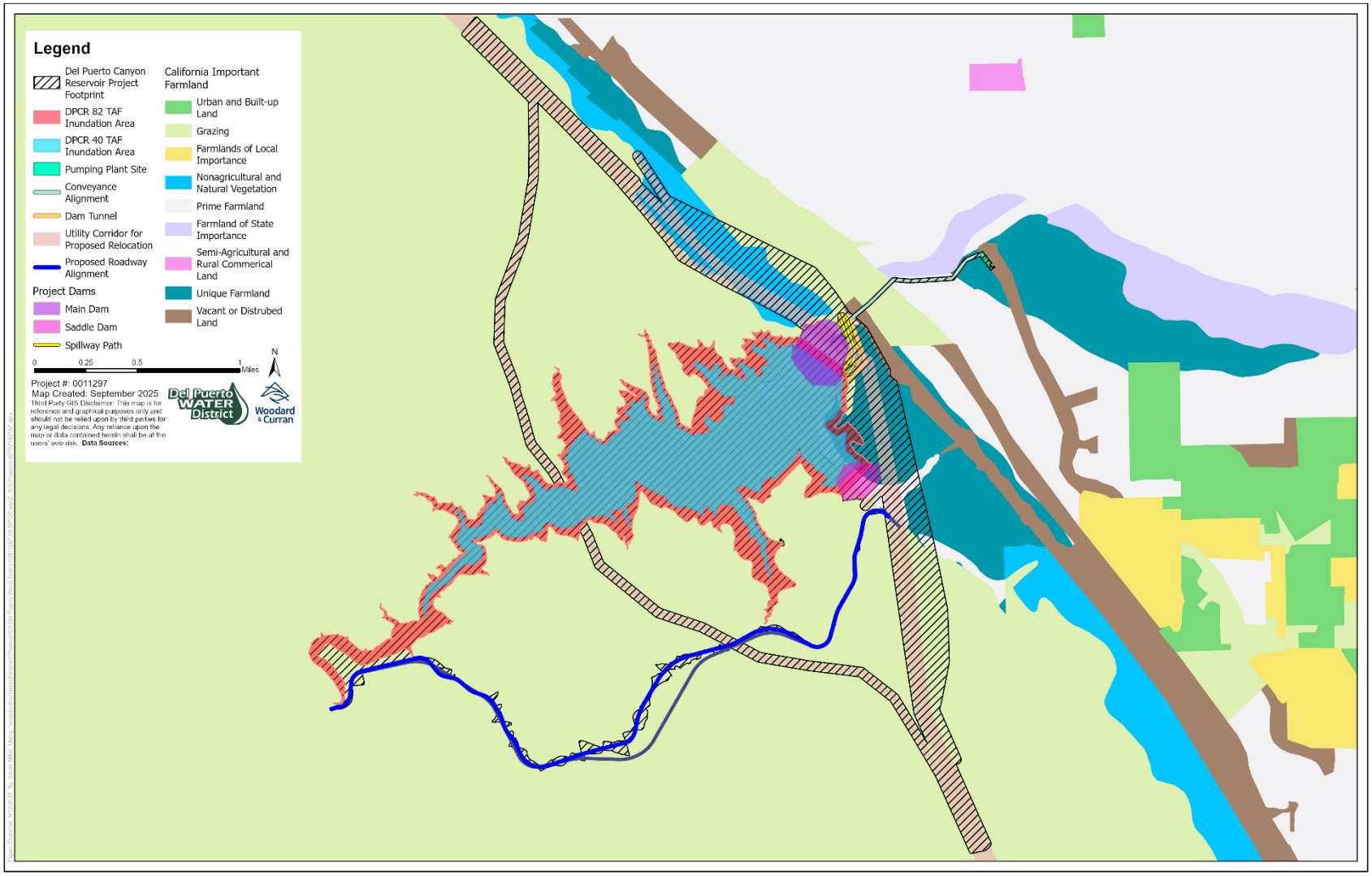

Figure 3.2-1: Del Puerto Canyon Study Area and Important Farmland Types

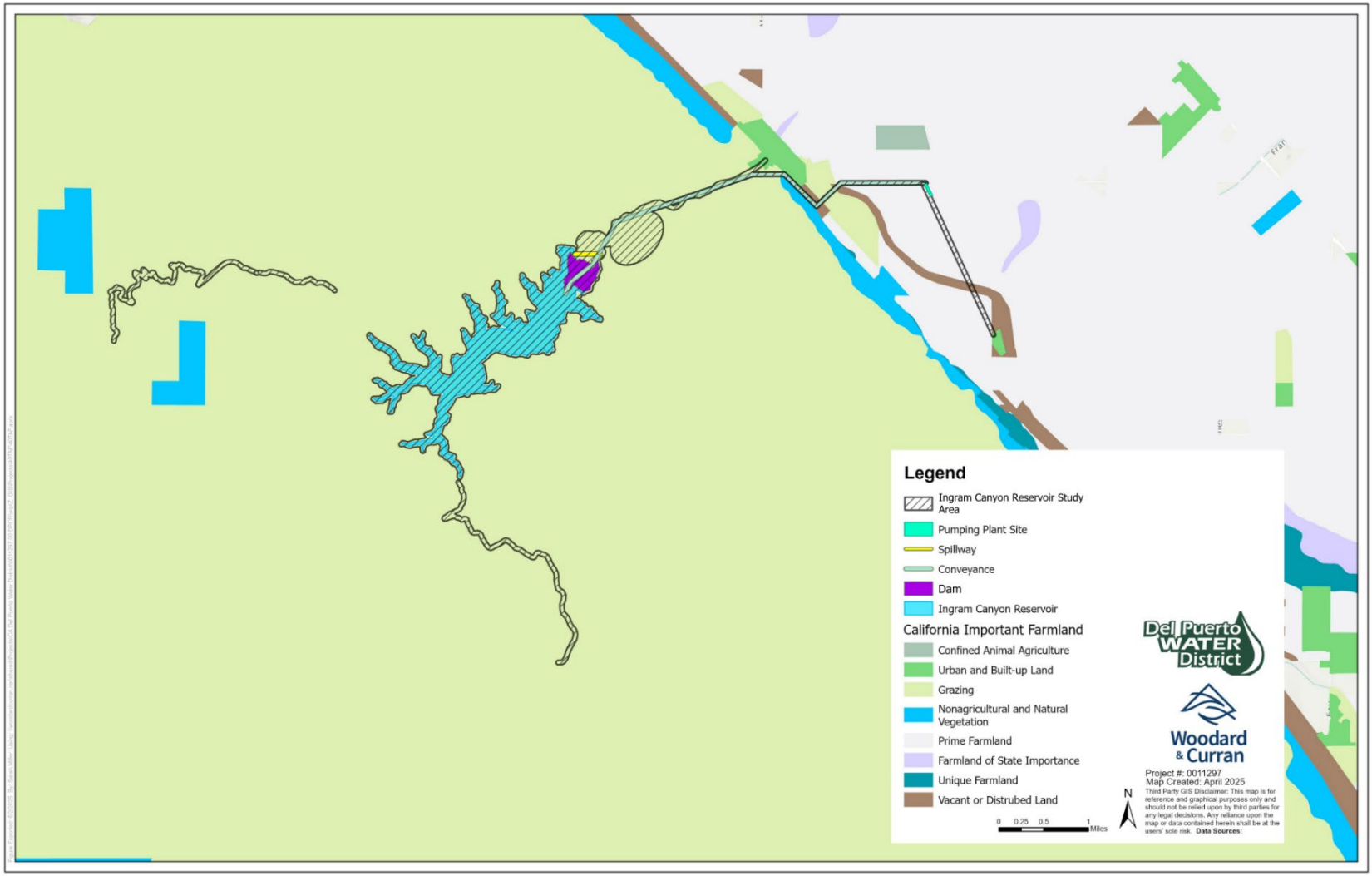

Figure 3.2-2: Ingram Canyon Study Area and Important Farmland Types

*Merced County***.** Merced County is a major agricultural county in California. In 2022, the total value of agricultural commodities produced in Merced County was approximately $4.1 billion (Merced County Department of Agriculture, 2022). Agriculture is Merced County's number one industry and largest employer (Merced County, 2022).

*San Joaquin County***.** San Joaquin County has a robust agricultural industry. In 2023, the total value of agricultural products from San Joaquin County was $3.22 billion (San Joaquin County Agricultural Commissioner's Office, 2024).

*Fresno County***.** Agriculture is a significant component of the economy in Fresno County. In 2023, the total value of all agricultural commodities produced in Fresno County was $8.59 billion (Fresno County Agricultural Commissioner's Office, 2024).

*Madera County***.** Agriculture is an important part of Madera County's economy, with a variety of crops grown. The total value of agricultural products in 2023 for Madera County was nearly $1.9 billion (Madera County 2024).

Types of Farmland. Agricultural resources are defined as (1) Important Farmland designated under the California Department of Conservation (CDOC) Farmland Mapping and Monitoring Program (FMMP), specifically Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (2) land zoned for agricultural use by Stanislaus County; (3) land under Williamson Act or Farmland Security Zone contracts as recorded by each county and (4) Important Farmland as defined under the Farmland Protection Policy Act (FPPA), specifically Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. While CDOC and FPPA use similar categories to define Important Farmland, the FPPA categories are primarily based upon soil quality, while the CDOC breakdown is based on a combination of soil quality and current land use, and the CDOC maps are updated every two years on a rotating basis. FPPA coordination with National Resources Conservation Service (NRCS), required for projects with a federal nexus that would affect farmland, is ongoing, and a Land Evaluation and Site Assessment is being prepared to assess impact on agricultural land for each alternative.

The definitions of the various types of farmland discussed below are provided in Appendix E, Regulatory Framework, State Policies and Regulations, Farmland Mapping and Monitoring Program. According to the Farmland Mapping and Monitoring Program, Stanislaus County consists of approximately 25 percent prime farmland, 3 percent farmland of statewide importance, 12 percent unique farmland, and 3 percent farmland of local importance. Grazing land, which is not considered important farmland, covers almost 42 percent of Stanislaus County.

Important Farmland. Much of each study area is classified by the California Department of Conservation (CDOC) as grazing land, which is not considered important farmland. Portions of the Del Puerto Canyon study area are classified as unique farmland and prime farmland (**Figure 3.2-1**). Portions of the Ingram Canyon study area east of I-5 are classified as prime farmland (**Figure 3.2-2**). Based on review of historical Google Earth aerial photographs, the area west of I-5 and south of Del Puerto Creek was first planted with orchards in late 2008 to early 2009, but existing trees near Del Puerto Canyon Road have been dead since about 2018 and large portions of the orchard were removed in 2025. Prior to 2010 there was no important farmland designated within the dam and

reservoir footprint (CDOC 2008). Historically (i.e., prior to the planting of the orchards), the only agricultural activity in the area west of I-5 was grazing. Both living and dead orchards exist in this area. Based on the definitions of important farmland, areas that are no longer being used for irrigated agricultural production would not qualify as important farmland four years after irrigation of the parcel ceased.

Williamson Act Contracts. As stated on the California Department of Conservation website, "Williamson Act Contracts are voluntary and formed between a county or city and a landowner for the purpose of restricting specific parcels of land to agricultural or related open space use. Private lands within locally-designated agricultural preserve areas are eligible for enrollment under a contract. The minimum term for contracts is ten years." According to the Williamson Act 2022 Status Report, approximately 580,000 acres were enrolled under the Williamson Act in Stanislaus County as of 2021 (CDOC, 2022).

As shown in **Figure 3.2-3**, portions of the Del Puerto Canyon Study area are enrolled in Williamson Act contracts, and classified as nonprime agricultural land. As shown in **Figure 3.2-4**, portions of the Ingram Canyon study area are also enrolled in Williamson Act contracts and classified as nonprime agricultural land west of I-5, with the conveyance corridor traversing prime and mixed enrollment agricultural land east of I-5.

3.2.2 Regulatory Setting

The regulatory setting for agricultural-related laws and regulations is presented in Appendix E, Regulatory Framework, Stanislaus County Zoning Code.

3.2.3 Environmental Consequences

3.2.3.1 Environmental Protection Measures

There are no agricultural resource-related Environmental Protection Measures necessary for the Project.

3.2.3.2 Alternative 1 (No Action)

Alternative 1 would not include the construction of any new facilities and thus would not have any impacts related to agricultural resources. However, Alternative 1 would provide no water supply benefits to existing agriculture in the service areas of the Project Sponsors and therefore could result in adverse impacts to agricultural productivity in the region over the long term. Without additional water storage, farmers may fallow lands temporarily or for longer periods associated with drought or lack of storage or convert them away from agriculture permanently. This represents an economic loss to these agricultural areas and increases the potential for land to be converted to non-agricultural uses. Additionally, the City of Patterson General Plan indicates that the majority of the important farmland in the study area is expected to be developed with non-agricultural uses in the future.

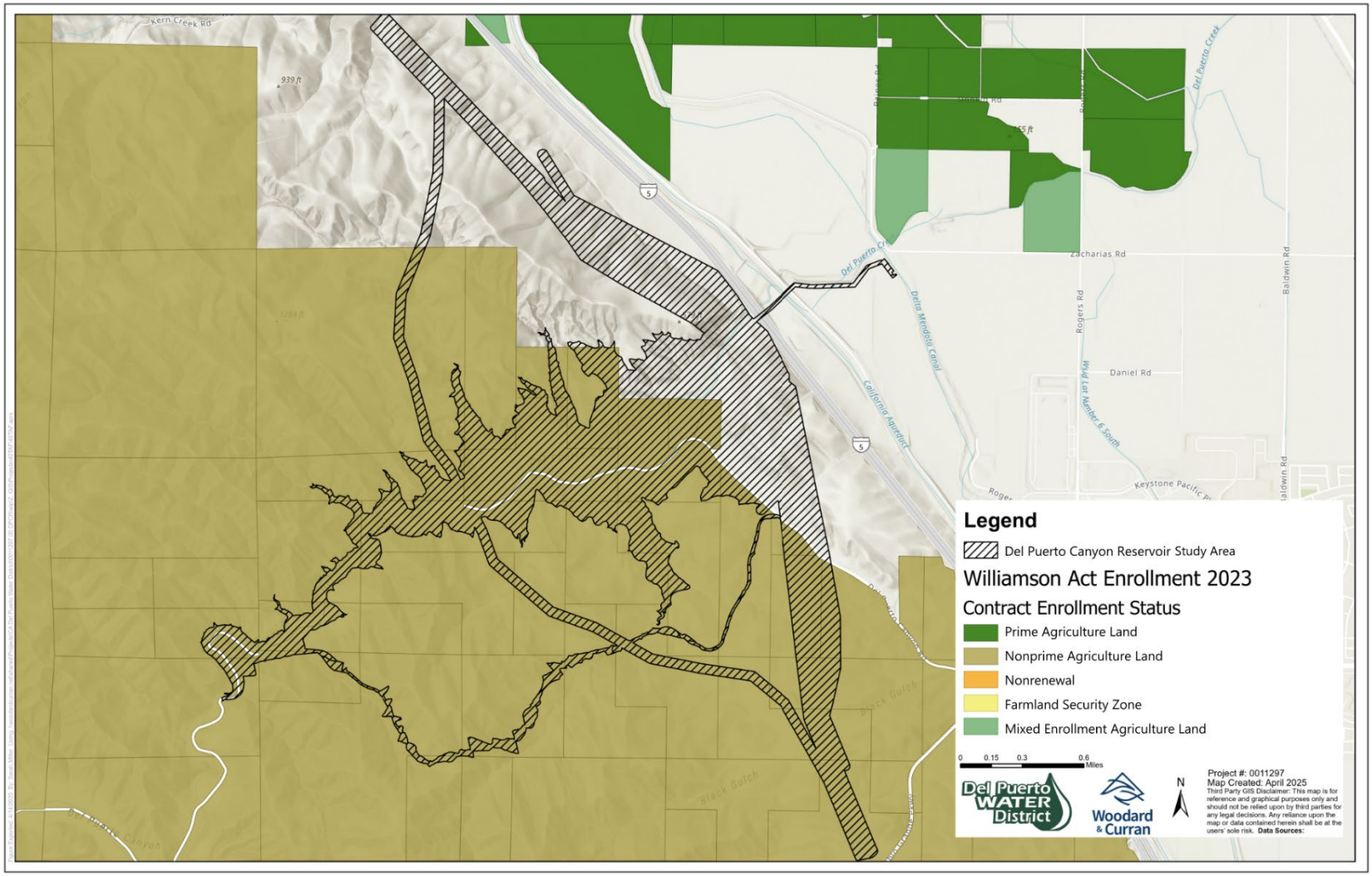

Figure 3.2-3: Williamson Act Lands –Alternative 2

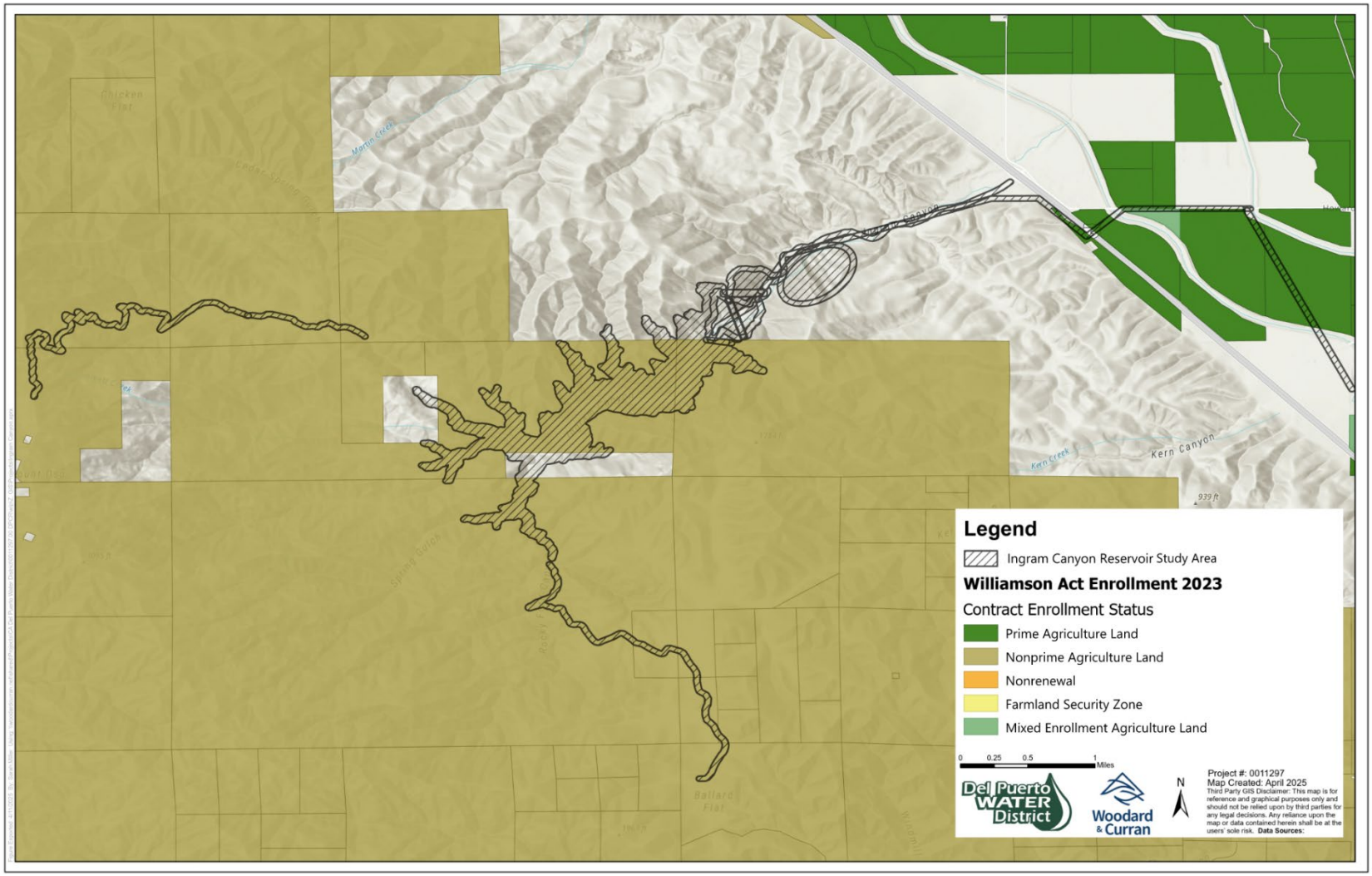

Figure 3.2-4: Williamson Act Lands –Alternative 5

3.2.3.3 Alternative 2 (DCPR 82 TAF)

Convert Farmland to Non-Agricultural Use

Alternative 2 would convert a total of about 1,530 acres of agricultural land to non-agricultural use.

*Reservoir***.** Under Alternative 2, the reservoir and dams in Del Puerto Canyon would be constructed in part on land designated as important farmland (see **Figure 3.2-1**). Land would be converted from agricultural use. Construction work would occur within the dam and reservoir footprint; staging areas would also be located within the dam and reservoir footprints. No impacts on agricultural land would occur outside this footprint. Once complete, the dam sites would be permanently converted away from agricultural use. Following construction, the reservoir would be filled, and the inundation area would be permanently converted to non-agricultural use.

The inundation area and dam area of the reservoir includes a total of 80.2 acres of important farmland, specifically prime farmland and unique farmland, with the remainder being grazing land, non-agricultural and natural vegetation, or vacant or disturbed land. No crops are currently produced on this important farmland; it was planted with orchards, but these have been abandoned or removed. Alternative 2 would permanently convert these areas into acreage that could not be used for agricultural production. Because this acreage is currently not in production, the construction of Alternative 2 would not reduce the acreage in production compared to existing conditions, however, it would reduce the availability of farmland that could be put into production compared to Alternative 1. No adverse impacts on existing agricultural production would occur.

The City of Patterson General Plan identifies land uses for the city's general plan area (see *Section 3.11, Land Use and Recreation,* **Figure 3.11-3**). Nearly all of the important farmland that would be affected by the reservoir and dams is included in the city's General Plan map. The city designates these areas as mixed use, which indicates that the area is already a candidate for potential development and the important farmland may be converted from agriculture to urban use in the future. Excluding the important farmland that is already designated for development, Alternative 2 would affect 2 acres of currently designated important farmland; this designation could be removed if irrigated agricultural production does not resume before the next biennial update of CDOC important farmland mapping.

Although construction of Alternative 2 would result in a permanent loss of important farmland in the Project footprint, the operation of Alternative 2 would benefit other agricultural lands in Stanislaus County and elsewhere. Alternative 2 would improve water supply reliability for the 45,000 acres served by DPWD and the 255,000 acres served by the Exchange Contractors. In some dry years and extended droughts, water supply to these productive agricultural areas has been insufficient to meet demand. Similar to Alternative 1, without additional water storage, farmers may fallow lands or convert them away from agriculture permanently. This represents an economic loss to these agricultural areas and increases the potential for land to be converted to non-agricultural uses. By improving the reliability of the water supply, Alternative 2 would reduce the potential for land conversion throughout the Project Sponsors' service areas. Therefore, Alternative 2 would provide an overall benefit to agricultural resources, despite the loss of approximately 2 acres of important farmland that is not currently in production or capable of irrigation.

*Roadway Relocation***.** Under Alternative 2, the roadway relocation would occur on grazing land, which is not considered important farmland. The road area is currently grazed. The grazing land would be permanently converted away from agricultural use, but there would be no conversion of important farmland.

*Conveyance Facilities***.** Under Alternative 2, the conveyance facilities between the reservoir and DMC would pass through prime farmland and unique farmland. No agricultural activities are currently taking place on this land; orchards within the conveyance corridor were abandoned for a number of years and have recently been removed. To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 100 feet wide. In areas where the construction corridor would be located within agricultural lands, agriculture would be temporarily precluded for some portion of the 18-month construction period of the conveyance facilities. Construction in agricultural fields may require the removal of crops, depending on the crop and time of year.

The pump station would be sited within the DMC right-of-way, which is not designated as important farmland. Thus, the pump station would have no impact on farmland conversion.

Portions of the conveyance corridor would be within the Patterson city limits. The conveyance corridor would pass through areas of the city zoned for light industrial use. Portions of the conveyance corridor are outside the Patterson city limits. However, the city's General Plan map does include city zoning designations for areas outside the city limits. The map identifies the conveyance corridor outside the city limits as mixed use and light industrial land. Based on these designations, the conveyance facilities would pass through important farmland that may be slated for future development and conversion away from agriculture.

*Utility Relocation***.** Under Alternative 2, relocation of the utilities that run north-south through the study area would involve construction in areas designated as prime farmland and unique farmland. Relocation of power lines would require grading, installation of foundations (for monopoles or lattice steel structures), and construction of an access road. The pipeline relocation process would require trenching with a top width of 15 feet. No crops are currently grown in the utility realignment corridor, so no crops would need to be removed. Any agricultural activities would be temporarily precluded from the construction areas while utilities are being relocated. Following construction, agricultural activities could be conducted over portions of the existing utility alignment (where the alignment does not overlap with the reservoir inundation area or dam footprint).

Once the utility relocation is complete, agricultural activities could be conducted on the land above the pipeline and beneath the power lines. The foundations for monopoles or lattice steel structures, and the access roads for these structures, would convert agricultural land to developed uses if sited on important farmland. The acreage of the converted area would be small because of the small footprint size of the transmission towers, and only the southern part of the realignment corridor is situated on important farmland. Portions of the utility relocation corridor overlap with the City of Patterson's general plan area. The General Plan identifies areas within the utility relocation corridor as mixed use and highway service commercial, indicating that these areas have already been identified for potential future development and conversion to urban uses.

The City of Patterson General Plan indicates that the majority of the important farmland in the study area is expected to be developed with non-agricultural uses in the future.

Conflict with Existing Zoning for Agricultural Use, or a Williamson Act Contract

Reservoir. Alternative 2 would include constructing one main dam and two saddle dams. Construction impacts on agriculture would be limited to the footprints of the proposed reservoir and dams. At the end of construction, the reservoir would be filled; operation of the reservoir would not affect agricultural areas outside the reservoir and dam footprint. The dam and reservoir component of the Alternative 2 would permanently remove nonprime Williamson Act land from agricultural use. Currently, the agricultural land in the reservoir footprint is used for grazing; the area also includes some dead orchards.

Alternative 2 is consistent with the intent of the Stanislaus County's general agriculture zoning designation, which is to "support and enhance agriculture as the predominant land use in the unincorporated areas of the county… and to ensure that all land uses are compatible with agriculture" (Stanislaus County Zoning Code Section 21.20.010). Alternative 2 would provide water to agricultural users, including users in unincorporated areas of Stanislaus County. Alternative 2 would provide improved water supply reliability and reduce the potential for fallowing or land conversion compared to Alternative 1. Therefore, Alternative 2 supports agricultural land uses in Stanislaus County.

According to the Stanislaus County zoning code, land uses compatible with Williamson Act lands shall not "significantly compromise the long-term productive agricultural capability on contracted parcels" or "displace or impair current or reasonably foreseeable agricultural operations on contracted parcels." Additionally, according to the zoning code, the "erection, construction, alteration, or maintenance of gas, electric, water, communication facilities" are uses deemed compatible with Williamson Act land. The zoning code also states that "uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands." Although the reservoir would remove Williamson Act land from agricultural use, Alternative 2 is consistent with the existing zoning, including Williamson Act contracts. Alternative 2 would consist of construction and operation of a water facility that would provide water supply to agricultural areas on neighboring lands and would therefore be consistent with the zoning code. As noted above, Alternative 2 would support agriculture in the Project Sponsors' service areas, including agriculture on land enrolled in the Williamson Act.

Roadway Relocation. Under Alternative 2, the new road would be constructed on Williamson Act land that is currently used for grazing. This area would be permanently converted to a roadway and no longer available for agricultural use. However, the roadway would remove only small portions of each Williamson Act parcel from agricultural use. Per the Stanislaus County Williamson Act Uniform Rules, a nonprime agricultural parcel of 40 gross acres is presumed large enough to sustain its agricultural use (Stanislaus County 2007). The realigned roadway would cross eight parcels, all of which consist of nonprime land under Williamson Act contract. One of these parcels has an existing

area of under 40 acres, therefore the Alternative 2 would not cause the gross parcel size to fall below the 40 acres specified by the County. Each of the remaining parcels would have an area of at least 40 acres of agricultural land following construction of the roadway. Therefore, the remaining portions of the parcels would still be large enough to be maintained under Williamson Act contract. As mentioned in the discussion of reservoir impacts above, Alternative 2 would serve water to agricultural users, thereby preserving agricultural lands in the County and the surrounding region. Alternative 2, including the road relocation, would not induce residential, commercial, or industrial development in the surrounding area; therefore, Alternative 2 would not cause conversion of adjacent sites to non-agricultural uses. Agriculture would remain the predominant land use in the area surrounding the Project.

Conveyance Facilities. Under Alternative 2, the conveyance corridor passes through Williamson Act lands and land zoned for general agriculture that is not contracted under the Williamson Act. The zoning code states that "erection, construction, alteration, or maintenance of gas, electric, water, communication facilities" are compatible with Williamson Act lands. The construction of the water conveyance facilities would be consistent with this provision. For the lands designated only as general agriculture (i.e., not enrolled in the Williamson Act), the zoning code notes that "facilities for public utilities" are a permissible use (section 21.20.030). Based on the zoning code, the conveyance facilities would be compatible with existing land use designations.

Utility Relocation. Under Alternative 2, the utility relocation work would occur on currently contracted Williamson Act land. Stanislaus County zoning code deems utilities are compatible with the Williamson Act; the oil pipeline and power transmission facilities to be relocated would fall under this provision. Construction of the new gas pipeline and power lines and their associated staging areas may temporarily preclude agricultural activity during the construction period. However, the construction activity would be temporary. Neither the construction nor the operation of the utilities would affect the long-term agricultural productivity of the parcels, displace other agricultural operations, or remove contracted land from agricultural use. Therefore, the utility relocation would be consistent with existing zoning and Williamson Act contracts.

The majority of the Project would occur on nonprime lands enrolled in the Williamson Act. The Project consists of water facilities, which are an acceptable use under the Stanislaus County Zoning Code for the Williamson Act. The roadway realignment would also occur on Williamson Act land but would not reduce the size of any parcels below 40 acres, which is the minimum size that Stanislaus County permits. Therefore, construction and operation of the Project is considered a compatible use relative to the Williamson Act. Under county zoning code, facilities for public utilities are considered consistent with the general agriculture designation. Therefore, construction and operation of the Project are also considered compatible use relative to county zoning code. Although utility relocation would occur under Alternative 2, which may affect a different area than its existing location, there would be no change in total footprint size from Alternative 1.

3.2.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be the same as described above for Alternative 2.

3.2.3.5 Alternative 4 (DCPR 40 TAF)

Under Alternative 4, the dam and reservoir component of the Project would permanently remove 76.7 acres of prime/unique farmland from agricultural use. Impacts of the all other facilities, including the new road would be the same as for Alternative 2. Impacts under Alternative 4 would be similar to, although less than those described above for Alternative 2, because the reservoir would have a smaller footprint, resulting in a loss of roughly 661 total acres of agricultural land.

3.2.3.6 Alternative 5 (Ingram Canyon)

Convert Farmland to Non-Agricultural Use

Reservoir. Under Alternative 5, the reservoir and dam would be constructed on grazing land, which is not considered important farmland and 733 acres of land would be permanently converted from agricultural use. Construction work and staging areas would occur within the dam and reservoir footprints. No impacts on agricultural land would occur outside these footprints.

Alternative 5 would result in a permanent loss of grazing land; however, it would benefit agricultural lands and improve water supply reliability in the region. Thus, this alternative would reduce the potential for land conversion throughout the Project Sponsors' service areas. Therefore, this alternative would overall provide a benefit to agriculture.

Conveyance Facilities. Under Alternative 5, the conveyance facilities would pass through prime farmland. Agricultural activities currently take place on this land, but the majority of the pipeline going through important farmland would be constructed within existing public roadway. To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 100 feet wide, which could temporarily affect a portion of the orchards along the alignment. In areas where the construction corridor would be located within agricultural lands, agriculture would be temporarily precluded for some portion of the 18-month construction period of the conveyance facilities. Construction in agricultural fields may require the removal of crops, depending on the crop and time of year.

The pump station would be constructed within the DMC right-of-way and would thus not cause a permanent conversion away from agriculture.

Utilities. Under Alternative 5, a new powerline would need to be constructed to convey power to the pump station site and the new powerline would cross important farmland. Once construction is complete, agricultural activities could be conducted on the land beneath the powerlines. Compared to Alternative 1, there would be a small amount of converted area due to the footprint size of the power poles.

Conflict with Existing Zoning for Agricultural Use, or a Williamson Act Contract.

Under Alternative 5, the dam and reservoir component would not convert any prime or unique farmland, but would permanently remove nonprime Williamson Act land from agricultural use. The conveyance corridor and powerline pass through Williamson Act lands including prime agricultural land, mixed enrollment agricultural land, nonprime agricultural land, and land zoned for general agriculture that is not contracted under the Williamson Act.

The majority of the associated facilities would occur on nonprime lands enrolled in the Williamson Act. Alternative 5 would also consist of water facilities, which are acceptable under the Stanislaus County Zoning Code for the Williamson Act. Therefore, construction and operation of Alternative 5 is considered a compatible use relative to the Williamson Act. Under county zoning code, facilities for public utilities are considered consistent with the general agriculture designation. Therefore, construction and operation of this alternative is also considered a compatible use relative to the county zoning code.

Table 3.2-1 summarizes acres of important farmland, as identified in the California FMMP program, affected by each alternative.

Table 3.2-1: Conversion of Farmland by Alternative

Alternative	CA prime/unique farmland (acres)	Total Agricultural Land (acres)
Alternative 1 (No Action)[1]	0	0
Alternative 2 (DCPR 82 TAF)	80.2	963
Alternative 3 (Limited Action)	80.2	963
Alternative 4 (DCPR 40 TAF)	76.7	653
Alternative 5 (Ingram Canyon)	0	460

[1] Alternative 1 would not directly result in conversion of agricultural land, but all but 2 acres of the prime and unique farmland in the study area for Del Puerto Canyon is slated for development by the City of Patterson.

3.3 Air Quality

3.3.1 Affected Environment

This section summarizes the existing air quality for the region of influence, including the National Ambient Air Quality Standards (NAAQS), the attainment status with these standards, and monitored air pollutant concentrations as an indicator of air quality trends. The Air Quality and General Conformity Rule Analysis (**Appendix F**) provides additional air emissions information to support this Draft EIS.

3.3.1.1 Study Area

Because air quality impacts have a regional effect and are not limited to the immediate Project site for each alternative, the study areas are the same for the Action Alternatives. The geographic study area for air quality thus encompasses the entire San Joaquin Valley Air Basin (see **Figure 3.3-1**), which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The San Joaquin Valley Air Basin is defined by the Sierra Nevada mountains in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. The San Joaquin Valley is flat, with a slight downward gradient to the northwest, and opens to the sea at the Carquinez Strait, where the San Joaquin-Sacramento Delta empties into San Francisco Bay.

Although marine air generally flows into the San Joaquin Valley Air Basin from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the air basin. The Coastal Range hinders wind access into the valley from the west, the Tehachapi range prevents southerly passage of airflow, and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak airflow, which becomes blocked vertically by high barometric pressure over the valley. Consequently, the San Joaquin Valley Air Basin is highly susceptible to air pollutant accumulation over time.

To protect human health and welfare the U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for the following pollutants: ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb). EPA calls these pollutants "criteria air pollutants" (CAP) because it regulates them by developing criteria, or science-based guidelines, for setting permissible levels. There are California Ambient Air Quality Standards (CAAQS) for all CAPs listed above, as well as sulfates (SOx), hydrogen sulfide, and visibility.

The SJVAPCD has reached NAAQS and CAAQS attainment status for all criteria pollutants except for O_3, PM_{10} (CAAQS only), and $PM_{2.5}$. As a result, the emissions of most concern are O_3 (which includes precursors such as volatile organic compounds [VOC] and nitrogen oxides [NO_X]), PM_{10} and $PM_{2.5}$. Appendix F shows the attainment status and de minimis threshold for general conformity for the criteria pollutants of most concern.

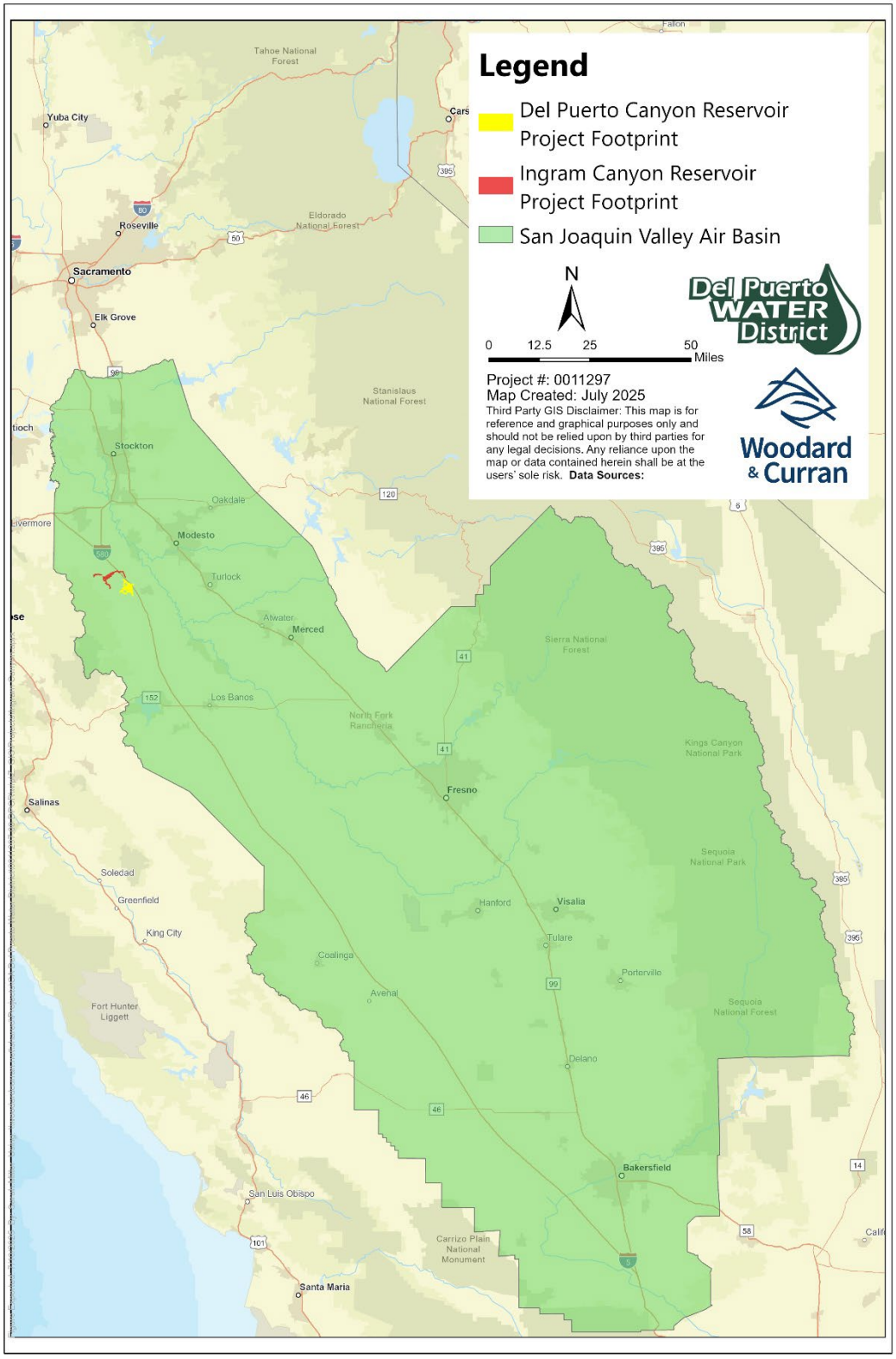

Figure 3.3-1: San Joaquin Valley Air Basin

The SJVAPCD and the California Air Resources Board (CARB) operate and maintain an expansive network of air monitoring sites throughout the San Joaquin Valley. Over the most recent three-year period for which data are available, 2021-2023, air monitoring results at the station in Turlock nearest to the Project sites showed that the federal 8-hour ozone standard was exceeded up to 30 days per year and the federal 24-hour fine particulate matter standard was exceeded up to 15 days per year.

Environmental concern for air quality includes short-term pollutant emissions related to dust, vehicle exhaust, and particulates generated by soil-disturbing activities during the construction period, and long-term emissions related to land use change and combusting fossil fuels during operation and maintenance of the reservoir. The direct effect of the Project is a change in land use from grasslands to reservoir, and combustion of fossil fuels for reservoir maintenance activities described in Section 2.4.3.

3.3.2 Regulatory Setting

Laws and regulations at the Federal, state, and local level that may apply to the Project are included in **Appendix E**.

3.3.3 Environmental Consequences

3.3.3.1 De Minimis Emission Rates

Table 3.3-1 lists the nonattainment and maintenance areas within the San Joaquin Valley Air Basin, under the jurisdiction of the SJVAPCD and presents de minimis emission rates.

Table 3.3-1: SJVAPCD Attainment Status and de Minimis Emission Rates for the San Joaquin Valley Air Basin for Federal General Conformity Determinations

Pollutant	Primary Attainment Status	De Minimis Emission Rate (tons/year)	SJVAPCD Significance Threshold for Construction Emissions (tons/year)
Ozone (VOCs or NO_X)	Nonattainment/ Extreme	10	10
Respirable Particulate Matter (PM_{10})	Attainment/ Maintenance[1]	100	15
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment/ Serious	70	15

Notes: 1. On September 25, 2008, US Environmental Protection Agency redesignated the San Joaquin Valley to attainment for the PM_{10} National Ambient Air Quality Standard (NAAQS) and approved the *2007 PM_{10} Maintenance Plan*. Sources: US Environmental Protection Agency, De Minimis Tables, https://www.epa.gov/general-conformity/de-minimis-tables. San Joaquin Valley Air Pollution Control District, Guidance for Assessing and Mitigating Air Quality Impacts, https://www.valleyair.org/media/g4nl3p0g/gamaqi.pdf.

3.3.3.2 Methodology and Basis for Analysis

Emissions were calculated using the California Emissions Estimator Model (CalEEMod) version 2022.1.1.29. Construction of the Action Alternatives would require large amounts of grading, soil movement, and use of construction equipment that generates criteria air pollutants, diesel emissions, and dust. Detailed Project-specific construction schedules and material movement estimates are summarized in Appendix F, Modeling Inputs and Assumptions. The following general assumptions and constraints were included in the modeling input:

- The Action Alternatives would require three to six years to construct
- Construction activities were assumed to occur year-round
- Construction was conservatively assumed to begin in 2026, for the purposes of this EIS. If construction starts in 2027 or later, emissions would be reduced because newer equipment with more efficient engines generate less emissions.
- All plans and specifications will require that construction contractors control for dust, NO_X, and diesel particulate matter (see Environmental Protection Measures), use only off-road equipment that implements the equipment control practices (see AIR-1), and implement all feasible best performance standards (see AIR-2).

3.3.3.3 General Conformity Rule

Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) requires that any entity of the federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110(a) of the Clean Air Act (42 U.S.C. 7401(a)) before the action is otherwise approved. The SIP is not a single document but a compilation of new and previously submitted attainment plans, maintenance plans, emissions reduction programs, district rules, state regulations, and federal controls.

The General Conformity regulations at Title 40 Code of Federal Regulations (CFR) Subchapter C Part 93 ensure that the actions taken by federal agencies do not interfere with a state's plans to achieve expeditious attainment and maintenance of the National Ambient Air Quality Standards (NAAQS) for air quality. A General Conformity Determination documents how the federal action under the proposed Project would be consistent with the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and thus would meet the requirements of the General Conformity regulations. The General Conformity process has four main components: an emissions analysis, an applicability determination, mitigation commitments, and an agency and public review. Appendix F contains the General Conformity Rule Applicability Analysis Modeling Assumptions and Results. The mitigation commitments and agency public review components will be finalized in the Final EIS.

3.3.3.4 Environmental Protection Measures (EPMs) Imposed by SJVAPCD

EPM: Fugitive Dust Control. All projects must control fugitive dust emissions in accordance with SJVAPCD Regulation VIII: Control Measures for Construction Emissions of PM_{10}. According to Rule 8011, the SJVAPCD requires the implementation of control measures for fugitive dust emission sources. Dust management plans must be submitted to the SJVAPCD. The Project would implement the following control measures to reduce fugitive dust emissions and comply with SJVAPCD Regulation VIII:

- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.

- All onsite unpaved roads and offsite unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.

- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.

- When materials are transported offsite, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.

- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday.

- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.

- An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles shall implement measures to prevent carryout and trackout.

EPM: NO_X and Diesel Particulate Matter Controls. In 2007, CARB adopted a regulation to reduce diesel particulate matter and NO_X emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. CARB approved amendments in 2009 and 2010. The regulation imposes limits on unnecessary vehicle idling to five minutes and requires fleets to reduce NO_X emissions by retiring, replacing, repowering, or installing exhaust retrofits to older engines. The restrictions on adding older vehicles into fleets vary by fleet size. On November 17, 2022, CARB (CARB 2022, 2023) approved amendments to the in-use, off-road diesel-fueled fleets regulation that require phasing out old, high-polluting vehicles (i.e., Tier 0/model year 1994 or older, Tier 1/model year 1999 or older, and Tier 2/model year 2003 or older) between 2024 and 2036. The amendment also restricts adding vehicles with Tier 3 or Tier 4 Interim engines/model year 2006 or older, beginning in 2024 for large or medium fleets (small fleets are given more time to comply). The regulation also mandates the use of R99 or R100 Renewable Diesel for all fleets, with limited exceptions, and provides flexibility options for fleets that adopt zero-emission technology. This regulation would apply to vehicles used in construction of the Project.

3.3.3.5 Environmental Protection Measures Proposed by Project Sponsors

EPMs for air quality include:

6 AIR-1: Reduce NOx Emissions

NO_X emissions associated with construction activities shall be reduced to 10 tons per year through on-site equipment and hauling vehicle mitigation measures to the extent feasible. All vehicles and equipment used during construction shall be maintained and properly

tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Emissions reduction methods may be chosen from any combination of the following measures:

- Use of alternative fueled vehicles;
- Use of newer tier engines (Tier 4 or better);
- Use of phased material hauling trips;
- Use of after-market pollution control devices to reduce emissions; and
- Lengthening the construction schedule to reduce the annual intensity of construction activities.

These NO_X emission reduction methods simultaneously address CO emissions. The CO emissions associated with construction activities shall be reduced below 100 tons per year through a combination of the same emission reduction measures identified to reduce NO_X.

Before emissions associated with proposed Project activities begin, the Del Puerto Water District and San Joaquin River Exchange Contractors Water Authority (i.e., the Project Sponsors) shall be responsible for producing a SJVAPCD-approved air quality impact assessment analysis to determine the projected maximum Project emissions which incorporates the most current proposed equipment fleet, hours of operation, duration of work, and on-site NO_X reduction measures, based on final Project design and phasing. If all feasible on-site measures have been implemented and annual emissions are anticipated to still be above 10 tons per year for NO_X, then the Project Sponsors shall enter into a Voluntary Emissions Reduction Agreement (VERA) with SJVAPCD. The VERA would provide pound-for-pound mitigation of air emissions increases down to a net zero emissions per year as required under general conformity through a process that develops, funds, and implements emission reduction projects. To ensure emission reductions targeted by the VERA occur at the same time as Project emissions, and thereby achieve net zero annual emissions, the Project Sponsors shall enter into a VERA with SJVAPCD prior to any groundbreaking activities associated with proposed Project activities. SJVAPCD would serve as administrator of the emissions reduction projects and verifier of the successful mitigation effort.

Under the VERA, the Project Sponsors shall agree to mitigate Project-specific emissions by providing funds for the SJVAPCD's Emission Reduction Incentive Program (ERIP). The funds would be disbursed by ERIP in the form of grants for projects that achieve emission reductions. Types of emission reduction projects that have been funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks, and replacement of old farm tractors. The Project Sponsors would request that

funding disbursement priority would be given to emission reduction projects of Project Sponsor landowners. The initial agreement would generally be based on the projected maximum emissions increases as calculated by a SJVAPCD-approved air quality impact assessment and contain the corresponding maximum fiscal obligation. However, because the goal is to mitigate actual emissions, the SJVAPCD has designed flexibility into the VERA such that the final mitigation would be based on actual emissions related to the Project as determined by actual equipment used, hours of operation, duration of work, and consideration of equipment control measures designed to alleviate Project emissions. After the Project is mitigated, the SJVAPCD would certify to the Project Sponsors that the mitigation is completed, providing the Project Sponsors with an enforceable mitigation measure demonstrating that Project-specific emissions have been mitigated to de minimis levels

7 **AIR-2 Best Performance Standards**

The Project Sponsors shall implement all feasible Best Performance Standards. The SJVAPCD defines Best Performance Standards as "the most effective in-practice means of reducing or limiting emissions from an emissions source."

Types of Best Performance Standards that the proposed Project shall implement during construction could include but would not be limited to:

- Use equipment types that rely on electric and/ or hybrid fuel. Note that biodiesel fuel use, while beneficial for reducing particulate matter emissions, does not have a substantial effect, and may actually increase, NO_X and CO_2e emissions.
- Limit the size of the construction vehicle fleet, especially vehicles with high Hp (e.g., 5,000 Hp or more), as much as possible.
- Limit the amount of time that construction vehicles are operating.
- Maintain construction equipment in the best possible working order to maximize engine fuel efficiency.
- All equipment shall be operated by a properly trained worker to minimize unnecessary vehicle use.
- Encourage workers to carpool to and from the site.
- Phase vendor and hauling trips.

Types of Best Performance Standards that the proposed Project shall implement during long-term operations include:

- Implement the most energy efficient equipment design possible.
- Encourage operations and maintenance employees to carpool or otherwise commute using a method other than a single-occupancy fossil-fuel powered vehicle.

3.3.3.6 Alternative 1 (No Action)

Alternative 1 would not require equipment use or soil disturbance, as there would be no construction or operation. In addition, there would be no long-term maintenance requirements associated with the reservoir. A portion of the water that would have been pumped into a reservoir as part of the Action Alternatives would continue to be pumped into the San Luis Reservoir, so there would be ongoing energy requirements associated with Alternative 1 that would have ongoing indirect emissions.

3.3.3.7 Alternative 2 (DPCR 82 TAF)

The Air Quality and General Conformity Rule Analysis (**Appendix F**) contains CalEEMod output tables and summarizes emissions by Project alternative. Construction equipment would produce combustion-related emissions, including carbon monoxide, nitrogen dioxide, volatile organic compounds, sulfur dioxide; and particulate matter PM_{10} and $PM_{2.5}$. Exhaust from construction equipment, delivery trucks bringing in and moving equipment and materials, and construction workers' personal vehicles would be temporary sources of criteria air pollutants. Criteria air pollutant emissions during operation related to routine maintenance activities and energy use would be limited.

Construction Criteria Air Pollutants. Alternative 2 would result in emissions of criteria pollutants (see **Table 3.3-2**). Although the Project Sponsors would implement EPMs to control fugitive dust and lower NO_X emissions (EPMs for Fugitive Dust Control and NO_X and Diesel Particulate Matter Controls, measure AIR-1 Reduce NO_X Emissions, and measure AIR-2 Best Performance Standards), in three of the years of construction period, total criteria air pollutant emissions may exceed the federal Clean Air Act de minimis emission rates for determining conformity with the State Implementation Plan for achieving the federal standards for one of the criteria air pollutants for which the San Joaquin Air Basin is nonattainment, ozone. The Project Sponsors would implement environmental commitments to reduce NO_X emissions through on-site measures or a VERA, which would provide pound-for-pound mitigation of air emissions increases down to a net zero emissions per year as required under general conformity. The numbers in **bold** indicate annual emissions that exceed the general conformity de minimis emission rate.

Table 3.3-2: Construction Criteria Pollutant Emissions–Alternative 2 (Tons/Year)-- Mitigated

Year	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
2026	6.26	1.08	0.12	0.01	0.54	0.27
2027	32.5	4.13	0.66	0.06	3.44	1.64
2028	69.8	**12.1**	1.54	0.14	6.29	2.88
2029	108	**22.4**	2.57	0.24	9.83	4.38
2030	87.8	**18.1**	2.11	0.20	8.25	3.70
2031	3.75	1.10	0.14	0.01	0.14	0.05
De Minimis Emission Rate	n/a	10	10	n/a	100	70
SJVAPCD Construction Thresholds for Criteria Air Pollutants	100	10	10	27	15	15

Notes: VOC = volatile organic compounds, CO = carbon monoxide, NO_X = nitrogen oxides, SO_X = sulfur oxides, PM = particulate matter

Totals are rounded to the nearest one hundredth

Operational Emissions. Minor operation-related air emissions would result from ongoing maintenance of the proposed facilities. Results can be found in Appendix F.

3.3.3.8 Alternative 3 (Limited Action)

Under Alternative 3 impacts would be the same as those described under Alternative 2.

3.3.3.9 Alternative 4 (DPCR 40 TAF)

Construction Criteria Air Pollutants. Construction of Alternative 4 would result in emissions of criteria air pollutants (see **Table 3.3-3**).

Although the Project Sponsors would implement EPMs to control fugitive dust and lower NO_X emissions (EPMs for Fugitive Dust Control and NO_X and Diesel Particulate Matter Controls, measure AIR-1 Reduce NO_X Emissions, and measure AIR-2 Best Performance Standards), in two of the years of the construction period, total criteria air pollutant emissions may exceed the federal Clean Air Act de minimis emission rates for determining conformity with the State Implementation Plan for achieving the federal standards for one of the criteria air pollutants for which the San Joaquin Air Basin is nonattainment, ozone. The Project Sponsors would implement environmental commitments to reduce NO_X emissions through on-site measures or a VERA, which would provide pound-for-pound mitigation of air emissions increases down to a net zero emissions per year as required under general conformity. The numbers in **bold** indicate annual emissions that exceed the general conformity de minimis emission rate.

Table 3.3-3: Construction Criteria Pollutant Emissions–Alternative 4 (Tons/Year) - Mitigated

Year	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
2026	67.2	**12.6**	1.65	0.16	6.56	3.01
2027	55.5	**10.7**	1.41	0.12	6.31	2.82
2028	6.6	1.2	0.19	0.02	0.70	0.29
2029	0.31	0.12	0.02	<0.01	0.12	0.03
De Minimis Emission Rate	n/a	10	10	n/a	100	70
SJVAPCD Construction Thresholds for Criteria Air Pollutants	10	10	100	27	15	15

Notes: VOC = volatile organic compounds, CO = carbon monoxide, NO_X = nitrogen oxides, SO_X = sulfur oxides, PM = particulate matter
Totals are rounded to the nearest one hundredth

Operational Emissions. Minor operation-related air emissions would result from ongoing maintenance of the proposed facilities. Results can be found in Appendix F.

3.3.3.10 Alternative 5 (Ingram Canyon)

Construction Criteria Air Pollutants. Alternative 5 would also result in emissions of criteria air pollutants (see **Table 3.3-4**).

Although the Project Sponsors would implement EPMs to control fugitive dust and lower NO_X emissions (EPMs for Fugitive Dust Control and NO_X and Diesel Particulate Matter Controls, measure

AIR-1 Reduce NO_X Emissions, and measure AIR-2 Best Performance Standards), in three of the years of the construction period, total criteria air pollutant emissions may exceed the federal Clean Air Act de minimis emission rates for determining conformity with the State Implementation Plan for achieving the federal standards for one of the criteria air pollutants for which the San Joaquin Air Basin is nonattainment, ozone. The Project Sponsors would implement environmental commitments to reduce NO_X emissions through on-site measures or a VERA, which would provide pound-for-pound mitigation of air emissions increases down to a net zero emissions per year as required under general conformity. The numbers in **bold** indicate annual emissions that exceed the general conformity de minimis emission rate.

Table 3.3-4: Construction Criteria Pollutant –Alternative 5 (Tons per Year) - Mitigated

Year	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
2026	60.7	**10.4**	1.53	0.12	6.69	3.14
2027	70.1	**12.1**	1.76	0.14	7.71	3.60
2028	69.4	**13.8**	1.69	0.15	8.12	3.71
2029	48.4	8.67	1.08	0.10	5.68	2.57
2030	1.68	0.16	0.03	<0.005	0.08	0.02
De Minimis Emission Rate	n/a	10	10	n/a	100	70
SJVAPCD Construction Thresholds for Criteria Air Pollutants	10	10	100	27	15	15

Notes: VOC = volatile organic compounds, CO = carbon monoxide, NO_X = nitrogen oxides, SO_X = sulfur oxides, PM = particulate matter
Totals are rounded to the nearest one hundredth

Operational Emissions. Minor operation-related air emissions would result from ongoing maintenance of the proposed facilities. Results can be found in **Appendix F.**

3.4 Biological Resources – Terrestrial

3.4.1 Affected Environment

This section describes the Del Puerto Canyon Reservoir Project (Project) and potential impacts of the proposed Action Alternatives (Alternatives 2 – 5) on terrestrial biological resources. The resources described include vegetation communities and associated wildlife, wetlands and other water bodies, and special-status plants and wildlife (federal and state endangered, threatened, proposed, and candidate species, as well as state and local species of concern). Impacts on aquatic biological resources are discussed separately in Section 3.5, *Biological Resources – Aquatic*.

This section incorporates by reference **Appendix I1**, Draft Biological Assessment; **Appendix I2**, Species Lists; **Appendix I3**, Species Observed in the Study Area; **Appendix I4**, the April 2020 *Memorandum Regarding Special-Status Plant Assessment–Del Puerto Canyon Reservoir Project* and the July 2025 *Del Puerto Reservoir Project –Special-Status Plant Assessment of Additional Project Footprint Areas*; **Appendix I5**, Special-Status Species Tables; and **Appendix I6**, Special-Status Wildlife Species Accounts (excluding listed and fully protected species), and **Appendix I7**, Ingram Canyon Biological Resources Memorandum.

3.4.1.1 Study Area

The study areas for the proposed Action Alternatives include the footprints for reservoir infrastructure, maximum inundation areas, areas where utilities would be located or relocated, and any areas of potential disturbance.

The Del Puerto Canyon study area (see **Figure 3.4-1** through **Figure 3.4-4**) includes a 300-foot buffer around the Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF) Project sites. The Del Puerto Canyon study area includes Del Puerto Canyon and lower Del Puerto Creek downstream of the Alternative 2, Alternative 3, and Alternative 4 Project sites. The study area encompasses Del Puerto Creek in the reservoir inundation area and the entire reach of Del Puerto Creek downstream of I-5. The portion of the Del Puerto Canyon study downstream of the inundation area includes a variable-width buffer extending outward from the creek channel along a 7.4-mile segment of Del Puerto Creek, an intermittent stream extending from the California Aqueduct to the San Joaquin River. The buffer along this portion of Del Puerto Creek was defined based on the extent of adjacent agricultural lands and was designed to encompass the full range of existing habitat types that may support terrestrial or semi-terrestrial species that could be affected by changes in creek flows. This includes the full extent of riparian habitats along Del Puerto Creek, including riparian wetlands, seasonal wetlands, grasslands, orchards, and vineyards. These habitats are known to support a variety of terrestrial or semi-terrestrial species, including amphibians, reptiles, birds, and mammals. In addition, this portion of the Del Puerto Canyon study area captures adjacent upland habitats that may support terrestrial species independent of direct hydrological inputs.

The landscape surrounding lower Del Puerto Creek consists mainly of flat agricultural land that slopes gently to the east. Elevations range from approximately 180 feet near I-5 to about 45 feet

where Del Puerto Creek discharges to the San Joaquin River. The upper reaches of the stream flow primarily during the winter and spring; some stream reaches are dry during the summer and fall. Inundation and creek flow in the study area, downstream of I-5, are supported primarily by agricultural drainage during the summer and fall. Del Puerto Creek flows are not supported by the California Aqueduct or the DMC, which do not discharge to the creek, but the lower portion of the creek is supplied by operational spills from the West Stanislaus Irrigation District, which estimates that it discharges about 2 cfs to the creek from March through November.

The Ingram Canyon study area (see **Figure 3.4-5** through **Figure 3.4-9**) includes a 300-foot buffer around the Alternative 5 (Ingram Canyon) Project site. The Ingram Canyon study area also includes lower Ingram Creek, downstream of the Alternative 5 Project site, an area where operations could alter flows and affect sensitive natural communities and special-status species' habitats. This portion of the Ingram Canyon study area primarily consists of channelized ditches with minimal habitat, and includes a variable-width buffer extending outward from the creek channel from the California Aqueduct to the San Joaquin River. The buffer along this portion of Ingram Creek was defined based on the extent of adjacent agricultural lands, as well as commercial land uses, and was designed to encompass the full range of existing habitat types that may support terrestrial or semi-terrestrial species that could be affected by changes in creek flows. However, as discussed further in Section 3.10, *Hydrology and Water Quality*, the reduced reservoir size and smaller upstream watershed at Ingram Creek (11,160 acres vs. 46,499 acres) would result in only minor reductions in downstream flow. Similar to Del Puerto Creek, dry season flows are maintained by agricultural drainage and operational spills from the West Stanislaus Irrigation District.

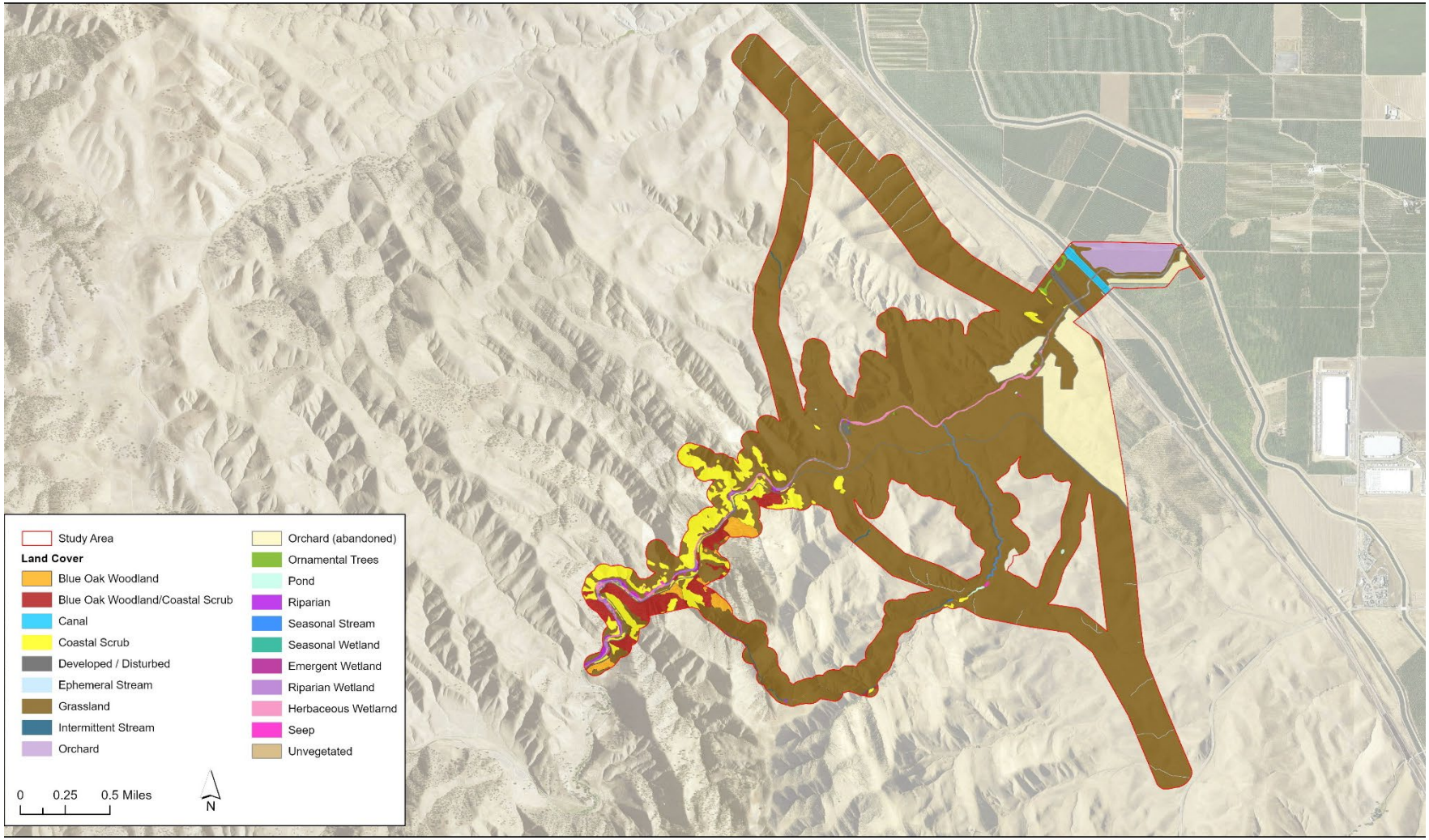

Figure 3.4-1: Land Cover Types In the Del Puerto Canyon Study Area, Sheet 1 of 4

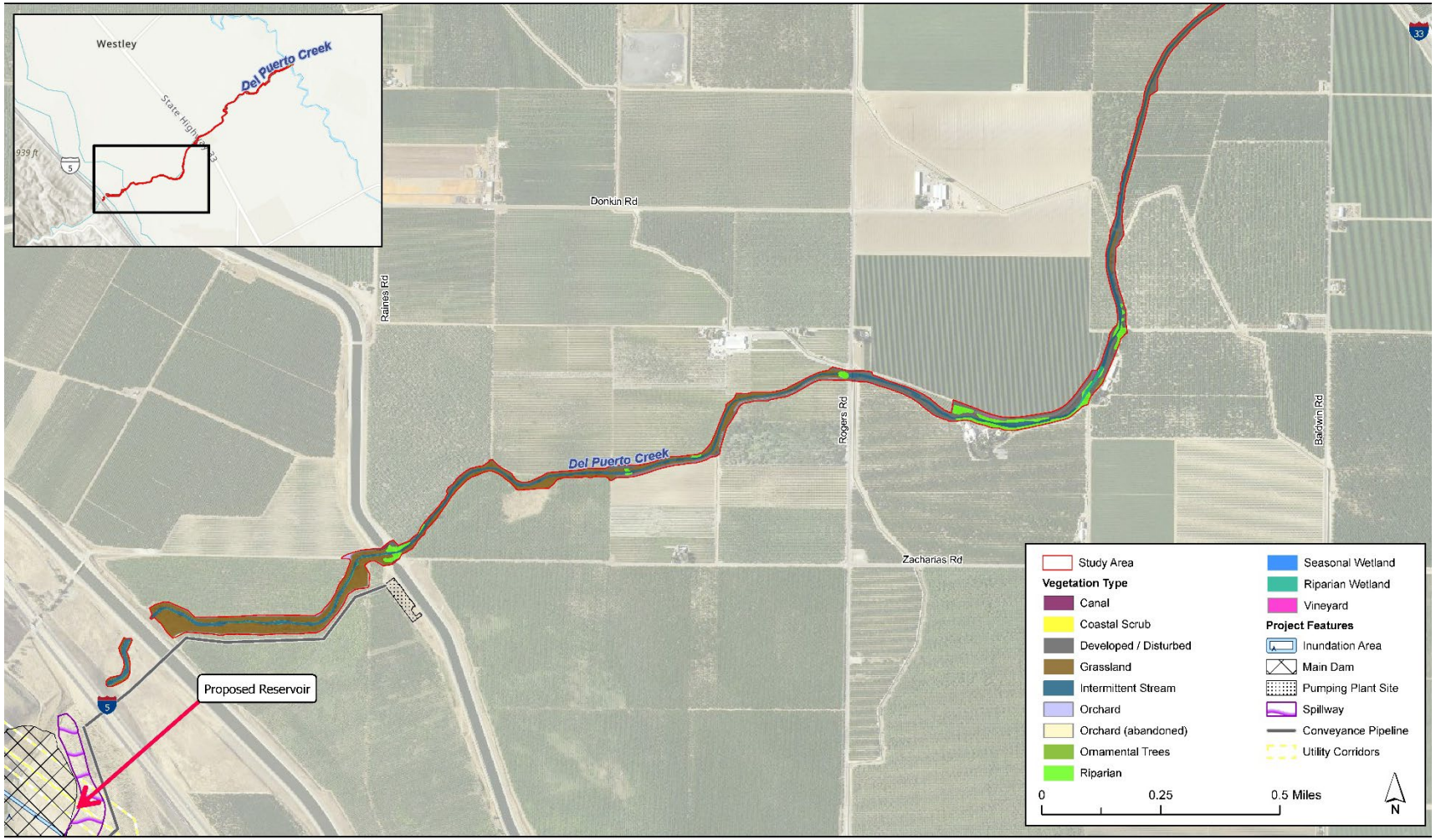

Figure 3.4-2: Land Cover Types In the Del Puerto Canyon Study Area, Sheet 2 of 4

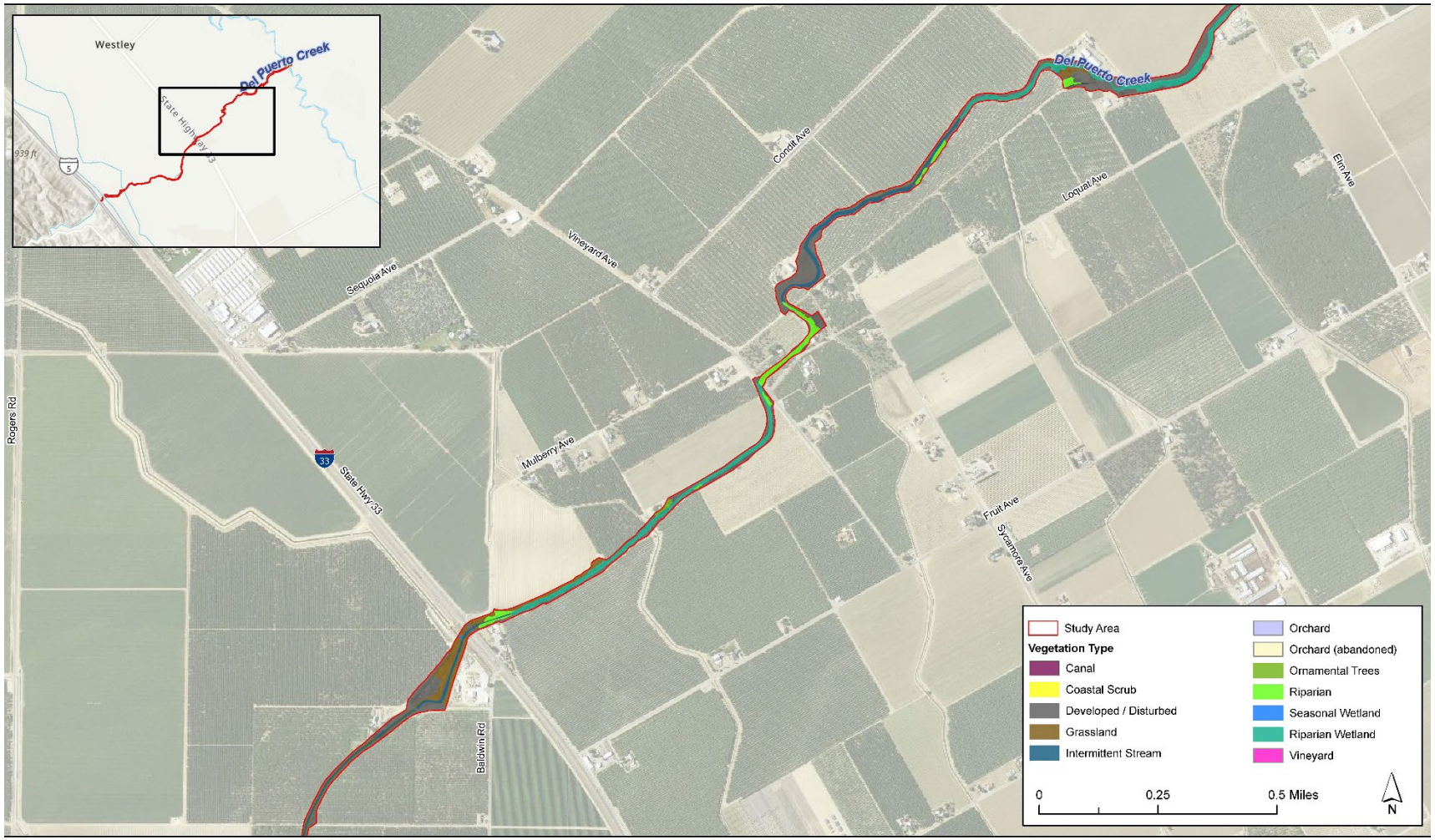

Figure 3.4-3: Land Cover Types In the Del Puerto Canyon Study Area, Sheet 3 of 4

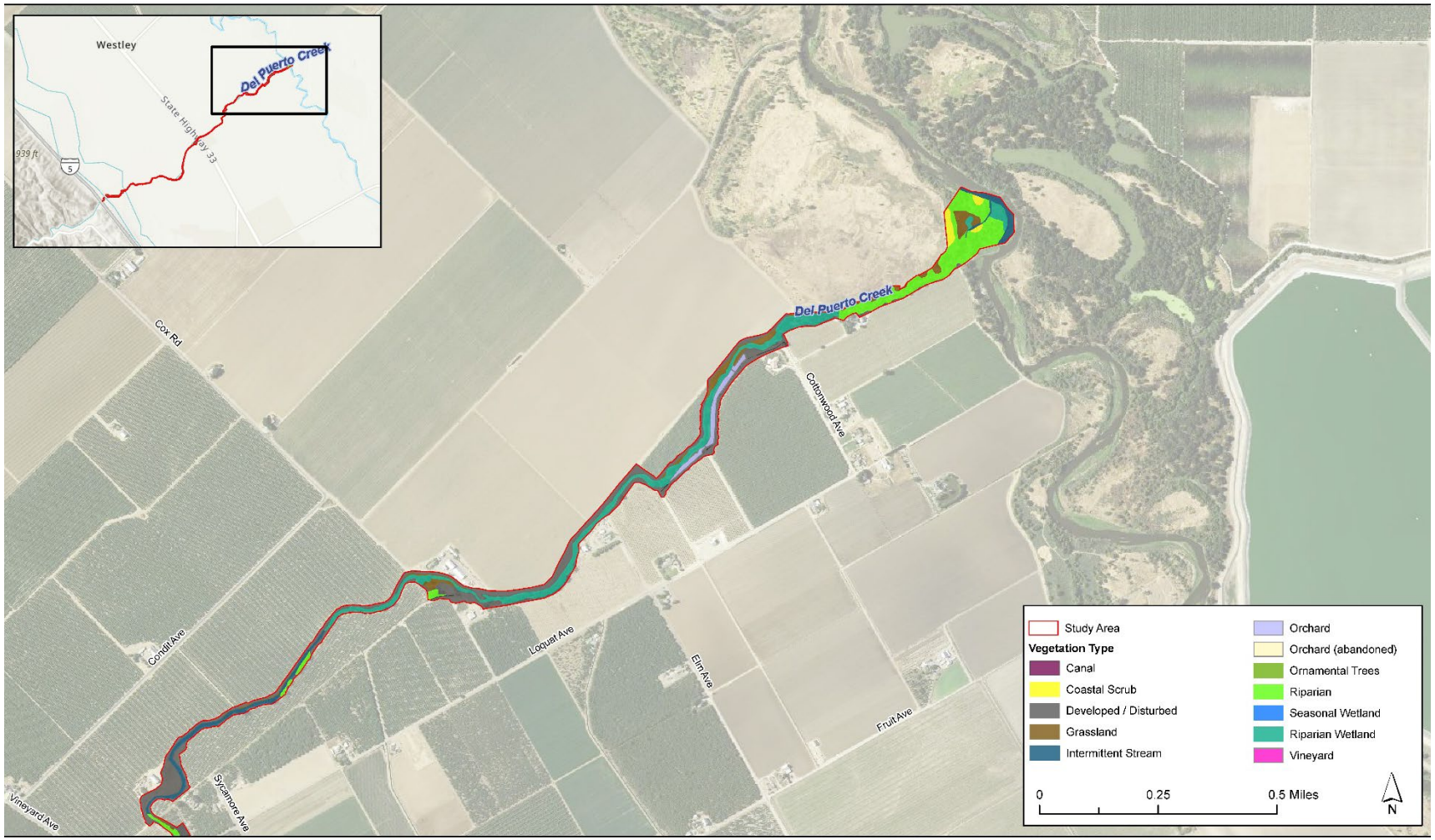

Figure 3.4-4: Land Cover Types In the Del Puerto Canyon Study Area, Sheet 4 of 4

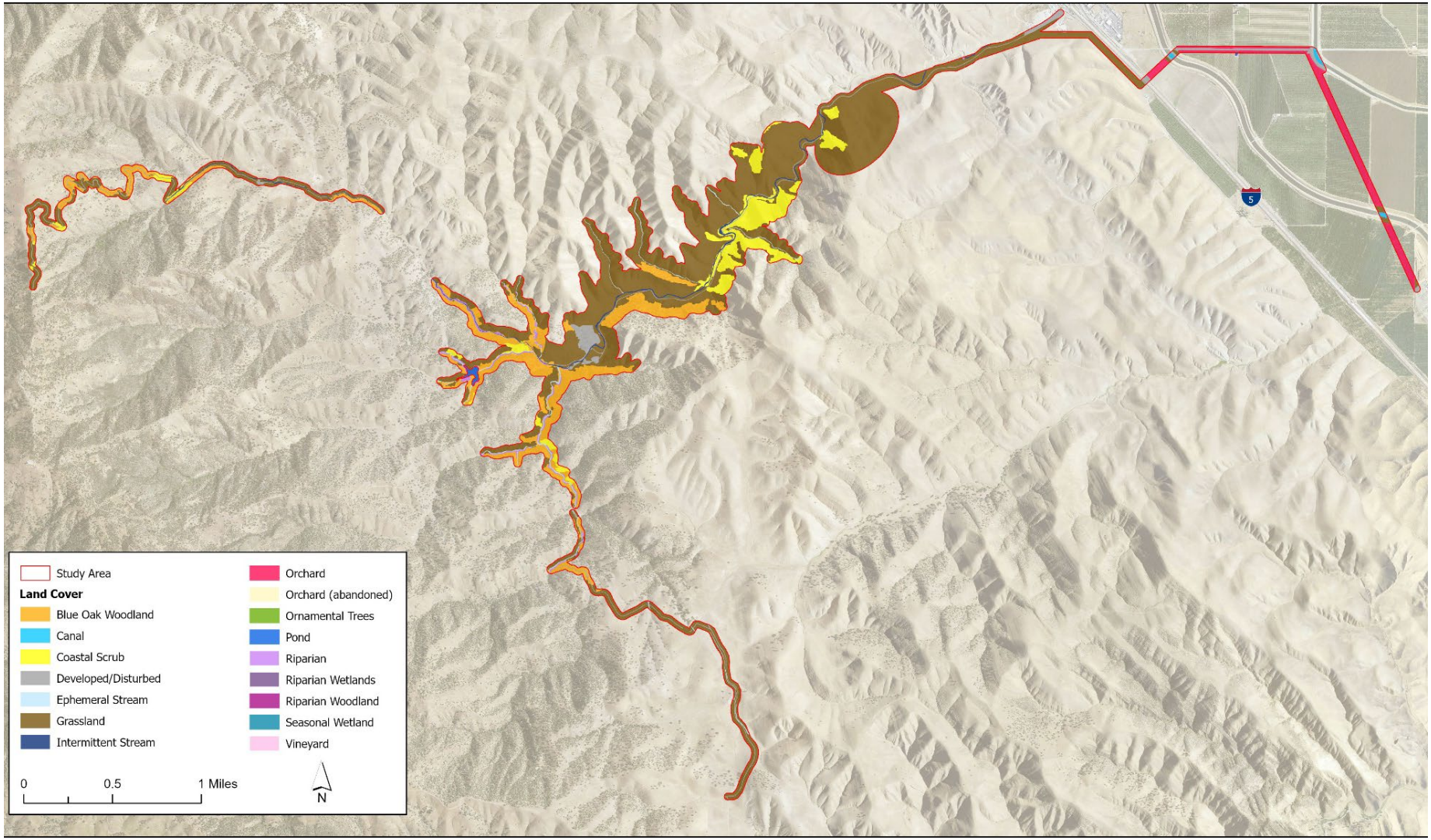

Figure 3.4-5: Land Cover Types in the Ingram Canyon Study Area (Sheet 1 of 5)

Figure 3.4-6: Land Cover Types in the Ingram Canyon Study Area (Sheet 2 of 5)

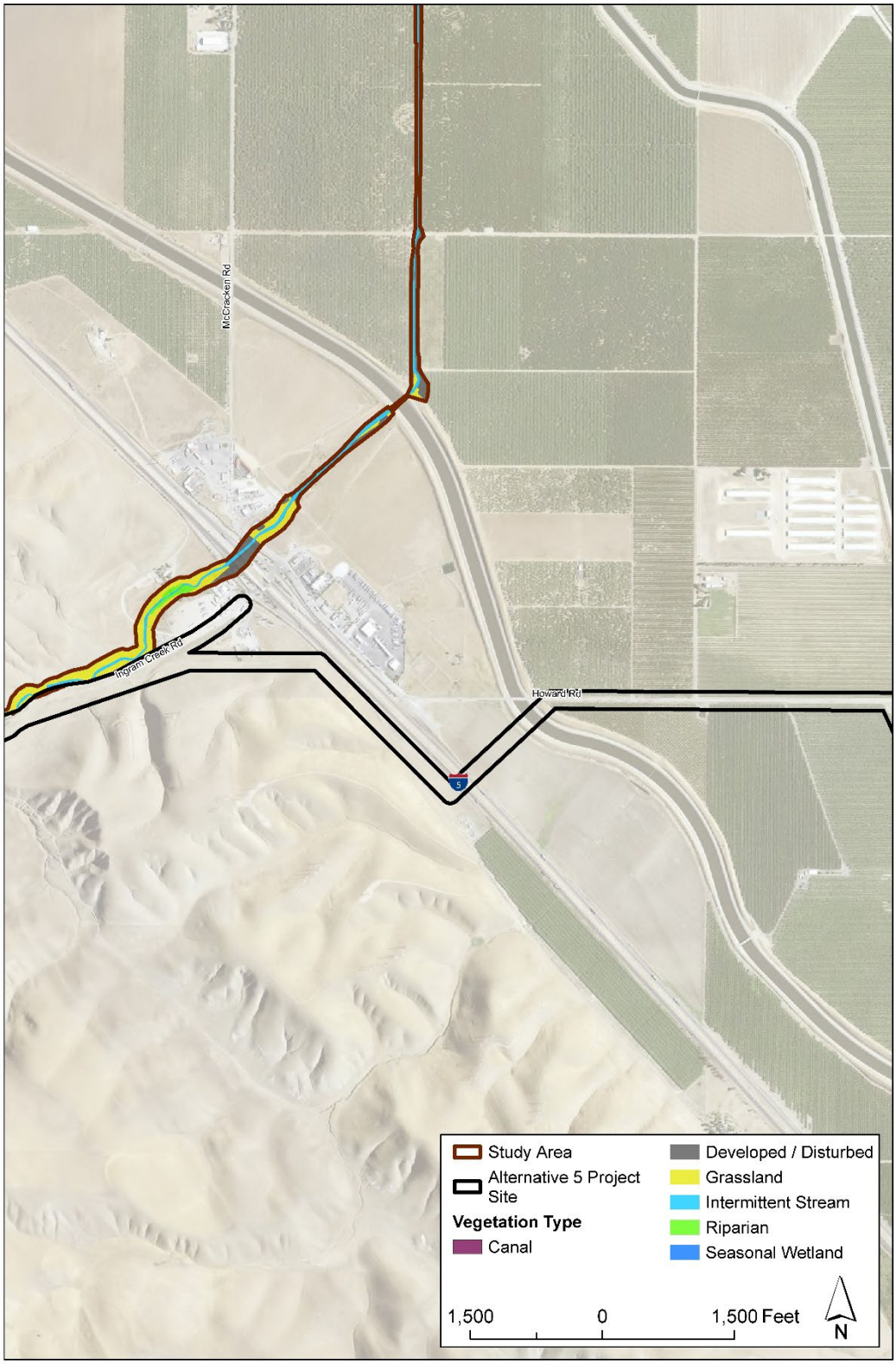

Figure 3.4-7: Land Cover Types in the Ingram Canyon Study Area (Sheet 3 of 5)

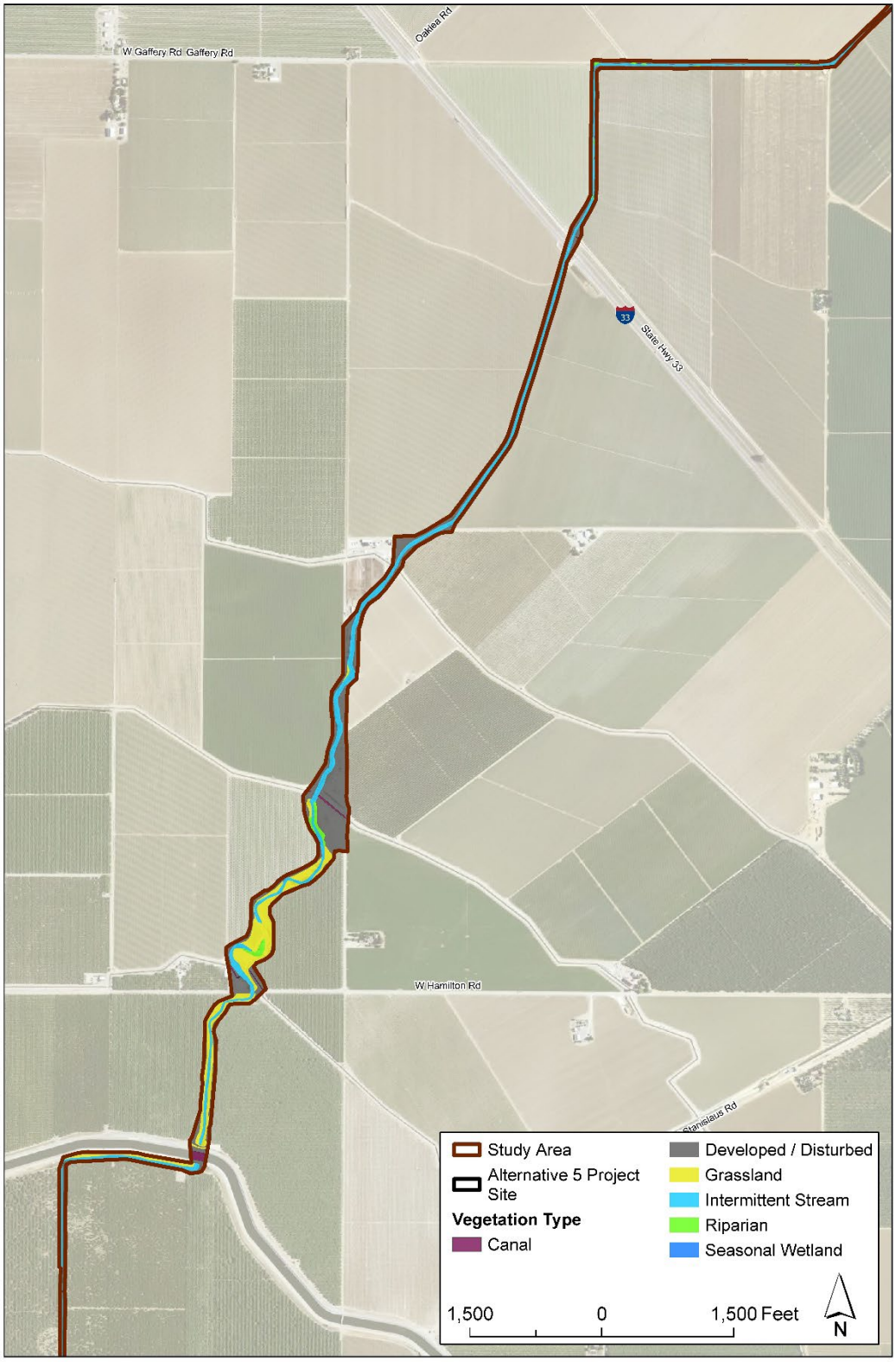

Figure 3.4-8: Land Cover Types in the Ingram Canyon Study Area (Sheet 4 of 5)

Figure 3.4-9: Land Cover Types in the Ingram Canyon Study Area (Sheet 5 of 5)

3.4.1.2 Issues of Environmental Concern

Issues of environmental concern for biological resources include adverse effects on special-status plants and wildlife and their habitat; loss and degradation of sensitive natural communities; adverse effects on wetlands, streams, ponds, and riparian vegetation; interference with wildlife movement corridors; and conflicts with local policies or habitat conservation plans. These issues are described in detail below.

3.4.1.3 Characterization

Del Puerto Canyon Study Area Surveys. Biological surveys for the Del Puerto Canyon study area were conducted as follows:

- Wildlife habitat evaluation performed May 8, 9, and 13–17; June 10–14 and 24–25; July 17; and August 1, 2019; August 25–26 and December 6–7, 2021; April 24 and 30 and May 1, 22, and 23, 2024; July 23–26, 2024; and August 5–14, 2024, July 14, 2025, and September 9, 2025.
    - Motion-activated trail cameras placed near the mouth of Del Puerto Canyon for a total of 2 weeks from mid- to late June 2019.
    - Motion-activated trail cameras placed within a 500-foot buffer of the proposed road realignment, checked monthly from March to August 2025.
    - Wildlife landscape connectivity assessment conducted March 17–18, 2025.
    - Recordings of wildlife observations made during field surveys.
- Delineation of waters of the United States and waters of the State conducted June 17–20 and July 26, 2019; July 23–26, August 19–23, and December 3–4, 2024.
- Botany surveys following the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018a) conducted October 28–31, 2019; March 26–April 8, 2020; August 19–22, 2024; March 24–27 and May 20, 2025.

Ingram Canyon Study Area Surveys. The lower portion of Ingram Canyon, east of the gate on Ingram Creek Road at Westley Gas & Food, was assessed along public roadways for vegetation and wildlife resources on May 3 and 16, 2024. However, the majority of the Ingram Canyon study area was not accessible and was evaluated with aerial photograph interpretation. Field surveys in accessible areas were conducted both on foot and by vehicle (windshield surveys), with vehicle-based assessments limited to portions of Ingram Creek Road and Howard Road. Foot surveys were conducted along accessible portions of the California Aqueduct and Delta-Mendota Canal, as well as areas adjacent to I-5 and Ingram Creek Road. Inaccessible areas were observed from these vantage points using binoculars and a spotting scope (20x–60x) to aid in species identification and habitat assessment. Data and photographs were collected using Gaia GPS and Solocator apps on an iPhone 13 mini, with additional imagery captured using a Canon R6 camera and 70–200mm lens.

Land Cover. The Del Puerto Canyon and Ingram Canyon study areas are vegetated predominantly by natural vegetation; Vegetation types, listed in **Table 3.4-1**, were mapped from aerial photographs (**Figure 3.4-1** through **Figure 3.4-9**). Vegetation and land cover data within the Del Puerto Canyon study area were compiled using a combination of field-based botanical surveys and existing vegetation mapping data within the Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG), combined with data from the National Hydrography Dataset (NHD) (U.S. Department of Agriculture 2025; USGS 2023). In addition, aerial photography data was interpreted remotely for the vegetation maps using ArcGIS Pro 3.3 with NAIP 2020/22 and Maxar 10/2023 imagery. Land cover within the Del Puerto Canyon study area includes: grasslands, blue oak woodland, coastal scrub, blue oak woodland/coastal scrub, intermittent stream, riparian woodland, riparian wetlands, seeps, seasonal wetlands, seasonal streams, ponds, ornamental trees, and orchards. Unvegetated areas within the Del Puerto Canyon study area includes paved roads and canals.

Table 3.4-1: Land Cover Types in the Del Puerto Canyon and Ingram Canyon Study Areas

Land Cover Type	Del Puerto Canyon Study Area (acres)	Ingram Canyon Study Area (acres)
Grasslands	2,181[a]	662
Blue Oak Woodland	24	173
Coastal Scrub	127	100
Blue Oak Woodland/Coastal Scrub	59	0
Intermittent Stream	3.6	15.5
Riparian Woodland	22.7	13
Riparian Wetland	26	0
Seep Wetland	1.9	0
Seasonal Wetland	0.12	0.2
Seasonal Stream	0.6	12.0
Pond	0.6	0.1
Ornamental Trees	3.3	0
Orchard	257[b]	47
Unvegetated Areas		
Developed/Disturbed	65	49
Canal	10.7	3
Total	2,783	1,075

a. The "Grasslands" land cover type in the lower Del Puerto Creek portion of the Del Puerto Canyon study area includes primarily ruderal habitats that support non-native grasses and forbs.

b. The "Orchard" land cover type in the in the lower Del Puerto Creek portion of the Del Puerto Canyon study area includes orchard, abandoned orchard, and vineyard types.

Grassland is the most abundant plant community within both study areas; there are also areas of coastal scrub and blue oak woodland in the steep canyons on the west side of the Del Puerto Canyon study area. Riparian woodlands and wetlands are present along Del Puerto Creek, and a few small ponds, seasonal seeps, and isolated seasonal wetlands are scattered across the Del Puerto

Canyon study area. Abandoned orchards are present on about 257 acres of the Del Puerto Canyon study area. A total of 297 plant species were observed during botanical surveys in the Del Puerto Canyon study area.

Vegetation and land cover data within the Ingram Canyon study area were collected using existing vegetation mapping data within the Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) combined with data from the National Hydrography Dataset (NHD) (U.S. Department of Agriculture 2025; USGS 2023); aerial photography data was interpreted remotely for the vegetation maps using ArcGIS Pro 3.3 with NAIP 2020/22 and Maxar 10/2023 imagery.

Vegetation and land cover data were compiled using remote sensing and mapping sources for the Ingram Canyon study area. These sources identified a range of habitat types in Ingram Canyon: grasslands, blue oak woodland, coastal scrub, intermittent stream, riparian woodland, seasonal wetlands, seasonal streams, ponds, and orchards. Riparian woodlands and wetlands are present along Ingram Creek, with a few small ponds and isolated seasonal wetlands are scattered across the Ingram Canyon study area. Unvegetated areas within the Ingram Canyon study area also include paved roads and canals. Given the ecological similarity between the two study areas, it is reasonable to assume that many of the species observed in Del Puerto Canyon study area also occur in the Ingram Canyon study area.

While formal botanical surveys could not be conducted in the Ingram Canyon study area due to access restrictions, it is reasonable to assume that many of the same plant species observed in the Del Puerto Canyon study area would also be present in the Ingram Canyon study area given the ecological similarity between the two study areas.

More detailed descriptions of each vegetation type and a list of plant species observed are provided in **Appendix I4**, the April 2020 *Memorandum Regarding Special-Status Plant Assessment–Del Puerto Canyon Reservoir Project* and the July 2025 *Del Puerto Reservoir Project –Special-Status Plant Assessment of Additional Project Footprint Areas;* **Appendix I5**, *Special-Status Species Tables;* and **Appendix I7**, *Ingram Canyon Biological Resources Memorandum*.

Wetlands and Other Waters. In accordance with 40 Code of Federal Regulations (CFR) 230.10(a), no discharge of dredged or fill material may be permitted if a practicable alternative exists that would result in a less adverse impact on the aquatic ecosystem, provided that the alternative does not have other significant adverse environmental consequences. This requirement applies regardless of whether the discharge site is a special aquatic site or whether the activity is water dependent. The Section 404(b)(1) analysis is a critical component to identifying the Least Environmentally Damaging Practicable Alternative (LEDPA). Sections of this EIS may be used by the U.S. Army Corps of Engineers (USACE) to support its evaluations under the Clean Water Act Section 404(b)(1) Guidelines.

Wetlands include waters of the United States, as defined under the 2023 Rule (40 CFR 120.2[a]) and the identical USACE definition (33 CFR 328.3[c][16]). Waters of the United States means:

(1) Waters which are:

(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) The territorial seas; or

(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:

(i) Waters identified in paragraph (a)(1) of this section; or

(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section

Wetlands subject to federal jurisdiction include riparian woodlands, riparian wetlands, seasonal wetlands, seeps, and ponds. These features are illustrated in **Figure 3.4-1** for the Del Puerto Canyon study area and **Figure 3.4-5** for the Ingram Canyon study area.

A request for a preliminary jurisdictional determination was submitted to USACE on April 8, 2020. On June 17, 2020, USACE provided concurrence, stating that approximately 32.05 acres of wetlands and approximately 6.16 acres of other waters present are potential jurisdictional aquatic resources (i.e., waters of the United States) regulated under Section 404 of the Clean Water Act. These features are depicted in **Figure 3.4-10**.

Due to changes in regulations and guidance, as well as changes to Alternative 2 since 2020, the acreages presented in Section 3.4.3, *Environmental Consequences*, are preliminary because the updated wetland delineation has not been subjected to jurisdictional review by USACE. The Project Sponsors will submit a request to USACE for an approved jurisdictional determination for Alternative 2 once complete. The final determination about the location and extent of wetlands and other waters, as well as their regulatory jurisdiction, would ultimately be determined by USACE at that time.

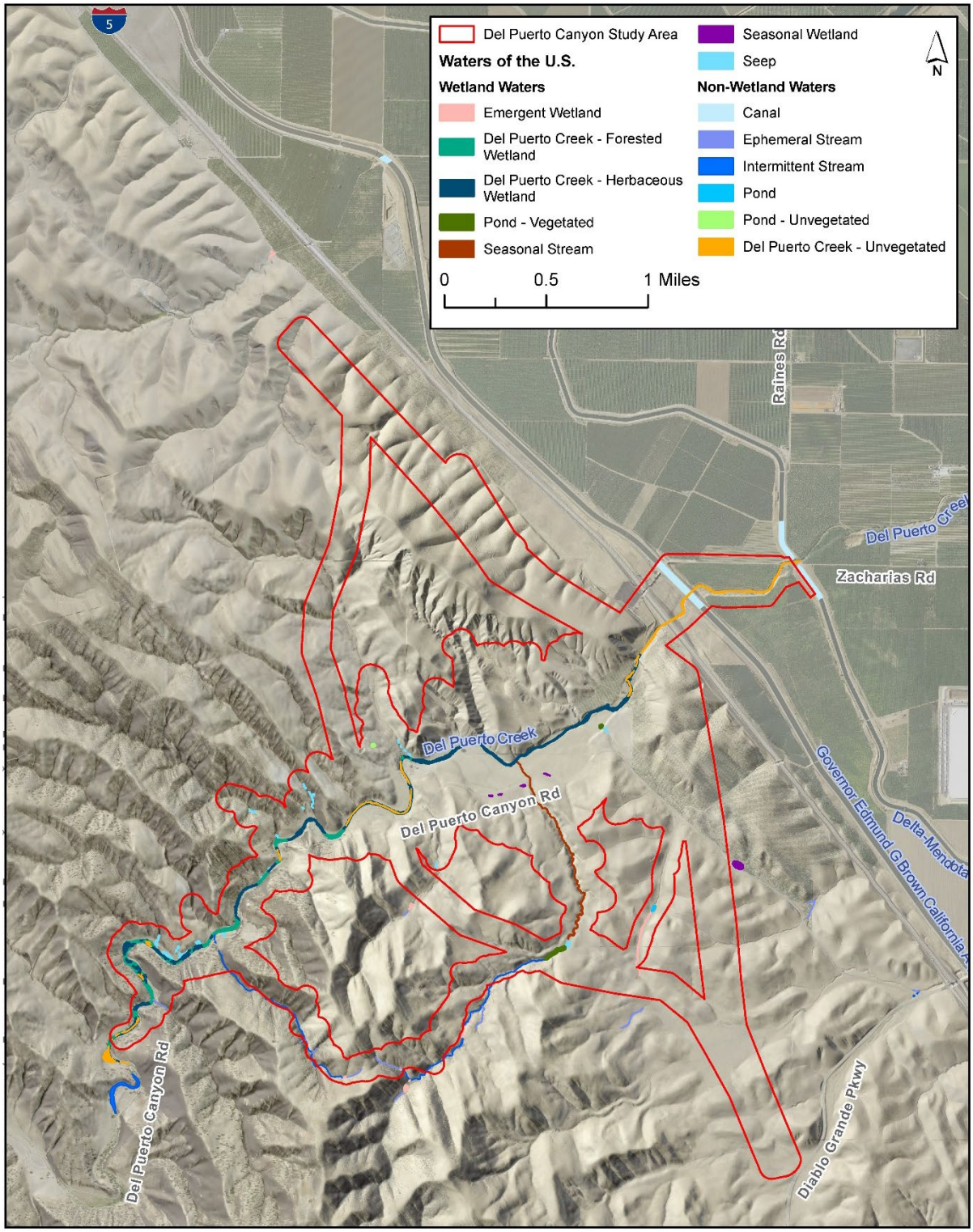

Figure 3.4-10: Wetlands and Other Waters in the Del Puerto Canyon Study Area

Natural Communities of Special Concern. Riparian woodlands and wetlands are natural communities of special concern. The riparian woodlands in the study areas are Fremont cottonwood forest and vulnerable in the state due to restricted range, relatively few populations, recent and widespread declines, or other factors that make them vulnerable to extirpation.

Special-Status Plants. The plant species included in this analysis are federally listed, state listed, proposed or candidates for federal or state listing, or fully protected species under state law that have potential to occur in the study areas. Fifty-two special-status plant species occur in or within 15 miles of the study areas (**Appendix I5**) (California Department of Fish and Wildlife [CDFW] 2025 and California Native Plant Society [CNPS] 2025). Of these, one federally and state-listed plant species, large-flowered fiddleneck (*Amsinckia grandiflora*), is known to occur within 15 miles of the study areas, and one state-listed plant species, Delta button-celery (*Eryngium racemosum*), is known to occur within 5 miles of the study areas.

During the 2020 and 2025 surveys of the Del Puerto Canyon study area, three non-federally and non-state-listed special-status species were observed: big tarplant (*Blepharizonia plumosa*), California alkali grass (*Puccinellia simplex*), and San Benito poppy (*Eschscholzia hypecoides*). Because of the low amount of late winter rainfall prior to the 2020 surveys, the absence of four species—Lemmon's jewelflower (*Streptanthus glandulosus ssp. lemmonii)*, diamond-petaled California poppy (*Eschscholzia rhombipetala*), showy madia (*Madia elegans*), and shining navarretia (*Navarretia nigelliformis* ssp. *Radiata)*—could not be confirmed. A limited portion of the Ingram Canyon study area was accessible for surveys in 2024 due to restricted property access, and no special-status plants were observed.

Twenty-five non-listed special-status species have potentially suitable habitat in the Del Puerto Canyon and Ingram Canyon study areas. These species were not observed during the 2020 or 2025 surveys of Del Puerto Canyon study area or the 2024 surveys of the Ingram Canyon study area. Based on this survey data, and current California Natural Diversity Database (CNDDB) and CNPS inventory data (CDFW 2025; CNPS 2025), no potential habitat for these species is present in the Del Puerto Canyon and Ingram Canyon study areas or the species have low potential to occur. Fourteen of these species are discussed in **Appendix I4**. The other 11 species have been added as potentially present in the Del Puerto Canyon and Ingram Canyon study areas. These 11 species are discussed in **Appendix I5**, *Special-Status Species Tables*.

Special-Status Wildlife. The species included in this analysis are federally listed, state listed, proposed or candidates for federal or state listing, or fully protected species under state law that have potential to occur in the study areas. There are 37 special-status wildlife species that could reside in the study areas; however, eight of the 37 species were found to have no suitable habitat within the Del Puerto Canyon and Ingram Canyon study areas based on a desktop review of available land cover data, information on species' range, and CNDDB occurrences (CDFW 2025). Additional information is presented in **Appendix I5**.

Federally listed species with potential habitat in the Del Puerto Canyon study area include vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), foothill yellow-legged frog (*Rana boylii*), least

Bell's vireo (*Vireo bellii pusillus*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Potential habitat is also present in the Del Puerto Canyon study area for federally proposed threatened monarch butterfly (*Danaus plexippus*), western spadefoot (*Spea hammondii*), and northwestern pond turtle (*Actinemys marmorata*). The Del Puerto Canyon study area also contains suitable habitat for other sensitive species, including golden eagle (*Aquila chrysaetos*), which is protected by the Bald and Golden Eagle Protection Act; white-tailed kite (*Elanus leucurus*), a California fully protected species; and loggerhead shrike (*Lanius ludovicianus*), a California Species of Special Concern. In addition, state-listed Swainson's hawk (*Buteo swainsoni*) and tricolored blackbird (*Agelaius tricolor*) and candidate species western burrowing owl (*Athene cunicularia hypugaea*) have potential habitat in the Del Puerto Canyon study area.

Federally listed species with potential habitat in the Ingram Canyon study area include all of the species with potential habitat in the Del Puerto Canyon study area, as well as several species that only have potential to occur in the Ingram Canyon study area, including riparian brush rabbit (*Sylvilagus bachmani riparius*), riparian woodrat (*Neotoma fuscipes riparia*), and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

Wildlife Corridors. Wildlife corridors are landscape features that connect habitat segments and facilitate the movement of wildlife between two or more habitats (Soule and Gilpin 1991; Beier and Loe 1992). Linkages are large conservation corridors that constitute substantial areas of habitat (Hoctor et al. 2007; Penrod et al. 2001). Wildlife corridors and linkages in or in the vicinity of the Del Puerto Canyon study area include the San Joaquin Valley Wildlife Corridors (Figure 11 in Appendix C), University of California at Davis Core Reserves and Corridors (Figure 12 in Appendix C), CDFW Terrestrial Connectivity Areas of Conservation Emphasis (Figure 13 in Appendix C), Bay Area and Beyond Critical Linkages (Figure 14 in Appendix C), California Essential Habitat Connectivity (Figure 15 in Appendix C), and Missing Linkages in California's Landscape (Figure 16 in Appendix C).

The study areas and vicinity provide an opportunity for local wildlife movement within these areas and larger landscape-scale connectivity through the region, especially west of I-5. Habitat east of I-5 provides a limited opportunity to support wildlife movement through the area due to constraints on habitat and resources from agricultural development and the substantial barrier to east-to-west wildlife movement posed by the California Aqueduct and DMC.

Wildlife corridors and linkages in or in the vicinity of the Ingram Canyon study area are the same as those listed for the Del Puerto Canyon study area. These include the San Joaquin Valley Wildlife Corridors, University of California at Davis Core Reserves and Corridors, CDFW Terrestrial Connectivity Areas of Conservation Emphasis, Bay Area and Beyond Critical Linkages, California Essential Habitat Connectivity, and Missing Linkages in California's Landscape.

Migratory Birds and Non-Special-Status Roosting Bats. Based on field survey data for both study areas, and current CNDDB inventory data (CDFW 2025), 7 migratory bird species could occur in the study area (**Appendix I3**). These birds could also nest in the various habitats within the Del Puerto Canyon and Ingram Canyon study areas. In addition roosting bats without special status, such as the Mexican free-tailed bat, have the potential to occur within the Del Puerto Canyon and Ingram Canyon study areas.

3.4.2 Regulatory Setting

See **Appendix E** for the laws and regulations at the federal level that may apply to the terrestrial and aquatic resources.

3.4.3 Environmental Consequences

3.4.3.1 Methodology

In accordance with the Department of the Interior (DOI) NEPA implementing procedures (43 CFR § 46.100 et seq.), agencies are expected to use the best available information when preparing environmental documents but are not required to develop new data if existing information is sufficient to support informed decision-making. 516 Departmental Manual 1- U.S. Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures further clarifies that environmental analyses should be based on reliable data and professional judgment, and that agencies may rely on existing sources when those sources adequately characterize the environmental baseline and potential effects.

The methods for analysis of impacts on terrestrial resources follow established professional and best practices. The analysis uses data from field surveys conducted by qualified biologists and available land cover data, and considers available information on species-specific ecological requirements, known distributions, occurrence data from verified sources (e.g., CNPS, CNDDB), and potential habitat within the study areas. Citations have been provided throughout this section. The key impacts were identified and evaluated based on the environmental characteristics of each study area and the expected magnitude, intensity, and duration of activities related to the construction and operation of the proposed alternatives.

Direct impacts are effects directly caused by construction and operation (even if it takes time for the resulting effect to develop). Indirect impacts occur either later in time or at a distance from the Project sites but are reasonably foreseeable, such as conversion of uplands to wetlands due to seepage into the adjacent habitat. Direct and indirect impacts can be either permanent or temporary.

Permanent direct impacts on terrestrial resources were quantified using the estimated amount of land cover that would be converted as a result of construction of new facilities and the operation of the Action Alternatives, which would be from the reservoir inundations and operation of permanent facilities such as the road and pump station. Temporary impacts on biological resources were quantified using the estimated amount of land cover that would be temporarily disturbed during construction of the Action Alternatives but would be restored to pre-Project conditions within 1 year of disturbance. Areas temporarily impacted by construction, that would ultimately be permanently impacted by reservoir inundation were totaled under the operational impacts to avoid double counting and because these would ultimately be considered permanent impacts. Conditions on parcels of land surrounding the reservoir would be maintained similar to existing conditions; e.g., grazing.

Impacts on biological resources within the study areas were determined using geographic information system (GIS) software. The footprint of each Action Alternative and associated temporary impact areas were overlaid on vegetation community, wildlife habitat, and wetland data to quantify permanent and temporary impacts associated with the construction and operation of the

Action Alternatives. Impacts on special-status plants known to occur in each study area were determined by overlaying the Action Alternative's footprint over mapped occurrences and determining area of overlap.

For the Ingram Canyon study area, available hydrologic and ecological data obtained from verified sources (e.g., CNPS, CNDDB, NWI), provides a sufficient basis for evaluating potential environmental effects. Because the potential for adverse environmental effects in the Ingram Canyon study area is low based on limited ecological variability and stable land use, and the existing data adequately characterizes baseline conditions, further data collection for the Ingram Canyon study area was not justified under the DOI NEPA framework.

3.4.3.2 Environmental Protection Measures

Environmental Protection Measures (EPMs) for terrestrial biological resources include the following. If measures from regulatory permits issued for the proposed action (e.g., USFWS Biological Opinion, CDFW Incidental Take Permit, CDFW Streambed Alteration Agreement) conflict with these EPMs, the most protective measure will be implemented.

BIO-TERR-1a: Avoid and Minimize Impacts on Biological Resources.

The Project Sponsors will incorporate the following measures into construction plans:

- Employees and contractors performing construction and decommissioning activities will receive environmental sensitivity training. Training will include a review of environmental laws, mitigation measures, permit conditions, and other requirements that must be followed by all personnel to reduce or avoid effects on biological resources during construction activities.
- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
- Off-road vehicle travel will be avoided outside of the construction footprint.
- Grading will be restricted to the minimum area necessary.
- Prior to ground-disturbing activities, sensitive habitats will be flagged by a USFWS- and CDFW-approved biologist, and temporary fencing will be in place during construction to reduce the potential for vehicles and equipment to stray into these areas.
- Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area (i.e., with a created berm made of sandbags or other removable material) is constructed.
- Erosion control measures will be implemented to reduce sedimentation in nearby aquatic habitat when activities are the source of potential erosion. Plastic monofilament netting (erosion control matting) or similar material containing netting will not be used at the Project site. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

- The following will not be allowed at or near work sites on the Project site: trash dumping, firearms, open fires (e.g., barbecues), hunting, and pets.
- First- and second-generation rodenticides will not be used within the Project site, except for the limited use of zinc phosphide or a rodenticide allowed for use by the California Department of Pesticide Regulation.
- An approved biologist will be on-site during initial ground-disturbing activities within and adjacent to grassland areas and during the removal of any trees. The biologist will help the crew, as needed, comply with all implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that contractors maintain exclusion areas adjacent to sensitive biological resources and for documenting compliance with all biological resources–related mitigation measures. The biologist will have the authority to temporarily stop work to allow observed special-status species to move out of the work area (passively or relocated; as appropriate) or when any EPMs are not functioning appropriately for the protection of special-status species, following the requirements of all relevant environmental documents and permits.

9 **BIO-TERR-1b: Avoid and Compensate for Adverse Effects on Special-Status Plant Species**

Surveys of grasslands must be conducted by qualified botanists in accordance with the appropriate protocols for special-status plants prior to the start of any construction activities. The surveys will be conducted in accordance with *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018a) during the season when special-status plant species would be evident and identifiable, which, generally, is during their blooming season. The surveys will be conducted no more than 3 years prior to the start of ground-disturbing activities. The results of the survey will be submitted to the Del Puerto Water District (DPWD), CDFW, and USFWS for review no less than 1 year prior to the start of ground-disturbing activities. The report will include the location and description of all proposed work areas and the location and description of all occupied habitat for special-status plant species. It will identify locations where effective avoidance measures could be implemented. In areas where no special-status plant species are present, no further mitigation would be required.

Where surveys determine that a special-status plant species is present in or adjacent to a work area, where temporary ground-disturbing activities would take place, impacts due to the chosen Action Alternative will be avoided through the establishment of activity exclusion zones, within which no ground-disturbing activities will take place, including construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species will be established around each occupied habitat site, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no construction-related disturbances will occur within 250 feet of the occupied habitat. The size of activity exclusion zones may be reduced through consultation with a qualified biologist and concurrence from USFWS and CDFW, based on site-specific conditions. Prior to any activities that would result in permanent impacts on special-status plants,

compensation habitat for each affected species will be acquired and permanently protected at a minimum compensation ratio of 2 acres protected for every 1 acre that would be lost and may be a combination of off-site restoration/creation and mitigation credits. Final compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW and USFWS) during permit processing.

Compensation habitat will consist of existing off-site occupied habitat acquired in fee, through conservation easements, or by purchasing credits from a certified conservation bank or mitigation bank. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of the two) would be completed as agreed upon by the Project Sponsors, USFWS, and/or CDFW, as appropriate for the species being mitigated. If onsite or offsite occupied habitat is acquired (permittee-responsible mitigation), the habitat will require monitoring by the Project Partners. If credits are purchased from a certified bank, no further monitoring will be required.

The Project Sponsors will monitor any permittee-responsible mitigation habitat annually for a minimum of 5 years, or as required by the regulating agency, to verify that the habitat suitability and extent of species cover are maintained. For these mitigation areas, the Project Sponsors will prepare and implement a long-term management plan for each compensation habitat. The plan will include requirements to monitor the occupied habitat, including the special-status species absolute and relative cover, cover of other native species, and cover of invasive species. The plan will determine and implement appropriate management measures to maintain the habitat and the plant species cover, at the same or greater extent as when the occupied habitat was acquired. Management measures may include removal of invasive plant species. The Project Sponsors will submit annual monitoring reports for a minimum of 5 years, or as required by the regulating agency, for review and verification that the chosen Action Alternative remains in compliance with the mitigation requirements.

10 **BIO-TERR-1c: Avoid, Minimize, and Compensate for the Loss of Habitat Occupied by Vernal Pool Fairy Shrimp and/or Vernal Pool Tadpole Shrimp**

Preconstruction Protocol-level Surveys

At least 1 year prior to affecting any of the potential vernal pool branchiopod habitat, a biologist with a 10(a)(1)(A) recovery permit for vernal pool branchiopods will conduct protocol-level surveys for federally listed vernal pool branchiopods following the USFWS 2015 *Survey Guidelines for the Listed Large Branchiopods*. These surveys require the completion of one dry-season survey and one wet-season survey.

Avoidance and Minimization Measures

To the extent practicable, construction areas will avoid direct or indirect (i.e., activities that would alter hydrology within 250 feet of vernal pool habitat) impacts on vernal pool habitat. If avoidance within 250 feet of habitat is not possible, those work areas will be assessed for their potential to alter the hydrology of the pool habitat such that the hydroperiod of the pool will no longer support the species. Where the USFWS and CDFW agrees that any changes to the

hydroperiod will not permanently affect habitat functionality, compensatory mitigation would not be required.

Where avoidance is not possible, and construction occurs within 250 feet of vernal pool habitat, EPM BIO-TERR-1a: *Avoid and Minimize Impacts on Biological Resources* will be implemented to ensure that construction activities minimize effects on the habitat by requiring environmental sensitivity training for construction personnel, installing flagging and/or protective fencing around sensitive habitats, installing erosion control measures, and presence of a biological monitor to ensure all relevant EPMs are maintained for the duration of construction.

Compensation

If federally listed branchiopods are determined to be present in permanent disturbance areas and avoidance is not possible, then the Project Sponsors will compensate for the loss of federally listed vernal pool branchiopod habitat through the purchase of credits from a USFWS and CDFW-approved mitigation bank at a minimum conservation acreage ratio of 2:1 for protection and 1:1 for restoration. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW and USFWS).

11 **BIO-TERR-1d: Avoid, Minimize, and Compensate for Impacts of Valley Elderberry Longhorn Beetle**

Preconstruction Exit Hole Surveys

Prior to filling the reservoir, all elderberry shrubs in the inundation footprint will be surveyed for exit holes following the guidance in the 2017 USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (Framework) to determine if they are occupied by valley elderberry longhorn beetle.

Avoidance and Minimization Measures

The measures outlined below come from the USFWS 2017 Framework. They are to be implemented where construction would occur within 165 feet of elderberry shrubs.

- Fencing. All areas to be avoided during construction activities will be fenced and/or flagged as close to construction limits as feasible.
- Avoidance Area. Activities that may damage or kill an elderberry shrub (e.g., trenching, paving) may need an avoidance area of at least 6 meters (20 feet) from the drip-line, depending on the type of activity.
- Worker Education. A qualified biologist will provide training for all contractors, work crews, and any on-site personnel on the status of the valley elderberry longhorn beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.
- Construction Monitoring. A qualified biologist will monitor the work area at appropriate intervals to ensure that all avoidance and minimization measures are

implemented. The amount and duration of monitoring will depend on the specifics of the chosen Action Alternative and will be discussed with the USFWS biologist.

- 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 valley elderberry longhorn beetle (March–July).
- Trimming. Trimming may remove or destroy valley elderberry longhorn beetle eggs and/or larvae and may reduce the health and vigor of the elderberry shrub. To avoid and minimize adverse effects on valley elderberry longhorn beetle when trimming, trimming will occur between November and February and will avoid the removal of any branches or stems that are 1 inch or more in diameter. Measures to address regular and/or large-scale maintenance (trimming) will be established in consultation with USFWS.
- Chemical Usage. Herbicides will not be used within the drip-line of the shrub. Insecticides will not be used within 30 meters (98 feet) of an elderberry shrub. All chemicals will be applied with use of a backpack sprayer or similar direct application method.
- Mowing. 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.
- Erosion Control and Re-vegetation. Erosion controls will be implemented and the affected area will be re-vegetated with appropriate native plants.

Compensation

If no occupied shrubs would be lost, no compensatory mitigation would be required. If shrubs determined to be occupied by valley elderberry longhorn beetle are lost due to construction and/or inundation, the Project Sponsors will compensate for the loss of individual shrubs by purchasing credits at a USFWS-approved mitigation bank. Per the USFWS 2017 Framework, those shrubs that can be transplanted (i.e., those not on cliffs and those that are likely to withstand transplantation) will also be moved to the USFWS-approved mitigation bank. The specific location for the mitigation will be developed during Reclamation's consultation with USFWS.

12 **BIO-TERR-1e: Avoid and Minimize on Special-Status Amphibians**

Conduct Protocol-Level Surveys

To guide implementation of avoidance and minimization measures, protocol-level surveys for California tiger salamander, California red-legged frog, and foothill yellow-legged frog will be conducted by a USFWS- and CDFW-approved biologist who possesses the necessary handling permits (California tiger salamander only).

- California tiger salamander surveys will be conducted in potentially suitable habitat within the Project site, and accessible areas within 2 km, according to the USFWS and CDFW Interim Guidance on Site Assessment and Field Surveys for Determining

Presence or a Negative Finding of the California Tiger Salamander (USFWS and CDFW 2003) or the most up-to-date survey protocol at that time.

- California red-legged frog surveys will be conducted in potentially suitable habitat in the Project site, and surrounding 1.6 km, according to the USFWS Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005) or the most up-to-date survey protocol at that time.
- Foothill yellow-legged frog surveys will be conducted in the Project site according to CDFW's Considerations for Conserving the Foothill Yellow-Legged Frog (CDFW 2018b) or the most up-to-date survey protocol at that time.

No specific protocol has been developed for western spadefoot toad. Presence will be determined by conducting surveys during the winter and spring to identify adults, egg masses, larvae, and/or metamorphs. Surveys will be conducted during the breeding season and timed to document breeding adults at potential breeding ponds. Auditory surveys will be conducted to listen for calling males. Because potential breeding habitat may be far from accessible roads, and spadefoots breed during rainfall events, Remote Auditory Recording Devices (RARDs) and analysis software (e.g., Kaleidoscope) may be deployed to assist in documenting this species at hard-to-reach sites within the study areas.

Avoidance and Minimization Measures

The measures outlined below will be implemented to avoid and minimize direct and indirect effects on special-status amphibians during construction, operation, and maintenance activities.

- Ground disturbance will be limited to permanent and temporary impact areas identified in the final plans for the reservoir.
- Suitable aquatic habitats needed for access to, and construction of, saddle dams will be avoided during construction by placing high-visibility fencing around the suitable habitat areas. The fencing will be open at the bottom to allow wildlife to move in and out of the pond.
- The approved biologist will be present during all ground-disturbing activities and any activities involving heavy equipment used in or adjacent to suitable upland and/or aquatic habitat.
- Maintenance activities in vegetated areas will be conducted during the dry season (generally April 1 to October 14) and will avoid and minimize any disturbance of small mammal burrows. Use of first- and second-generation rodenticides will not be permitted, except for the limited use of zinc phosphide or a rodenticide allowed for use by the California Department of Pesticide Regulation.
- Within habitat for California tiger salamander, California red-legged frog, and western spadefoot toad, initial ground-disturbing activities will not take place during the rainy season, generally October 15 to March 31, or until the first measurable rain of 1 inch or more occurs, to avoid the period when most amphibian movement across upland habitat is expected to occur.

- Ground-disturbing activities may take place during the wet season in areas where potential habitat for special-status amphibians has been removed when an approved biologist is present to monitor activities.
- When work occurs in special-status amphibian habitat, the approved biologist will conduct a pre-activity survey immediately prior to work beginning. The biologist will inspect beneath equipment, vehicles, and stored materials that have been left in the work area overnight.
- If a special-status amphibian is found in a work area, it will at first be allowed to move out of the work area on its own. However, if there is no suitable habitat for the animal to freely move to, it will be relocated by the approved biologist to a pre-determined location identified in coordination with USFWS and CDFW.
- To prevent the accidental entrapment of species during construction, all excavated trenches and holes deeper than 6 inches will be ramped at the end of the workday to allow trapped animals a means of escaping. Earthen ramps will be constructed at each end of the active trench, and boards will be placed in open holes. Each day that a trench and/or hole is open prior to backfilling, these areas will be inspected by a USFWS- and CDFW-approved monitor. If an animal is found trapped in a trench or hole, construction will cease until it exits the trench or hole on its own or is relocated to an approved location by a USFWS- and CDFW-approved biologist.
- If work in suitable special-status amphibian habitat occurs during the rainy season, generally October 15 to March 31, lasting for more than 1 day, exclusion fencing will be installed between the work area and area of suitable habitat. A USFWS- and CDFW-approved biologist will determine where exclusion fencing will be installed. The fencing will be installed to a depth of 6 inches and be at least 36 inches above grade. The contractor will avoid placing fencing on top of the burrows of ground squirrels. A qualified biologist will inspect the fencing daily for the presence of these species.
- If the exclusion fence is found to be compromised at any time, a survey will be conducted immediately preceding construction activity that occurs in special-status amphibian habitat or in advance of any activity that may result in take of the species. The biologist will search along exclusion fences, in pipes, and beneath vehicles before they are moved. The survey will include a careful inspection of all potential hiding spots, such as along exclusion fencing; within areas of large woody debris; and on the perimeter of ponds, wetlands, and riparian areas. Any special-status amphibians found will either be allowed to move of its own accord or will be captured and relocated, as described above.
- Between the time when construction begins and the reservoir is filled, if construction activities occur in streams, temporary aquatic barriers (e.g., hardware cloth) will be installed both upstream and downstream of the in-stream work area. Special-status amphibians will be relocated and excluded from the work area. The approved biologist will establish an adequate buffer on both sides of creeks and around potential aquatic habitat and restrict entry during the construction period.

If the use of pumps is necessary for diverting flows or dewatering during construction of the dam, pump intakes will be fitted with a screen-type device, consisting of, at a minimum, a water intake strainer. Water intake strainers are most appropriate for low-volume diversion projects. For high-volume water diversion projects or other diversion activities that may warrant greater protection, pump intakes will be fitted with screens made of woven mesh, a perforated plate, or wedge wire. The screen medium must be able to withstand forces related to pumping and be of sufficient size to prevent amphibian larvae from entering the intake and being diverted within the water.

13 **BIO-TERR-1f: Compensation for the Loss of California Tiger Salamander Habitat**

If protocol-level surveys determine that California tiger salamander is not present in the study area, then no further mitigation is required. If California tiger salamander is present in aquatic and upland habitat in the study area, the habitat permanently lost due to the chosen Action Alternative will be mitigated at a minimum of 1:1. Mitigation will be achieved through either purchasing credits at a USFWS- and CDFW-approved mitigation bank or through the purchase of a conservation easement with an associated endowment approved by USFWS and CDFW. Any conservation lands will be shown to be occupied by California tiger salamander and will be managed in perpetuity for the benefit of the species. Details of the mitigation will be further developed in consultation with USFWS and CDFW.

14 **BIO-TERR-1g: Compensate for the Loss of California Red-legged Frog Habitat**

If protocol-level surveys determine that California red-legged frog is not present, no compensatory mitigation would be required. If California red-legged frog is present in aquatic and upland habitat in the study area, the habitat permanently affected due to the chosen Action Alternative will be mitigated at a minimum of 1:1. Mitigation will be achieved through either purchasing credits at a USFWS-approved mitigation bank or through the purchase of a conservation easement with an associated endowment approved by USFWS. Any conservation lands will be shown to be occupied by California red-legged frog and will be managed in perpetuity for the benefit of the species. Details of the mitigation will be further developed in consultation with USFWS.

15 **BIO-TERR-1h: Compensate for the Loss of Foothill Yellow-legged Frog Habitat**

If surveys determine that foothill yellow-legged frog is not present, no further mitigation is necessary. If foothill yellow-legged from is present, the habitat permanently affected due to the chosen Action Alternative will be fully mitigated by either purchasing property and/or a conservation easement that contains stream habitat of similar quality and quantity and that is currently occupied by foothill yellow-legged frog and/or represents an area that has been historically occupied and where successful recolonization is likely (e.g., known occupation in nearby watershed or tributary). A final mitigation plan will be developed and approved by CDFW. The plan will include measures for the long-term management of these lands for the benefit of foothill yellow-legged frog and include adaptive management measures.

16 **BIO-TERR-1i: Avoid and Minimize Impacts on Special-Status Reptiles**

The following measures will be implemented to ensure that the chosen Action Alternative does not have an adverse impact on special-status reptiles:

- The approved biologist monitoring construction will survey for special-status reptiles in areas of suitable habitat immediately prior to initial ground-disturbing activities and vegetation removal. If special-status reptiles are not found, no additional measures are required.
- If any special-status reptiles are found, work will not begin until they are allowed to passively move out of the work area or are relocated to a CDFW-approved relocation site. Relocation of these species would require consulting with CDFW and a letter from CDFW authorizing this activity.
    - No monofilament plastic will be used for erosion control.
    - The approved biologist will inspect open trenches and pits and under construction equipment and materials left on-site for special-status reptiles each morning before equipment and materials are moved.
    - Ground disturbance in suitable habitat will be minimized to the extent practicable.
    - Vegetation outside the work area will not be removed.

All vegetation removal will be monitored by the approved biologist to minimize impacts on special-status reptiles.

17 **BIO-TERR-1j: Avoid and Minimize Impacts on Western Burrowing Owl**

The following measures, which were based on the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012), will be implemented to avoid and minimize potential adverse impacts on burrowing owls prior to and during construction and maintenance activities that require large areas of ground disturbance (e.g., grading):

- A qualified biologist will conduct preconstruction take avoidance surveys for burrowing owl 14 days prior to ground-disturbing activities and a second survey within 24 hours of initiating ground-disturbing activities and before reservoir inundation. The survey area will encompass the work area and a 500-foot buffer around this area as well as the inundation area. If no burrowing owls are found, then no further mitigation would be required, unless there is a lapse in time greater than 14 days before the start of construction activities.
- To the maximum extent feasible, construction activities within 500 feet of active burrowing owl burrows will be avoided during the nesting season (February 1–August 31).
- If an active burrow is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established by a biologist experienced with burrowing owls in coordination with CDFW.

- If burrowing owls are present at the site during the non-breeding season (September 1–January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow.
- If the designated no-activity zone for either breeding or non-breeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and, in coordination with CDFW, recommend a smaller buffer (if possible) that still minimizes the potential to disturb the owls. The site-specific buffer will consider the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity to background activities.
- If burrowing owls are present in the direct disturbance area and cannot be avoided during the non-breeding season (generally September 1–January 31), passive relocation techniques (e.g., installing one-way doors at burrow entrances) may be used. Passive relocation may also be used during the breeding season (February 1–August 30) if a biologist with burrowing owl experience, in coordination with CDFW, determines through site surveillance and/or scoping that the burrow is not occupied by burrowing owl adults, young, or eggs. Passive relocation will be accomplished by installing one-way doors (e.g., modified dryer vents or other CDFW-approved method), which will be left in place for a minimum of 1 week and monitored daily to ensure that the owls have left the burrow. Excavation of the burrow will be conducted using hand tools. During excavation of the burrow, a section of flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow tunnel to maintain an escape route for any animals that may be inside the burrow.
- Any owls in occupied burrows within the reservoir footprint will be relocated using passive relocation techniques.
- Destruction of unoccupied burrows outside the work area will be avoided and visible markers will be placed near burrows to ensure that they have not collapsed.
- Ongoing surveillance of the Project site will be conducted for burrowing owls during construction activities. If additional owls are observed using burrows within 500 feet of construction, the on-site biological monitor will determine, in coordination with CDFW, if the owls are or would be affected by construction activities and if additional exclusion zones are required.

If burrowing owls are detected during preconstruction surveys, the Project Sponsors will compensate for the loss of burrowing habitat according to the guidelines in *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). These guidelines do not recommend minimum habitat replacement ratios but do note that the conservation area should be comparable to or better than the impact area, large enough with respect to acreage, and support burrowing mammals. Any such conservation may be combined with conservation areas developed for Swainson's hawk and/or San Joaquin kit fox. If burrowing owl conservation is appropriate on these lands, the respective mitigation and monitoring plans developed will be modified to include measures for the maintenance and enhancement of habitat for burrowing owl.

18 **BIO-TERR-1k: Avoid and Minimize Impacts on Nesting Birds**

To the maximum extent practicable, the removal of structures and vegetation (e.g., trees, shrubs, ground vegetation) will take place during the non-breeding season for most migratory birds (generally September 1-February 1). This timing is highly preferable because if an active nest is found during preconstruction surveys in a tree (or other vegetation) that would be removed by construction, the tree (or other vegetation) would not be allowed to be removed until the end of the nesting season or until the nestlings have fledged, which could delay construction. If vegetation cannot be removed during the non-nesting season, or if ground cover re-establishes in areas where vegetation has been removed, the affected area must be surveyed for nesting birds.

Should structure and vegetation removal activities occur between February 15 and September 30, a qualified biologist will conduct preconstruction surveys for active nesting birds. If an active nest is found in the survey area, a no-disturbance buffer area will be established around the nest site to avoid disturbance or destruction of the nest until the end of the breeding season or until after a qualified wildlife biologist determines that the young have fledged and moved out of the study area (timing varies by species). Buffers will be developed by the biologist, based on the species' nesting behavior, their sensitivity to disturbance, the type or work taking place during the nesting season, and the surrounding topography and vegetation, which may attenuate noise and block visual disturbances. Buffers will be a minimum of 50 feet from disturbance for more common ground-nesting birds and a minimum of 500 feet for tree-nesting raptors. Initial reservoir filling will begin outside the nesting season.

19 **BIO-TERR-1l: Avoid and Minimize Impacts on Swainson's Hawk**

The Project Sponsors will retain a wildlife biologist experienced in surveying for Swainson's hawk to conduct surveys for the species in the spring/summer prior to construction. The surveys will be conducted within the limits of disturbance and in a buffer area up to 0.25 mile from the limits of disturbance. The size of the buffer area surveyed will be based on the type of habitat present and the line of sight from the construction area to surrounding suitable breeding habitat. Surveys will follow the methods in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). A minimum of six surveys will be conducted from January to March 20 to determine potential nest sites, from March 20 to April 20 to document breeding and nesting, and from June 10 to July 30 to determine post-fledging success. If a variance in the survey distance or number of surveys is necessary, the Project Sponsors will coordinate with CDFW regarding appropriate survey methods, based on proposed construction activities. Generally, surveys will be conducted from February to July. Survey methods and results will be reported to the Project Sponsors and CDFW.

The removal of trees within the reservoir inundation area will take place outside the Swainson's hawk nesting season. Active Swainson's hawk nests within 600 feet of the areas of active construction activities will be monitored by a wildlife biologist with experience in monitoring Swainson's hawk nests. The monitor will document the location of active nests,

coordinate with the Project Sponsors and CDFW, and record all observations in a daily monitoring log. The monitor will have the authority to temporarily stop work if activities are disrupting nesting behavior to the point of resulting in potential take (i.e., eggs and young chicks are still in the nest, and adults appear agitated and could abandon the nest). The monitor will work closely with the contractor, the Project Sponsors, and CDFW to develop plans for minimizing disturbance, such as modifying or delaying certain construction activities.

A minimum non-disturbance buffer of 600 feet (radius) will be established around all active Swainson's hawk nests. No entry of any kind related to construction will be allowed within this buffer while the nest is active, unless approved by CDFW through issuance of an Incidental Take Permit or through coordination during construction. The buffer size may be modified, based on site-specific conditions, including line of sight, topography, type of disturbance, existing ambient noise and disturbance levels, and other relevant factors. Entry into the buffer for construction activities will be granted when the biological monitor determines that the young have fledged and are capable of independent survival or that the nest has failed and the nest site is no longer active. All buffer adjustments will be approved by CDFW.

20 **BIO-TERR-1m: Compensate for the Loss of Swainson's Hawk Foraging Habitat**

The permanent loss of Swainson's hawk foraging habitat will be mitigated according to the guidance in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California* (California Department of Fish and Game 1994). This guidance includes recommended mitigation ratios, based on the proximity to an active nest (i.e., used during one or more of the last 5 years preceding the initiation of the activity).

21 **BIO-TERR-1n: Avoid and Minimize Impacts on Bats**

To avoid and minimize potential impacts on pallid bat, western red bat, and non-special-status bat species from the removal of trees and buildings, the Project Sponsors will implement the actions outlined below.

Preconstruction Surveys

Within 2 weeks prior to rock outcrop disturbance, tree removal, and any building demolition (e.g., sheds and other outbuildings), a qualified biologist will examine rock outcrops to be disturbed, trees to be removed, and buildings planned for demolition for suitable bat roosting habitat. High-quality habitat features (e.g., deep crevices, large tree cavities, basal hollows, loose or peeling bark, larger snags, abandoned buildings) will be identified and the area around these features searched for bats and bat sign (e.g., guano, culled insect parts, staining). Riparian woodland and stands of mature broadleaf trees will be considered potential habitat for solitary foliage-roosting bat species.

If suitable roosting habitat and/or bat sign is detected, biologists will conduct an evening visual emergence survey of the source habitat feature from a half hour before sunset to 1 to 2 hours after sunset for a minimum of two nights. Full-spectrum acoustic detectors will be used during emergence surveys to assist in species identification. Detectors will be set to record bat calls for

the duration of each night. All emergence and monitoring surveys will be conducted during favorable weather conditions (i.e., calm nights with temperatures conducive to bat activity and no precipitation predicted). The biologist will analyze the bat call data using appropriate software and prepare a report that will be submitted to the Project Sponsors and CDFW.

Timing of Rock Outcrop Disturbance, Tree Removal, and Building Demolition

Rock outcrops, trees, and buildings planned for removal and demolition will have exclusion devices installed between September 15 and October 31 to avoid affecting maternal and hibernating bat roosts. The exact timing of removal and demolition will be based on the results of preconstruction surveys of rock outcrops, trees, and buildings (i.e., if it is determined bats are present).

Protective Measures

Protective measures may be necessary if it is determined that bats are using rock outcrops, trees, or buildings in work areas as roost sites or if special-status bat species are detected during acoustic monitoring. The measures outlined below will be implemented when roosts are found within rock outcrops, trees, or buildings planned for removal according to the timing discussed above. Specific measures will be approved by the Project Sponsors and CDFW prior to excluding bats from occupied roosts.

- Exclusion from roosts will take place late in the day or in the evening to reduce the likelihood of evicted bats falling prey to diurnal predators and will take place during weather and temperature conditions conducive to bat activity.
- Biologists experienced with bats and bat evictions will carry out or oversee the exclusion tasks and monitor rock outcrop disturbance, tree removal, and building demolition if the affected areas are determined to be occupied. When entering areas that may have concentrations of bats, such as maternity colonies, biologists will implement decontamination procedures to prevent or reduce the human-based transmission of white-nosed syndrome following the *National White-nose Syndrome Decontamination Protocol* (White-nose Syndrome Disease Management Working Group 2024), or more current guidance if available.
- Trees that provide suitable roost habitat will be removed in pieces, rather than felling the entire tree, and late in the day or in the evening to reduce the likelihood of evicted bats falling prey to diurnal predators. Removal will take place during warm weather that is conducive to bat activity.
- Structural changes may be made to a known roost that has been proposed for removal to create conditions that would be undesirable for roosting bats and encourage the bats to leave on their own (e.g., open additional portals so that the temperature, wind, light, and precipitation regime in the roost change). Structural changes to the roost will be authorized by CDFW and will be performed during the appropriate exclusion timing (listed above) to avoid harming bats.
- Non-injurious harassment at the roost site, such as ultrasound deterrents or other sensory irritants, may be used to encourage bats to leave on their own.

- One-way door devices will be used where appropriate to allow bats to leave the roost but not return.
- Prior to rock outcrop disturbance, tree removal/trimming, and/or building demolition, and after other eviction efforts have been attempted, any confirmed roost site will be gently shaken or repeatedly struck with a heavy implement such as a sledgehammer or an axe. Several minutes will pass before beginning disturbance, felling trees, or beginning demolition work to allow bats time to arouse and leave the roost. A biological monitor will search downed vegetation for dead and injured bats. The presence of dead or injured bats will be reported to CDFW. Injured bats will be transported to the nearest CDFW-permitted wildlife rehabilitation facility.

22 **BIO-TERR-1o: Avoid and Minimize Impacts on San Joaquin Kit Fox**

The following measures have been adapted from the *Standard Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (Standard Recommendations) (USFWS 2011). A qualified biologist will conduct a preconstruction survey within the limits of proposed temporary and permanent construction footprints, no less than 14 days and no more than 30 days before the beginning of ground disturbance. The biologist will conduct den searches by systematically walking transects spaced 30 to 100 feet apart through the study area. Transect distance will be determined by the height of vegetation such that 100 percent visual coverage of the disturbed ground is achieved. If dens are found during the survey, the biologist will map the location of each den; record the size and shape of the den entrance; note the presence of tracks, scat, or prey remains; and determine if the den was recently excavated. Dens will be classified as one of the following four den status categories:

- Potential Den: Any subterranean hole within the species' range that has entrances with appropriate dimensions (5 to 8 inches in diameter) and the available evidence is sufficient to conclude that it is being used or has been used by a San Joaquin kit fox. Potential dens comprise (1) any suitable subterranean hole or (2) any den or burrow of another species (e.g., coyote, badger, red fox, ground squirrel) that otherwise has appropriate characteristics for San Joaquin kit fox use.
- Known Den: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radio telemetry or spotlighting data; San Joaquin kit fox signs such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being used or has been used by a San Joaquin kit fox.
- Natal or Pupping Den: Any den used by San Joaquin kit fox to whelp and/or rear their pups. Natal/pupping dens may be larger and may have more entrances than dens occupied exclusively by adults. These dens typically have more San Joaquin kit fox tracks, scat, and prey remains in the vicinity of the den and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which San Joaquin kit fox pups are whelped but not necessarily reared, is a more

restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition, either term applies.

- Atypical Den: Any artificial structure that has been or is occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

If no potential dens are present, no further avoidance measures would be required. If potential San Joaquin kit fox dens are present, their disturbance and destruction will be avoided. Results of the survey will be submitted to USFWS and CDFW within 1 week of the completion of the survey and prior to the beginning of ground disturbance and/or construction activities that are likely to affect San Joaquin kit fox. If dens are located within the Project site, the following avoidance buffers will be applied:

- Potential Den – 50 feet
- Atypical Den – 50 feet
- Known Den – 100 feet
- Natal/Pupping Den – USFWS and CDFW will be contacted for further guidance

If the den is within the construction footprint and/or reservoir inundation area and avoidance buffers are not possible, then dens may be collapsed following the guidance in the Standard Recommendations. Additional avoidance and minimization measures identified in the Standard Recommendations will be implemented during construction in suitable kit fox habitat.

23 **BIO-TERR-1p: Compensate for the Loss of San Joaquin Kit Fox Dispersal Habitat**

To compensate for the loss of potential kit fox dispersal habitat, the Project Sponsors will obtain conservation easements on properties at agency-approved acreage replacement ratios along the I-5/California Aqueduct corridors from Sperry Avenue/Diablo Grande Parkway (at I-5) north to the area around Del Puerto Creek to improve San Joaquin kit fox dispersal habitat in this area. Suitable areas for conservation easements are from east of I-5 to the California Aqueduct or west of I-5 between I-5 and the proposed dam structure. Both areas currently have abandoned orchards with dense understories of herbs and grasses that are unusable for San Joaquin kit fox. Improvements may include, but would not be limited to, removing old orchards, implementing vegetation management to keep herbs and grasses short, improving conditions for ground squirrel colonization (e.g., removing thatch, discontinuing rodent control measures), and providing artificial kit fox dens along this corridor. A final mitigation plan will be developed with input from USFWS and CDFW during consultation with the agencies. The plan will include measures for the long-term management of these lands for the benefit of San Joaquin kit fox dispersal and include adaptive management measures.

24 **BIO-TERR-1q: Avoid and Minimize Impacts on American Badger**

A qualified biologist will conduct a preconstruction survey within the limits of proposed temporary and permanent construction footprints no more than 30 days before the beginning of ground disturbance. The biologist will conduct den searches by systematically walking transects spaced 30 to 100 feet apart through the study area. Transect distance will be determined on the basis of the height of vegetation such that 100 percent visual coverage of the disturbed ground area is achieved. If dens are found during the survey, the biologist will map the location of each den; record the size and shape of the den entrance; note the presence of tracks, scat, and prey remains; and determine if the den was recently excavated. If no dens are found, no further mitigation is necessary.

If potential American badger dens are located within work areas and cannot be avoided during construction, a qualified biologist will determine if the dens are occupied or were recently occupied using remote cameras, media tracking, or methodology coordinated with CDFW. If unoccupied, the qualified biologist will request permission from CDFW to temporarily plug the burrow entrance with sandbags to prevent badgers from re-using them during construction and, if necessary, collapse the dens by hand. If occupied, the biologist will consult with CDFW regarding best practices for encouraging the badger(s) to move to alternate dens outside the work areas; this includes the excavation or the construction of artificial dens.

25 **BIO-TERR-1r: Avoid and Compensate for Adverse Effects on Special-Status Plant Species in Ingram Canyon**

Access to the private properties in the Ingram Canyon study area was not allowed by the property owners. Therefore, surveys for several special-status plants were not conducted for Alternative 5 (Ingram Canyon Alternative). If Alternative 5 becomes the chosen Action Alternative, surveys of the Ingram Canyon study area must be conducted for special-status plants prior to the start of any construction activities. The surveys will be conducted by qualified botanists in accordance with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018a) during the season when special-status plant species would be evident and identifiable, which, generally, is during their blooming season. The surveys will be conducted no more than 3 years prior to the start of ground-disturbing activities. The results of the survey will be submitted to DPWD and CDFW for review no less than 1 year prior to the start of ground-disturbing activities. The report will include the location and description of all proposed work areas, the location and description of all occupied habitat for special-status plant species, and locations where effective avoidance measures could be implemented. In areas where no special-status plant species are present, no further mitigation would be required.

If surveys determine that a special-status plant species is present in or adjacent to an area where temporary ground-disturbing activities would take place, potential impacts will be avoided through establishment of activity exclusion zones within which no ground-disturbing activities will take place, including construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species will be established around each occupied habitat site, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no construction-related disturbances will occur within 250 feet of the occupied habitat. The size of activity exclusion zones may be reduced

through consultation with a qualified biologist and with concurrence from CDFW, based on site-specific conditions. Prior to any activities that would result in permanent impacts on special-status plants, compensation habitat for each affected species will be acquired and permanently protected at a ratio of 2 acres protected for every 1 acre that would be lost. Compensation habitat will consist of existing off-site occupied habitat acquired in fee, through conservation easements, or from a certified conservation bank. The compensation habitat will be monitored to verify that habitat suitability is maintained. Monitoring will be conducted for 5 years or for a period of time to be determined in coordination with CDFW. An operations and management plan will be prepared and implemented for each compensation habitat, with funding provided through an endowment, to monitor the habitat and determine and implement appropriate management measures to maintain the habitat. Annual monitoring reports will be submitted to CDFW for review and a determination that the chosen Action Alternative remains in compliance with the mitigation.

26 **BIO-TERR-2: Compensate for Effects on Riparian Habitat or Other Sensitive Natural Communities**

Riparian habitat will be created or acquired and permanently protected to compensate for adverse effects and ensure no net loss of riparian habitat functions and values. Land that could be acquired could include acreage upstream of the reservoir or elsewhere that satisfies appropriate compensation ratios. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW, USFWS, USACE, State Water Resources Control Board [SWRCB]). The compensation will be at a minimum ratio of 1:1 (1 acre restored or created for every 1 acre filled) and may be a combination of off-site restoration/creation and mitigation credits. A restoration and monitoring plan will be developed and implemented concurrently with construction. The plan will describe how riparian habitat will be created and monitored, including information regarding funding mechanisms and the appropriate long-term management measures, and agency reporting requirements.

27 **BIO-TERR-3: Compensate for Adverse Effects on State or Federally Protected Wetlands**

Suitable wetland habitat (which provides habitat for northwestern pond turtle) will be created or acquired and permanently protected to compensate for adverse effects and ensure no net loss of wetland habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (e.g., CDFW, USFWS, USACE, SWRCB). The compensation will be at a minimum ratio of 1:1 (1 acre restored or created for every 1 acre filled) and may be a combination of off-site restoration/creation and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how wetland habitat will be created and monitored, including information regarding funding mechanisms and the appropriate long-term management measures, and agency reporting requirements.

28 **BIO-TERR-4a: Implement Wildlife Crossings**

Wildlife crossings and directional wildlife fencing will be incorporated into the new roadway. Crossings will be composed of bridges and oversized culverts where possible. At all cut/fill locations, wildlife crossings will be considered; pre-engineered, prefabricated structures will be considered in lieu of fill. Crossings will maximize structure height as much as possible to maximize openness and structure function for a wide range of species, including larger ungulates and species that prefer large crossings. Larger structures will be a minimum of 15 feet in height. Wildlife crossings and fencing designs will use the most up-to-date road ecology and wildlife crossing manuals and handbooks.

29 **BIO-TERR-4b: Wildlife Corridor Preservation and Enhancement**

Wildlife connectivity and habitat between the Project site and I-5 will be conserved to the maximum extent possible in order to preserve a wide swath of habitat between I-5 and the Project site. The conserved land will be as wide as possible and will incorporate habitat heterogeneity in order to facilitate movement for a broad range of species.

30 **BIO-TERR-4c: Roadway Wildlife Crossing Signage**

Non-standard wildlife crossing warning signs will be installed to alert drivers and educate them to maintain the speed limit and stay alert for wildlife crossing the roadway. The signs will engage drivers by providing explicit instructions. Flashing lights may also be used to draw drivers' attention to the signs.

31 **BIO-TERR-5: Develop a Management Plan for the Protection and Enhancement of Oak Woodlands**

Per Policy 4, 4.1, of the Stanislaus County General Plan, the Project Sponsors will develop and implement a management plan for the protection and enhancement of oak woodlands to offset the loss of oak woodlands from the chosen Action Alternative. This plan will include measures for the protection, management, and enhancement of oak woodlands on lands that are acquired for the development of the reservoir but that are above the high-water line for the reservoir. A minimum of 1 acre of oak woodland will be preserved, managed, and monitored for every acre of oak woodland lost as a result of implementation of the chosen Action Alternative.

32 **BIO-TERR-6: Implement Bird and Raptor-Safe Design and Construction of Transmission Lines**

To reduce impacts on avian species from transmission line relocation under the chosen Action Alternative, the Project Sponsors will work with electric utilities to ensure that the design and construction of transmission lines will be implemented following applicable guidance found in the Avian Power Line Interaction Committee (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (Avian

Power Line Interaction Committee 2012), or with more current guidance if it becomes available.

3.4.3.3 Alternative 1 (No Action)

Alternative 1 would not affect terrestrial biological resources.

3.4.3.4 Alternative 2 (DPCR 82 TAF)

Effects on Special-Status Plants and Their Habitats. Alternative 2 construction and inundation would result in the loss of habitat, and adverse effects on special-status plants. A full description of construction and operation under Alternative 2 is provided in Chapter 2, *Description of Alternatives*.

The acreage amounts associated with impacts on potential and occupied habitat for special-status plants under Alternative 2 are presented in **Table 3.4-2**. These acreages are based on the 2020, 2024, and 2025 surveys of the Del Puerto Canyon study area. As listed in **Table 3.4-2**, Alternative 2 could result in direct permanent loss of occupied habitat for big tarplant, California alkali grass, and San Benito poppy, along with a loss of suitable habitat for Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia. Most of these impacts would occur as the result of reservoir inundation, but some of the impacts (e.g., on big tarplant) would occur as a result of construction of the proposed roadway. None of the special-status plants observed in the Del Puerto Canyon study area were associated with the creek or riparian habitat.

Table 3.4-2: Impacts on Special Status Plants Under Alternative 2

Species Name	Potential/ Occupied Habitat	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
Big tarplant (*Blepharizonia plumosa*)	Occupied	Annual grassland	55.94	0	55.94
California alkali grass (*Puccinellia simplex*)	Occupied	Seep	0.03	0	0.03
San Benito poppy (*Eschscholzia hypecoides*)	Occupied	Annual grassland	< 0.01	0	< 0.01
Lemmon's jewelflower (*Streptanthus glandulosus ssp. lemmonii*)	Potential	Annual grassland and coastal scrub[a]	718	309	1,027
Diamond-petaled California poppy (*Eschscholzia rhombipetala*)	Potential	Annual grassland and coastal scrub[a]	718	309	1,027
Showy madia (*Madia elegans*)	Potential	Annual grassland and blue oak woodland[a]	682	307	989
Shining navarretia (*Navarretia nigelliformis ssp. Radiata*)	Potential	Annual grassland and coastal scrub[a]	718	309	1,027

[a] Because of the low amount of late-winter rainfall prior to the 2020 surveys of the Del Puerto Canyon study area, which did not include the current proposed new road alignment, the absence of four species—Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia—could not be confirmed. Therefore, impacts are shown for all potential habitat.

Alternative 2 could temporarily disturb special-status plants located adjacent to construction areas in the utility relocation, saddle dam, and access areas. In addition, Alternative 2 could affect occupied habitat for big tarplant due to utility relocation and the proposed roadway.

The occurrences of big tarplant in the Del Puerto Canyon study area are important because they represent the southernmost locality for the species and are the second-largest known population. Therefore, the loss of these plants is likely to result in the loss of substantial genetic diversity for the species. Furthermore, the new occurrence of California alkali grass is locally significant because it represents the only known extant occurrence in Stanislaus County.

Lower Del Puerto Creek, downstream of the Alternative 2 Project site, has been highly altered and supports minimal riparian and wetland vegetation that varies from approximately 10 to 150 feet in width on either side of the creek. The average width of creek and adjacent riparian vegetation appears constrained to approximately 80 feet. Beyond the narrow stream-side riparian vegetation, lands are heavily managed for agriculture, including annual row crops, almond orchards, and vineyards, as well as rural residential and agricultural infrastructure.

Alternative 2 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 2 Project site. No land cover conversion is anticipated downstream, and therefore no direct habitat loss is anticipated. However, hazardous materials used during construction, such as gasoline, lubricants, and other fluids, could pose indirect risks to terrestrial plant species and their habitats through accidental spills, leaks, or surface runoff. While aquatic plants are highly sensitive to chemical contamination due to their direct exposure to waterborne pollutants, terrestrial plants are generally less vulnerable because their exposure pathways are more limited. Contaminants typically reach terrestrial plants through soil contact or occasional surface water exposure, and natural soil processes such as infiltration, dispersion, and microbial degradation can reduce the bioavailability and toxicity of these substances before they affect plant health (Alori et al., 2022).

Standard construction best management practices (BMPs) and pollution prevention measures outlined in the Stormwater Pollution Prevention Plan (SWPPP) would be implemented under Alternative 2. These measures are expected to effectively minimize potential effects on special-status plants and their habitats in lower Del Puerto Creek during construction activities.

The proposed dam and reservoir operations under Alternative 2 would alter the volume and timing of flows in Del Puerto Creek by capturing and storing runoff, thereby reducing unregulated high flows and modifying the seasonal flow regime. However, under existing conditions, Del Puerto Creek experiences extended dry periods, with lower reaches sustained mainly by agricultural return flows and operational spills. Plant species in lower Del Puerto Creek are likely adapted to intermittent hydrologic conditions, relying primarily on subsurface moisture and seasonal groundwater recharge rather than continuous surface flows. Agricultural land uses in the area will continue to contribute return flows to lower Del Puerto Creek.

In addition, environmental flow commitments based on the "functional flow" approach would be implemented under Alternative 2, which would mimic key characteristics of the natural flow regime, such as peak flows and base flows, that support terrestrial habitats in lower Del Puerto Creek (Poff et al., 1997; Richter et al., 2006; Yarnell et al., 2015). As such, minor changes in flows downstream of the reservoir compared to Alternative 1 are not expected to affect any special-status plant species or their habitats.

However, construction and operation of Alternative 2 would result in the permanent loss of big tarplant and California alkali grass, along with the potential permanent loss of Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia. The loss of San Benito poppy, a California Rare Plant Rank (CRPR) 4.3 species, in the Del Puerto Canyon study area would not be considered a substantial adverse effect because the poppy is locally and regionally common, with 21 records in Stanislaus County and 378 records total (Consortium of California Herbaria 2025).

Therefore, adverse effects on special-status plant species under Alternative 2 would be greater than Alternative 1. Implementation of BIO-TERR-1a and BIO-TERR-1b would minimize adverse effects on big tarplant, California alkali grass, Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia.

Effects on Special-Status Wildlife and Their Habitats. Alternative 2 could result in permanent and temporary habitat loss for special-status wildlife species. The acreage amounts associated with impacts on potential habitat for special-status wildlife under Alternative 2 are presented in **Table 3.4-3**.

Table 3.4-3: Impacts on Special Status Wildlife Under Alternative 2

Species Name	Federal Status	State Status	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
California red-legged frog (*Rana draytonii*)	T	SSC	Aquatic habitat	29.22	0.09	29.31
			Dispersal habitat	512.62	334.26	846.88
			Upland habitat	317.33	17.89	335.23
California tiger salamander (*Ambystoma californiense*)	T	T	Aquatic habitat	0.09	0.00	0.09
			Upland habitat	429.55	134.91	564.46
Northwestern pond turtle (*Actinemys marmorata*)	PT	SSC	Aquatic habitat	28.62	0.04	28.66
			Upland habitat	605.57	60.64	666.21
San Joaquin kit fox (*Vulpes macrotis mutica*)	E	T	Suitable habitat	177.89	22.21	200.10
VP brachiopod	T/E	-	Suitable habitat	0.32	0.07	0.39
Western spadefoot (*Spea hammondii*)	PT	SSC	Aquatic habitat	0.35	0.09	0.44
			Upland habitat	751.32	315.23	1,066.55
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	T	-	Riparian habitat	3.795	0.168	3.963
Foothill yellow-legged frog (*Rana boylii*)	T	E	Aquatic habitat	28.55	0.00	28.55
			Riparian habitat	4.19	0.00	4.19

Species Name	Federal Status	State Status	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
Special-status reptiles	-	SSC	Grassland and scrub habitat	706.06	306.01	1,012.07
Monarch butterfly (*Danaus plexippus*)	PT	-	Potential migration and breeding habitat	694.14	302.77	996.91
Western burrowing owl (*Athene cunicularia hypugaea*)	-	CE, SSC	Potential breeding and wintering habitat	664.12	302.77	966.89
Special-status birds and nesting migratory birds	E	E, T, FP, SSC	Potential nesting habitat	9.22	0.73	9.95
			Potential foraging habitat	664.12	302.77	966.89
Special-status and non-special-status bats	-	SSC	Potential roosting habitat	21.19	4.06	25.25
American badger (*Taxidea taxus*)	-	SSC	Suitable habitat	711.60	306.74	1,018.34

* Status explanations:
Federal
E = listed as endangered under the federal Endangered Species Act
T = listed as threatened under the federal Endangered Species Act
PT = proposed for listing as threatened under the federal Endangered Species Act
– = no listing

State
E = listed as endangered under the California Endangered Species Act
T = listed as threatened under the California Endangered Species Act
CT = candidate for state threatened listing under the California Endangered Species Act
FP = California fully protected species
SSC = species of special concern in California
– = no listing

As discussed previously, Alternative 2 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 2 Project site. No land cover conversion is anticipated downstream, and therefore no direct habitat loss is anticipated. Implementation of standard construction BMPs and pollution prevention measures required under the SWPPP would minimize adverse effects on special-status wildlife and their habitats in lower Del Puerto Creek during construction activities.

During operation, environmental commitments would be implemented under Alternative 2 to ensure that downstream flows mimic the natural hydrologic regime. Combined with ongoing agricultural return flows and operational spills during the dry season, these flows are expected to maintain existing habitat conditions for special-status wildlife and their habitats in lower Del Puerto Creek.

Vernal Pool Branchiopods. Construction and operation of Alternative 2 could result in permanent impacts on vernal pool branchiopod habitat (seasonal wetland) (**Table 3.4-3**; Figure 17 in Appendix C). Though vernal pool fairy shrimp and vernal pool tadpole shrimp occurrences have not been

documented in the Del Puerto Canyon study area, reconnaissance-level surveys identified habitat that is potentially suitable for supporting these species. As such, Alternative 2 would result in the permanent loss of potential vernal pool branchiopod habitat and potential injury and/or mortality of vernal pool branchiopods.

Operations and maintenance activities would occur during operation of Alternative 2. Operations and maintenance activities are not expected to adversely affect vernal pool branchiopods because these activities would occur within areas that have already been disturbed and developed under Alternative 2 (e.g., for roads, pump station, spillway and conveyance infrastructure) or within the inundation area itself. These areas do not support the hydrologic or ecological conditions necessary for vernal pool branchiopod habitat.

It is assumed that no permanent structures would be placed within seasonal wetlands. If utilities are relocated within 250 feet of this wetland or such that it can be demonstrated that they would affect the wetland's hydrology, the hydrology in the pool could be permanently altered through changes in surface topography and subsurface hydrology. Therefore, adverse effects on vernal pool branchiopods under Alternative 2 would be greater than Alternative 1. Implementation of EPM BIO-TERR-1a would require avoidance and minimization measures, and EPM BIO-TERR-1c would reduce the impact on vernal pool branchiopods through the purchase of credits from a USFWS-approved mitigation bank at a conservation acreage ratio of 2:1 for protection and 1:1 for restoration.

Federally Listed and Proposed Insects. Suitable habitat for VELB in the study areas consists of elderberry shrubs and riparian woodlands along Del Puerto Creek and a tributary to Del Puerto Creek. Elderberry shrubs with exit holes are considered suitable habitat for VELB. The closest CNDDB occurrence for valley elderberry longhorn beetle is approximately 6.5 miles north of the Del Puerto Canyon study area (CDFW 2025). A total of 61 elderberry shrubs were found in the Del Puerto Canyon study area. Seventeen elderberry shrubs are located within the proposed inundation area (including the main dam), 32 elderberry shrubs are located in the southern portion of the study area near the road realignment, and 12 shrubs are located within lower Del Puerto Creek. Several of these shrubs were observed to have exit holes. A total of 125 exit holes were observed on these shrubs. According to the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017), these shrubs could be considered occupied.

In 2023, one migratory occurrence of monarch butterfly was recorded along Del Puerto Creek within the Del Puerto Canyon study area, west of I-5. Three additional migratory observations were recorded just outside of the study area in 2022 and 2024, along with one breeding occurrence in 2022 (iNaturalist 2025). These observations suggest that the broader Del Puerto Creek corridor, which provides areas of open grasslands and scattered riparian shrubs, may provide stopover or foraging habitat during migration, particularly when nectar-producing plants are present (Xerces Society for Invertebrate Conservation 2019). In addition, botanical surveys conducted in 2025 confirmed the presence of milkweed within the Del Puerto Canyon study area, indicating potential breeding habitat for monarch butterflies, as monarch caterpillars rely exclusively on milkweed for larval development (Xerces Society for Invertebrate Conservation 2019).

Construction of the proposed road realignment could result in potential injury and/or mortality for monarch butterfly and valley elderberry longhorn beetle. Construction activities during monarch butterfly migration or breeding season (March through September), and flight season for valley elderberry longhorn beetle (March through July), could disrupt dispersal, foraging, and breeding behaviors and result in injury or mortality.

Reservoir inundation and construction of the main dam would result in the permanent loss of 17 elderberry shrubs, which are the obligate host plant for valley elderberry longhorn beetles. Exit holes were observed on four of these shrubs; however, several shrubs were inaccessible due to dense poison oak and steep terrain. If these shrubs are occupied by valley elderberry longhorn beetle, inundation of the shrubs would result in a loss of habitat and injury or mortality for beetle larvae, pupae, or adults. Reservoir inundation would also remove approximately 3.80 acres of riparian woodland, a potential dispersal corridor, as well as the aforementioned shrubs.

The proposed road realignment would run adjacent to an intermittent tributary to Del Puerto Creek south of the proposed reservoir inundation area. However, no elderberry shrubs overlap the permanent or temporary construction footprints for the road realignment. Nine elderberry shrubs are within 165 feet of proposed temporary construction areas. Twenty-three elderberry shrubs are within 300 feet of the road realignment footprint, 22 of which had stems larger than one inch. Eighty-five potential exit holes were found in these shrubs. According to the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017), these shrubs are considered occupied. None of the elderberry shrubs in lower Del Puerto Creek would be affected by construction of Alternative 2 and because flows in the creek are primarily due to ongoing agricultural return flows and operational spills, operation of the Alternative would not adversely affect elderberries in the lower portion of the creek.

Inundation or removal of elderberry shrubs within the Alternative 2 Project site under Alternative 2 would result in a loss of habitat and potential injury and/or mortality for valley elderberry longhorn beetle larvae, pupae, and/or adults. If any shrubs are determined to be occupied, they shall be transplanted to a USFWS-approved conservation area and mitigated, as discussed above, ensuring that effects on occupied shrubs would be minimized in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017).

Inundation would result in permanent and temporary impacts on open grasslands and riparian woodland, a potential dispersal corridor for valley elderberry longhorn beetle, as well as removal of the aforementioned shrubs (**Table 3.4-2**). These habitats also provide stopover or foraging habitat during migration and breeding habitat for the monarch butterfly. This habitat loss would have a substantial adverse effect on monarch butterfly and valley elderberry longhorn beetle.

The increase of vehicle, equipment, and foot traffic in the area of the proposed road realignment could crush, kill, or bury individual larvae, pupae, and/or adults. In addition, adult monarch butterflies or valley elderberry longhorn beetles could be struck by vehicles during flight. Although the proposed road realignment would lead to an increase in vehicle, equipment, and foot traffic near elderberry shrubs and potential monarch butterfly habitat, because Del Puerto Canyon Road has generally low levels of traffic the overall increase in vehicle use is not anticipated to significantly impact valley elderberry longhorn beetle or monarch butterfly movement throughout the study area. Therefore,

the potential for long-term disruption to valley elderberry longhorn beetle or monarch butterfly dispersal and habitat connectivity is considered low.

There is also a potential for indirect impacts to valley elderberry longhorn beetle due to the removal of elderberry shrubs or the spread of invasive plant species in the area of the proposed road realignment, leading to a reduction in habitat quality. EPM BIO-TERR-1d would be implemented to provide avoidance and minimization and compensation measures for valley elderberry longhorn beetle.

Operations and maintenance activities would most likely not result in significant effects on monarch butterfly or valley elderberry longhorn beetle. While some vehicles may utilize proposed access roadways adjacent to elderberry shrubs and potential monarch butterfly habitat to perform road operations and maintenance activities, vehicle use would be infrequent and temporary in nature and is not anticipated to significantly impact valley elderberry longhorn beetle or monarch butterfly habitat or movement.

Therefore, adverse effects on federally listed and proposed insects under Alternative 2 would be greater than Alternative 1. EPM BIO-TERR-1a would be implemented to provide avoidance, minimization, and compensation measures for monarch butterfly and valley elderberry longhorn beetle. EPM BIO-TERR-1d would also be implemented to provide avoidance and minimization (e.g. limiting insecticide use to greater than 30 meters from a shrub and limiting weed removal within the dripline of the shrub to outside of the adult active season), and compensation measures for valley elderberry longhorn beetle. In addition, EPM BIO-TERR-2 would be also implemented, which requires compensation for riparian habitat to minimize adverse effects during construction and operation of Alternative 2.

Federally Listed and Proposed Amphibians. Construction and operation of Alternative 2 would result in permanent and temporary impacts on potential aquatic and upland habitat for the following federally listed and proposed amphibians: California tiger salamander, California red-legged frog, western spadefoot, and foothill yellow-legged frog (**Table 3.4-3**) (**Appendix C**, Figures 19, 20, 21, and 22). As such, Alternative 2 could also result in injury and/or mortality for these species. Reconnaissance-level surveys identified potential breeding and upland habitat for California tiger salamander and potential aquatic and upland habitat for California red-legged frog, western spadefoot, and foothill yellow-legged frog within the study area. In addition, foothill yellow-legged frog and western spadefoot have been documented in the Del Puerto Canyon study area (CDFW 2025). The loss of habitat would have a substantial adverse effect on California tiger salamander, California red-legged frog, western spadefoot, and foothill yellow-legged frog.

Construction in areas identified as suitable habitat, such as ponds and grasslands within the study area, could lead to injury or mortality if eggs or individuals are present on the surface, in burrows, or dispersed through the area. Exposure to construction materials and equipment, as well as nighttime lighting, could further harm these species by disrupting behavior, delaying movement, or increasing vulnerability to predators.

Reservoir inundation would result in a permanent loss of potential upland habitat for California tiger salamander and potential aquatic habitat for California red-legged frog, western spadefoot, and foothill yellow-legged frog (**Table 3.4-3**). It would also create a substantial barrier by restricting

north–south movement for these species, though some connectivity would remain near I-5 and west of the reservoir. In addition, the new reservoir could support American bullfrogs and non-native fish, increasing predation and competition pressures upstream. Ongoing maintenance activities and associated chemical use could cause injury or mortality if these species are present in treated areas. Artificial lighting at facility structures may further disrupt behavior by interfering with movement, foraging, and breeding, and increasing predation risk. As discussed in Section 3.10, *Hydrology and Water Quality*, reservoirs can exhibit conditions conducive to Harmful Algal Blooms (HABs), which occur when toxic cyanobacteria grow rapidly. If HABs occur in the reservoir, they could cause injury or mortality of special-status amphibians if they forage in aquatic habitats with conditions that promote formation of HABs; however, the reservoir is unlikely to support special-status amphibian habitat. In addition, the reservoir management plan described in Section 2.4.2.1 includes monitoring of cyanobacteria and measures to ensure that HABs would not be drawn through the outlet and would therefore not be transported to potential habitat for special-status amphibians downstream.

Therefore, adverse effects on federally listed and proposed amphibians under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a, BIO-TERR-1e, BIO-TERR-1f, and BIO-TERR-1g, which provide measures for avoiding, minimizing, and compensating for impacts on California tiger salamander, California red-legged frog, western spadefoot, and foothill yellow-legged frog, and EPMs AES-2 and AES-3, which minimize potential impacts from construction and operational lighting, would reduce the impacts on these species. The compensation measures in EPMs BIO-TERR-1c and BIO-TERR-1g would also compensate for the loss of western spadefoot habitat. Any aquatic habitat lost would be replaced, and suitable upland habitat would be preserved and managed.

Special-Status Reptiles. Northwestern pond turtles were documented in Del Puerto Creek in the proposed inundation area during diurnal aquatic herpetofauna surveys in 2024. Two adult turtles were documented, basking on mid-stream rocks, and fleeing to deep mid-stream water when flushed.

Construction and operation of Alternative 2 would result in the permanent loss and temporary disturbance of potential upland and aquatic habitat for northwestern pond turtle, along with grassland and scrub areas that provide potential habitat for other special-status reptiles (**Table 3.4-3**). The loss of habitat and/or potential for injury and mortality for special-status reptiles would have a substantial adverse effect.

Construction associated with Alternative 2 could result in injury and/or mortality for northwestern pond turtle and other special-status reptiles if they are present in the area during grading, excavation, or vehicle use. Construction activities could also expose special-status reptiles to construction materials such as fuels, oils, and cement, which could result in injury and/or mortality of juveniles, adults, and northwestern pond turtle eggs. Construction lighting during night work could disrupt normal behaviors of special-status reptiles if lighting spills over into adjacent habitats, potentially disrupting breeding, foraging, dispersal and increasing the risk of predation.

Reservoir inundation would result in a permanent loss of potential habitat for northwestern pond turtle and other special-status reptiles (**Table 3.4-3**) and create a substantial barrier by restricting north–south movement for these species, though some connectivity would remain near I-5 and west

of the reservoir. However, the reservoir would increase the amount of aquatic habitat available to northwestern pond turtle in the study area. Depending on when the filling takes place, northwestern pond turtle eggs laid in uplands could become inundated and suffer injury and/or mortality. Ongoing maintenance activities and associated chemical use could cause injury or mortality if these species are present in treated areas. Artificial lighting at facility structures may further disrupt behavior by interfering with movement, foraging, and breeding and increasing predation risk. As discussed in Section 3.10, reservoirs can exhibit conditions conducive to HABs, which occur when toxic cyanobacteria grow rapidly. If HABs occur in the reservoir, they could cause injury or mortality of northwestern pond turtle if they forage in aquatic habitats with conditions that promote formation of HABs; however, if HABs do occur, they would be temporary and seasonal and would degrade over time. In addition, the reservoir management plan described in Section 2.4.2.1 includes monitoring of cyanobacteria and measures to ensure that HABs would not be drawn through the outlet and would therefore not be transported to potential habitat for northwestern pond turtle downstream.

Therefore, adverse effects on special-status reptiles under Alternative 2 would be greater than Alternative 1. EPMs BIO-TERR-1a, BIO-TERR-1i, and BIO-TERR-1m would be implemented to avoid and minimize effects on northwestern pond turtle and other special-status reptiles, as well as compensate for the loss of grassland habitat (e.g., for Swainson's hawk foraging, as described below). In addition, EPMs AES-2 and AES-3 would be implemented to minimize potential effects from construction and operational lighting. With implementation of these EPMs, injury and/or mortality on special-status reptiles would be avoided or minimized and suitable habitat would be replaced.

Special-Status Birds and Nesting Migratory Birds. Construction and operation of Alternative 2 would result in the permanent removal and temporary disturbance of potential habitat for western burrowing owl, Swainson's hawk, and other special-status birds and nesting migratory birds, including white-tailed kite, tricolored blackbird, grasshopper sparrow, loggerhead shrike, and golden eagle (**Table 3.4-3**). Loss and disruption of potential habitat would have a substantial adverse effect on special-status and nesting birds.

Western burrowing owl was previously documented in the Del Puerto Canyon study area (CNDDB Element Occurrence #144 [year 1991] and ICF unpublished data), and suitable habitat was identified during the wildlife surveys conducted in 2019, 2021, and 2024. Swainson's hawk was documented in 1936 nesting in Del Puerto Canyon, but exact location details are vague (CNDDB Element Occurrence #2524). In addition, two golden eagle nest structures are within 0.5 mile of the proposed roadway. The Alternative 2 Project site also contains marginal habitat for least Bell's vireo; however, no recent occurrences have been reported in this area. Loggerhead shrike is occasionally seen as a flyover in the study area, but nesting has not been documented.

Noise and visual disturbance caused by construction activities such as grading, excavation, and the use of construction vehicles associated with Alternative 2 could disrupt nesting and foraging behaviors and result in injury and/or mortality for eggs, nestlings, and/or adult birds. Impacts could also result from the presence of construction personnel or exposure to artificial lighting during nighttime construction.

Tree removal prior to reservoir inundation has the potential to result in adverse effects on nesting birds by removing potential nesting habitat for tree-nesting birds and altering the environmental conditions that support successful nesting for ground-nesting birds. Changes in canopy density due to tree removal can affect light and temperature around nests, either cooling them too much or exposing them to overheating and predators, all of which can negatively affect both tree-nesting and ground-nesting birds. In addition, the presence of tree cover for ground-nesting birds contributes to essential habitat features such as shade, climate regulation, and protection from predators.

Reservoir inundation, which would take approximately 143 days, could result in inundation of active bird nests that are on the ground, which could result in injury and/or mortality for eggs and nestlings of ground-nesting birds. Because trees would be removed before the reservoir is filled, reservoir inundation is not expected to affect active Swainson's hawk, white-tailed kite, golden eagle, or other tree-nesting migratory bird or raptor nests. Operation and maintenance activities associated with operation of the reservoir could disrupt normal behaviors through noise and visual disturbance and result in injury and/or mortality or the abandonment of active nests. Artificial lighting could disrupt normal behaviors of migratory and special-status birds if lighting spills over into adjacent habitats, potentially disrupting nesting and roosting. In addition, relocated transmission lines associated with Alternative 2 could result in injury and/or mortality of birds, particularly large raptors, due to collisions and electrocution (Kochert and Olendorff 1999).

For least Bell's vireo, changes in downstream flows due to operation of Alternative 2 would not reduce the extent or quality of the existing sparse riparian habitat. Lower Del Puerto Creek lacks the dense riparian vegetation required by least Bell's vireo. In addition, the most recent documented occurrence of least Bell's vireo in the region was more than 5 miles northwest of the confluence of Del Puerto Creek and the San Joaquin River in the San Joaquin River National Wildlife Refuge in 2016 (eBird 2025). As discussed in Section 3.10, reservoirs can exhibit conditions conducive to HABs, which occur when toxic cyanobacteria grow rapidly. These toxins have been found in terrestrial foodwebs, likely through consumption of emergent aquatic insects (Moy et al. 2016), and can affect terrestrial species if they forage in or near habitats with conditions that promote HABs. If HABs occur in the reservoir, they could cause injury or mortality of special-status birds and nesting migratory birds if they forage in aquatic habitats with conditions that promote formation of HABs; however, if HABs do occur, they would be temporary and seasonal and would degrade over time. In addition, the reservoir management plan described in Section 2.4.2.1 includes monitoring of cyanobacteria and measures to ensure that HABs would not be drawn through the outlet and would therefore not be transported to potential habitat for special-status or nesting migratory birds downstream.

Therefore, adverse effects on special-status birds and nesting migratory birds under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a, BIO-TERR-1j, BIO-TERR-1k, BIO-TERR-1l, and BIO-TERR-6 would avoid and minimize effects on special-status birds and nesting migratory birds. These measures, together with implementation of EPM BIO-TERR-1m, which would help mitigate the loss of Swainson's hawk foraging habitat; EPMs BIO-TERR-2 and BIO-TERR-5, which would mitigate the loss of riparian habitat and blue oak woodland habitat that could be used for nesting; and EPMs AES-2 and AES-3, which minimize potential effects from construction and operational lighting, would reduce impacts on special-status and nesting migratory birds. The potential for disrupting nesting, as well as the potential for injury

and/or mortality, would be avoided or minimized. Occupied western burrowing owl and potential Swainson's hawk nesting habitat would be replaced, and suitable foraging habitat would be mitigated.

Special-Status and Non-Special-Status Bats. Construction and operation of Alternative 2 would result in permanent loss and temporary disturbance of riparian woodland and ornamental trees that provide potential roosting habitat for western red-bat (*Lasiurus blossevillii*), pallid bat (*Antrozous pallidus*), and non-special-status bats (**Table 3.4-3**). This loss would have a substantial adverse effect on special-status bats.

Construction would remove rock outcrops, which provide potential roosting habitat for pallid bat, western mastiff bat (*Eumops perotis*), and non-special-status bats and could result in injury and/or mortality for roosting bats. Lighting, noise, and vibrations associated with construction activities could disturb roosting bats and cause them to abandon roosts. The culvert beneath I-5, where roosting Mexican free-tailed bats (*Tadarida brasiliensis*) were observed in 2019, would not be removed or modified during construction.

Reservoir inundation would result in the permanent loss of roosting trees and the loss of rock outcrops at the Del Puerto Canyon study area and at a large rock outcrop along the south side of Del Puerto Canyon Road, approximately 2.2 miles due west of I-5. Reservoir inundation would also result in the loss of several abandoned structures that could be used as roosting habitat for bats. However, day-to-day operations and maintenance activities would most likely not result in effects on special-status and non-special-status bats.

Therefore, adverse effects on special-status and non-special-status bats under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a and BIO-TERR-1n would avoid and minimize impacts on bats. EPM BIO-TERR-2 would replace riparian woodland. EPMs AES-2 and AES-3 would minimize potential effects from construction and operational lighting. These measures would therefore reduce the impact on bats because the potential for disrupting roosting and the potential for injury and/or mortality would be avoided or minimized. Furthermore, potential tree-roosting bat habitat would be replaced.

San Joaquin Kit Fox. It is currently unknown where and how frequently San Joaquin kit fox disperse through the Del Puerto Canyon study area. The Del Puerto Canyon study area is unlikely to provide a home range that would be large enough to support occupancy by San Joaquin kit foxes due to the limited amount of contiguous grassland habitat. In addition, the grasslands in the Del Puerto Canyon study area are densely vegetated and lack areas of open, bare, or sparsely vegetated ground typically required by San Joaquin kit fox for predator evasion and foraging.

There are three CNDDB records from the region, one reported from the mouth of Del Puerto Canyon (from 1973, occurrence #80) and two more that were reported as road mortalities along I-5 (from 1990 and 2004, occurrence #560 and 206, respectively) (CDFW 2025).

No San Joaquin kit foxes of any life stage were confirmed during reconnaissance-level surveys conducted in 2024 and 2025 in the Del Puerto Canyon study area. However, during preconstruction geotechnical surveys in April 2024, a potential San Joaquin kit fox was observed near two possibly

active dens. Because the observation was made from a distance, the animal could not be conclusively identified and may have been a juvenile coyote. Potential San Joaquin kit fox burrows were also documented along the footprint of the road realignment during reconnaissance-level surveys in July and August of 2024; however, none of these burrows showed sign of San Joaquin kit fox occupancy.

In addition, remote-triggered trail cameras were installed near the mouth of Del Puerto Canyon in 2019 and along the roadway realignment in 2025 (1,062 trap nights across ten cameras); these failed to detect any San Joaquin kit foxes, although various small mammals and mesocarnivores were recorded (ICF 2025).

Considering the Cypher et al. (2013) range-wide habitat suitability data and the identification of suitable habitat in the Del Puerto Canyon study area that was done as part of this analysis (see Figures 23 and 24 in Appendix C), the most likely movement corridor for San Joaquin kit fox is along the I-5 and California Aqueduct corridors. The toe of the dam, bifurcation structure, and spillway would be approximately 160 feet from the I-5 embankment, at its narrowest, maintaining some degree of a north–south corridor west of I-5. Currently, the area west of I-5 between the Diablo Grande Parkway/Sperry Avenue overpass and the proposed dam comprises steep terrain and a mostly abandoned orchard with a dense understory of herbs and grasses that is not suitable for San Joaquin kit fox. The potential corridor immediately west of I-5 would not be substantially altered with the addition of reservoir infrastructure in the study area. If San Joaquin kit foxes are heading west on Del Puerto Canyon Road from I-5, continuing northwest to Del Puerto Canyon, then turning east to pass through the notch, then the presence of the reservoir would remove that option for a movement corridor.

As such, construction and operation of Alternative 2 would result in the permanent loss and temporary disturbance of potential San Joaquin kit fox habitat (**Table 3.4-3**). The permanent loss of dispersal habitat, movement corridors, as well as construction activities, would have a substantial adverse effect on San Joaquin kit fox.

Construction activities such as grading, excavation, and the use of construction vehicles and lighting could disturb San Joaquin kit fox and result in injury and/or mortality if they occupy or move through the work area. Construction activities could also expose San Joaquin kit fox to construction materials such as fuels, oils, and cement, which could result in injury and/or mortality for foxes.

Reservoir inundation would result in the permanent loss of low-quality San Joaquin kit fox habitat due to the location of the proposed dam and associated infrastructure between the dam and I-5. In addition, the reservoir would a barrier to the north–south movement of foxes, although movement would still be possible between the dam and I-5. As discussed previously, operation and maintenance activities, as well as artificial lighting, could disrupt normal behaviors because of noise and visual disturbance.

Therefore, adverse effects on San Joaquin kit fox under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a, BIO-TERR-1o, and BIO-TERR-1p would avoid, minimize, and compensate for impacts on San Joaquin kit fox. EPMs AES-2 and AES-3 would minimize potential effects from construction and operational lighting. These measures would reduce the impact on the species because they would avoid or minimize the potential for

disturbance, injury, and/or mortality and mitigate effects on dispersal habitat by improving conditions along a potential corridor.

American Badger. Construction and operation of Alternative 2 would result in the permanent loss and temporary disturbance of suitable habitat for American badger (*Taxidea taxus*) (**Table 3.4-3**). This could disrupt normal behaviors and result in injury and/or mortality for American badger. The loss would have a substantial adverse effect on American badger.

Construction activities associated with Alternative 2 could disrupt normal behaviors and result in injury and/or mortality for American badger if they occupy dens in annual grasslands, coastal scrub, and blue oak woodlands.

Reservoir inundation would result in a permanent loss of potential American badger habitat and could decrease survivorship of badgers if they are displaced from their home range. The reservoir would also create a substantial barrier to the north–south movement of badgers in the region. As discussed previously, operation and maintenance activities and artificial lighting could disrupt normal behaviors because of noise and visual disturbance and result in injury and/or mortality for American badger if they occupy upland areas where these activities take place and are exposed to chemicals used for some activities.

Therefore, adverse effects on American badger under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a and BIO-TERR-1q would avoid and minimize impacts on American badger, and the compensation provided in EPMs BIO-TERR-1m (Swainson's hawk compensation) and BIO-TERR-1p (San Joaquin kit fox corridors) would help offset the loss of habitat and the impacts on dispersal corridors for American badger. EPMs AES-2 and AES-3 would minimize potential effects from construction and operational lighting. These measures would reduce the impact on American badger because they would avoid or minimize the potential for disturbance, injury, and/or mortality and compensate for the loss of habitat.

Substantial Adverse Effect on Riparian Habitat or Other Sensitive Natural Community. Construction of Alternative 2 would not have permanent impacts on non-wetland riparian woodland in the Alternative 2 Project site. In addition, as discussed previously, Alternative 2 would not result in direct construction-related impacts to habitats downstream of the Alternative 2 Project site, as construction activities would be confined to the Project site, and would not extend into lower Del Puerto Creek. No land cover conversion is anticipated downstream, and therefore no direct habitat loss is anticipated. Implementation of standard construction BMPs and pollution prevention measures required under the SWPPP would minimize adverse effects on riparian habitats and other sensitive natural communities in lower Del Puerto Creek during construction activities.

Operation of Alternative 2 could result in the permanent loss of 3.4 acres of riparian woodlands from inundation associated with the reservoir within the Alternative 2 Project site. However, Alternative 2's environmental commitments would ensure that downstream flows mimic the natural hydrologic regime. Combined with ongoing agricultural return flows during the dry season, these flows are expected to maintain existing riparian habitats and other sensitive natural communities in lower Del Puerto Creek.

The loss of riparian woodland from construction and inundation during operation at the Alternative 2 Project site would be a substantial adverse effect. Therefore, adverse effects on riparian habitat and other sensitive natural communities under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a and BIO-TERR-2, which provide measures for avoiding, minimizing, and compensating for effects on riparian habitat, would reduce the impact on riparian woodlands.

Substantial Adverse Effect on State or Federally Protected Wetlands. Construction of Alternative 2, including the proposed roadway, main dam and saddle dams, spillway, and utility relocations, could result in both permanent and temporary direct effects on state or federally protected wetlands and other waters (**Table 3.4-4**). Inundation associated with the operation of the Alternative 2 reservoir could also result in the permanent loss of state or federally protected wetlands and other waters (**Table 3.4-4**).

As discussed previously, Alternative 2 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 2 Project site. No land cover conversion is anticipated downstream, and therefore no direct habitat loss is anticipated. Implementation of standard construction BMPs and pollution prevention measures required under the SWPPP would minimize adverse effects on state or federally protected wetlands and other waters in lower Del Puerto Creek during construction activities.

In addition, while operation of Alternative 2 would reduce overall flow volumes in the Del Puerto Canyon study area, scientific research indicates that wetland health is strongly influenced by the frequency and duration of inundation, such as seasonal or periodic flooding, then by the total annual volume of water flow (Environmental Protection Agency 2008). Environmental commitments that have been designed to replicate the existing frequency and duration of inundation in lower Del Puerto Creek would be implemented under Alternative 2. In addition, agricultural return flows and operational spills would continue to provide seasonal flows during the dry season, which would minimize adverse effects state or federally protected wetlands and other waters in lower Del Puerto Creek.

USACE has requirements under 33 CFR 325.1(d)(2), (d)(4), and (e) as well as requirements for Section 404 permit applications involving the discharge of dredged or fill material into waters of the United States. The requirements call for the source of the material to be included and an evaluation of impacts on aquatic resources, threatened and endangered species, and cultural/historical properties for decision-making and for consultation with the appropriate agencies.

Indirect effects associated with the discharge of dredged or fill material may include a loss of stream length, habitat fragmentation (e.g., from culverting natural stream segments), or the alteration of natural hydrology. Habitat fragmentation remains a concern due to the proposed reservoir as well as the installation of culverts as part of the proposed roadway relocation.

Table 3.4-4: Impacts on Wetlands and other Waters Under Alternative 2

Feature Type	Permanent Direct Impacts (acres)	Temporary Direct Impacts (acres)	Inundation Impacts (acres)	Total Impacts (acres)
Canal	0.003	—	—	0.003
Emergent Wetland	0.017	0.003	—	0.020
Ephemeral Stream	0.022	1.834	—	1.856
Forested Wetland	—	—	7.484	7.484
Herbaceous Wetland	1.160	0.001	17.270	18.431
Intermittent Stream	0.006	0.130	-	0.136
Pond	0.001	0.001	< 0.001	0.002
Pond (Unvegetated)	0.119	0.001	0.029	0.149
Pond (Vegetated)	—	0.021	0.045	0.066
Riparian Wetlands	0.168	—	0.444	0.612
Seasonal Stream	—	< 0.001	0.529	0.529
Seasonal Wetland	—	< 0.001	0.131	0.131
Seep	0.064	0.048	1.474	1.586
Unvegetated	0.717	—	1.307	2.024
Total	**2.277**	**2.039**	**28.713**	**33.029**

For the Action Alternatives, including Alternative 2, the Project Sponsors would comply with state regulatory requirements (e.g., obtain approvals and secure necessary permits or clearances from authorizing agencies prior to any construction). USACE would evaluate impacts on wetlands during the Section 404 permit review process. Compensatory mitigation is expected to be required by the USACE under the proposed design of Alternative 2.

Table 3.4-5 includes only the wetlands and other waters that could be under USACE jurisdiction. As discussed in Section 3.4.1, *Affected Environment*, due to changes in regulations and guidance, as well as changes since 2020, the acreages presented in **Table 3.4-5** are preliminary because the updated wetland delineation has not been subjected to jurisdictional review by the USACE. A request for an approved jurisdictional determination will be submitted to the USACE for Alternative 2. The final determination about the location and extent of wetlands and other waters, as well as their regulatory jurisdiction, would ultimately be determined by the USACE at that time.

Table 3.4-5: Impacts on Potential USACE Jurisdictional Waters of the U.S. Under Alternative 2

Feature Type*	Permanent Direct Impacts (acres)	Temporary Direct Impacts (acres)	Inundation Impacts (acres)	Total Impacts (acres)
Forested Wetland	—	—	7.484	7.484
Herbaceous Wetland	1.160	0.001	17.270	18.431
Pond (Unvegetated)	0.091	0.001	0.029	0.121
Pond (Vegetated)	0.021	< 0.001	0.045	0.066
Seasonal Stream	—	—	0.500	0.500
Seasonal Wetland	—	—	0.121	0.121
Seep	0.063	0.048	1.381	1.492
Unvegetated	0.717	—	1.307	2.024
Total	**2.052**	**0.050**	**28.137**	**30.239**

*Calculation of resources within the Del Puerto Canyon study area is preliminary but will be finalized as part of the approved jurisdictional determination process.

This loss of state or federally protected wetlands would be a substantial adverse effect. Therefore, adverse effects on state or federally protected wetlands under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a and BIO-TERR-3, which provide measures for avoiding, minimizing, and compensating for effects on state or federally protected wetlands and other waters, would reduce the impact on wetlands and other waters.**Interference with the Movement of Native Resident or Migratory Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites.** Potential western burrowing owl burrows and San Joaquin kit fox and American badger dens are located within the Alternative 2 Project site, including the inundation area and the proposed roadway. Two golden eagle nest structures are located within approximately 0.13 to 0.37 mile of the proposed roadway. Construction and operation of Alternative 2 could destroy the burrows and dens within the inundation area and roadway limits of construction, prevent access to burrows and dens outside of these areas but within the vicinity of Alternative 2, and prevent golden eagles from nesting at the nest structure locations at the Alternative 2 Project site.

Construction and operation of Alternative 2 could result in wildlife habitat loss and fragmentation, including within designated wildlife corridors; wildlife avoidance and/or altered use of the Del Puerto Canyon study area; and collisions between wildlife and vehicles. The reservoir itself would create a migratory barrier for many terrestrial species. These impacts on potential western burrowing owl burrows, San Joaquin kit fox and American badger dens, golden eagle nests, and wildlife corridors would be a substantial adverse effect.

In addition, changes in flow dynamics can influence terrestrial wildlife movement by altering the availability and quality of habitat corridors, potentially increasing their exposure to edge effects or human-related disturbances. For species that rely on riparian habitats for movement or dispersal, such as the San Joaquin kit fox and other terrestrial species, maintaining natural hydrologic conditions is essential for preserving connectivity between habitat patches.

However, during operation, environmental commitments would be implemented under Alternative 2 to preserve flow dynamics in lower Del Puerto Creek. Combined with ongoing irrigation return flows and operational spills during the dry season, these flows are expected to maintain existing habitat conditions, including existing wildlife corridors and native wildlife nursery sites, in lower Del Puerto Creek.

Therefore, adverse effects on wildlife movement, corridors, and native wildlife nursery sites under Alternative 2 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a, BIO-TERR-1j, BIO-TERR-1o, and BIO-TERR-1p would help to avoid, minimize, and compensate for impacts on nesting western burrowing owls and San Joaquin kit fox and American badger dens. Implementation of EPMs AES-2, AES-3, BIO-TERR-4a, BIO-TERR-4b, and BIO-TERR-4c would help to avoid or minimize collisions between wildlife and vehicles and maintain wildlife movement and wildlife corridors through the Del Puerto Canyon study area and region.

Conflict with Local Policies or Ordinances Protecting Biological Resources. Because the Stanislaus County General Plan requires mitigation measures for impacts on sensitive species and habitat, including oak woodlands, proposed EPMs BIO-TERR-1a through BIO-TERR-1q for special-status species, BIO-TERR-2 for riparian habitat and other sensitive natural communities, BIO-TERR-3 for state or federally protected wetlands, and BIO-TERR-5 for protection and enhancement of oak woodlands would avoid a conflict with plan goals.

Conflict with Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other Approved Local, Regional, or State Habitat Conservation Plan. The Del Puerto Canyon study area does not overlap the plan areas for any natural community conservation plan or other approved local, regional, or state habitat conservation plan.

Spread Invasive Plant Species Such that There Would Be a Substantial Effect on Special-Status Species, Sensitive Communities, or Wetlands. The introduction or spread of invasive species in the Del Puerto Canyon study area during construction activities would not have a substantial adverse effect on special-status species, sensitive natural communities, or wetlands because these resources would be inundated along with the other plants and habitats under reservoir operations at the Alternative 2 Project site. With implementation of standard construction BMPs and pollution prevention measures required under the SWPPP, the introduction or spread of invasive species in lower Del Puerto Creek would be minimized.

Furthermore, on-water recreational facilities are not proposed; therefore, the spread of aquatic invasive plant species would not occur through recreation. Areas on the Alternative 2 Project site that would not be inundated (i.e., adjacent to the spillway or the DMC) after construction of the dam would be revegetated. Maintenance for the proposed dam and conveyance facilities would include vegetation control to limit the spread and introduction of invasive species.

3.4.3.5 Alternative 3 (Limited Action)

A full description of construction and operation under Alternative 3 is provided in Chapter 2, *Description of Alternatives*. Under Alternative 3, Reclamation would not participate as a funding partner in construction of Del Puerto Canyon Reservoir. Reclamation would cooperate with any required construction, right-of-way, or other permits required to construct the appropriate connecting

conveyance and pumping structures. It is assumed that the Project Sponsors would choose to move forward with Alternative 3 without Reclamation funding, and impacts would be the same to those described under Alternative 2. Alternative 3 would not provide refuge water supply and would not benefit wildlife and habitats in refuges. Therefore, adverse effects under Alternative 3 would be greater than Alternative 1.

3.4.3.6 Alternative 4 (DPCR 40 TAF)

Construction and operation of a smaller reservoir in the Del Puerto Canyon study area under Alternative 4 would have greater adverse effects than Alternative 1. Impacts of the pump station, conveyance facilities and utility and road relocation would be the same as for Alternatives 2 and 3, but the impacts of reservoir construction and operation would be less because the reservoir would have a smaller footprint.

Substantial Adverse Effect on Special-Status Plants and Their Habitats. Alternative 4 could result in permanent and temporary habitat loss for special-status plant species, but the extent of impacts would be smaller than with Alternative 2 and 3 due to the smaller dams and smaller reservoir inundation area. The acreage amounts associated with impacts on potential habitat for special-status plants under Alternative 4 are presented in **Table 3.4-6**.

The types of adverse effects on special-status plants from the permanent loss of occupied habitat due to construction of the proposed roadway and inundation of the reservoir, as well as temporary impacts on occupied habitat adjacent to utility locations, the saddle dam, and access areas, would be the same under Alternative 4 as those described for Alternative 2. As such, the loss of San Benito poppy, a CRPR 4.3 species, in the Del Puerto Canyon study area under Alternative 4 would not be considered a substantial adverse effect because the poppy is locally and regionally common.

As discussed previously, lower Del Puerto Creek has been heavily modified by agriculture and supports only a narrow band of riparian and wetland vegetation. Alternative 4 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 4 Project site. No direct habitat loss is anticipated. However, hazardous materials used during construction could pose indirect risks to terrestrial plants through spills or runoff. These risks are considered minimal due to limited exposure pathways and natural soil processes that reduce contaminant toxicity. Standard BMPs and pollution prevention measures under the SWPPP would be implemented to minimize adverse effects on special-status plants and their habitats in lower Del Puerto Creek.

During operation, Alternative 4 would alter flow patterns by storing runoff; however, environmental flow commitments that are designed to mimic natural flow patterns would also be implemented under Alternative 4 to minimize adverse effects to special-status plants and their habitats in lower Del Puerto Creek. In addition, downstream habitats are primarily sustained by agricultural return flows and operational spills, which would remain unchanged.

Table 3.4-6: Impacts on Special Status Plants Under Alternative 4

Species Name	Potential/ Occupied Habitat	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
Big tarplant (*Blepharizonia plumosa*)	Occupied	Annual grassland	55.94	0	55.94
California alkali grass (*Puccinellia simplex*)	Occupied	Seep	0.03	0	0.03
San Benito poppy (*Eschscholzia hypecoides*)	Occupied	Annual grassland	< 0.01	0	<0.01
Lemmon's jewelflower (*Streptanthus glandulosus ssp. Lemmonii*)	Potential	Annual grassland and coastal scrub[a]	446	314	760
Diamond-petaled California poppy (*Eschscholzia rhombipetala*)	Potential	Annual grassland and coastal scrub[a]	446	314	760
Showy madia (*Madia elegans*)	Potential	Annual grassland and blue oak woodland[a]	433	311	744
Shining navarretia (*Navarretia nigelliformis ssp. Radiata*)	Potential	Annual grassland and coastal scrub[a]	446	314	760

a. Because of the low amount of late-winter rainfall prior to the 2020 surveys of the Del Puerto Canyon study area, which did not include the proposed new road alignment, the absence of four species—Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia—could not be confirmed. Therefore, impacts are shown for all potential habitat.

Alternative 4 would have adverse effects on special status plants when compared to Alternative 1, but effects would be less than Alternative 2.. As described in Section 3.4.3.3, implementation of EPMs BIO-TERR 1a and BIO-TERR 1b would help to avoid, minimize, and compensate for impacts on special-status plants.

Substantial Adverse Effect on Special-Status Wildlife and Their Habitats. Alternative 4 could result in permanent and temporary habitat loss for special-status wildlife species. The acreage amounts associated with impacts on potential habitat for special-status wildlife under Alternative 4 are presented in **Table 3.4-7**. The adverse effects on special-status wildlife caused by Alternative 4 would be the same as those described under Alternative 2.

Alternative 4 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 4 Project site. No direct habitat loss is anticipated. Standard construction BMPs and pollution prevention measures required under the SWPPP would be implemented to minimize adverse effects on special-status wildlife and their habitats in lower Del Puerto Creek during construction activities.

As discussed previously, during operation, Alternative 4 would alter flow patterns by storing runoff; however, environmental commitments would be implemented under Alternative 4 to ensure that downstream flows mimic the natural hydrologic regime. Combined with ongoing agricultural return flows during the dry season, these flows are expected to maintain existing habitat conditions for special-status wildlife in lower Del Puerto Creek.

Table 3.4-7: Impacts on Special Status Wildlife Under Alternative 4

Species Name	Federal Status	State Status	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
California red-legged frog (*Rana draytonii*)	T	SSC	Aquatic habitat	19.29	0.28	19.57
			Dispersal habitat	298.87	337.79	636.66
			Upland habitat	222.92	22.45	245.37
California tiger salamander (*Ambystoma californiense*)	T	T	Aquatic habitat	0.09	0.00	0.09
			Upland habitat	306.87	135.28	442.15
Northwestern pond turtle (*Actinemys marmorata*)	PT	SSC	Aquatic habitat	18.85	0.18	19.03
			Upland habitat	428.20	68.16	496.36
San Joaquin kit fox (*Vulpes macrotis mutica*)	E	T	Suitable habitat	173.63	22.82	196.45
VP brachiopod	T/E	-	Suitable habitat	0.32	0.07	0.39
Western spadefoot (*Spea hammondii*)	PT	SSC	Aquatic habitat	0.32	0.09	0.41
			Upland habitat	492.82	322.49	815.32
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	T	-	Riparian habitat	1.31	0.05	1.36
Foothill yellow-legged frog (*Rana boylii*)	T	E	Aquatic habitat	19.13	0.00	19.13
			Riparian habitat	0.99	0.00	0.99
Special-status reptiles	-	SSC	Grassland and scrub habitat	440.34	311.17	751.51
Monarch butterfly (*Danaus plexippus*)	PT	-	Potential migration and breeding habitat	446.65	307.17	753.82
Western burrowing owl (*Athene cunicularia hypugaea*)	-	CE, SSC	Potential breeding and wintering habitat	428.14	307.06	735.21
Special-status birds and nesting migratory birds	E	E, T, FP, SSC	Potential nesting habitat	1.94	0.73	2.67
Special-status and non-special-status bats	-	SSC	Potential roosting habitat	6.28	4.06	10.35
American badger (*Taxidea taxus*)	-	SSC	Suitable habitat	441.06	311.90	752.96

* Status explanations:
Federal
E = listed as endangered under the federal Endangered Species Act
T = listed as threatened under the federal Endangered Species Act

PT = proposed for listing as threatened under the federal Endangered Species Act
– = no listing

State
E = listed as endangered under the California Endangered Species Act
T = listed as threatened under the California Endangered Species Act
CT = candidate for state threatened listing under the California Endangered Species Act
FP = California fully protected species
SSC = species of special concern in California
– = no listing

Alternative 4 would have adverse effects when compared to Alternative 1, but would have lesser effects on special-status wildlife than Alternative 2. As described in Section 3.4.3.3, implementation of EPMs BIO-TERR 1a through BIO-TERR 1q and EPMs AES-2 and AES-3 would help to avoid, minimize, and compensate for impacts on special-status wildlife.

Effects on Riparian Habitat or Other Sensitive Natural Community. Construction activities associated with Alternative 4 would not result in the permanent loss of riparian woodland along Del Puerto Creek. Operation of Alternative 4 could result in the permanent loss of riparian woodlands from inundation associated with the reservoir, as shown in **Table 3.4-8**.

As discussed previously, Alternative 4 would not result in direct construction-related impacts to habitats downstream of the Alternative 4 Project site, as construction activities would be confined to the Project site. No direct habitat loss would occur. Implementation of standard construction BMPs and pollution prevention measures required under the SWPPP would minimize adverse effects riparian habitats or other sensitive natural communities in lower Del Puerto Creek during construction activities.

In addition, environmental commitments would still be implemented under Alternative 4 to ensure that downstream flows mimic the natural hydrologic regime. Combined with ongoing agricultural return flows and operational spills during the dry season, these flows are expected to maintain existing habitat conditions for riparian habitats or other sensitive natural communities in lower Del Puerto Creek.

The loss of riparian woodland from operation of Alternative 4 would be a substantial adverse effect as compared to Alternative 1. Alternative 4 would have a lesser effect on riparian habitat and other sensitive natural communities than Alternative 2. Implementation of EPM BIO-TERR-2, which provides measures for compensating for effects on riparian habitat, would minimize adverse effects on riparian woodlands.

Substantial Adverse Effect on State or Federally Protected Wetlands. Construction of Alternative 4, including the proposed roadway, main dam and saddle dams, spillway, and utility relocations, could result in both permanent and temporary direct effects on state or federally protected wetlands and other waters, as shown in **Table 3.4-8**. Inundation associated with operation of the reservoir would also result in the permanent loss of state or federally protected wetlands and other waters, as shown in **Table 3.4-8**.

As discussed previously, Alternative 4 would not result in direct construction-related impacts to terrestrial habitats in lower Del Puerto Creek, as construction activities would be confined to the Alternative 4 Project site. No direct habitat loss is anticipated. Standard construction BMPs and pollution prevention measures required under the SWPPP would be implemented to minimize adverse effects on state or federally protected wetlands and other waters in lower Del Puerto Creek during construction activities.

Table 3.4-8: Impacts on Wetlands and Other Waters Under Alternative 4

Feature Type	Permanent Direct Impacts (acres)	Temporary Direct Impacts (acres)	Inundation Impacts (acres)	Total Impacts (acres)
Canal	0.003	—	—	0.003
Emergent Wetland	0.170	0.004	—	0.021
Ephemeral Stream	0.021	1.855	—	1.876
Forested Wetland	—	—	2.014	2.014
Herbaceous Wetland	0.382	0.048	14.648	15.078
Intermittent Stream	0.006	0.130	—	0.136
Pond	< 0.001	0.001	< 0.001	0.002
Pond (Unvegetated)	0.091	0.001	—	0.092
Pond (Vegetated)	—	0.021	0.045	0.066
Riparian Wetlands	0.015	0.053	0.415	0.483
Seasonal Stream	—	< 0.001	0.210	0.210
Seasonal Wetland	—	< 0.001	0.131	0.131
Seep	0.064	0.048	0.343	0.455
Unvegetated	0.124	0.090	1.340	1.554
Total	**0.876**	**2.251**	**19.146**	**22.588**

For the Action Alternatives, including Alternative 4, the Project Sponsors would comply with state regulatory requirements (e.g., obtain approvals and secure necessary permits or clearances from authorizing agencies prior to any construction).

Table 3.4-9 includes only the wetlands and other waters that could be under USACE jurisdiction. As discussed in Section 3.4.1, *Affected Environment*, due to changes in regulations and guidance, as well as changes since 2020, the acreages presented in **Table 3.4-9** are preliminary because the updated wetland delineation has not been subjected to jurisdictional review by the USACE. If Alternative 4 is the chosen Action Alternative, a request for an approved jurisdictional determination will be submitted to the USACE for Alternative 4. The final determination about the location and extent of wetlands and other waters, as well as their regulatory jurisdiction, would ultimately be determined by the USACE at that time.

3.4-9: Impacts on USACE Jurisdictional Waters of the U.S. Under Alternative 4

Feature Type*	Permanent Direct Impacts (acres)	Temporary Direct Impacts (acres)	Inundation Impacts (acres)	Total Impacts (acres)
Forested Wetland	—	—	2.014	2.014
Herbaceous Wetland	0.382	0.048	14.648	15.078
Intermittent Stream	—	0.070	—	0.070
Pond (Vegetated)	—	0.021	—	0.021
Seasonal Stream	—	—	0.210	0.210
Unvegetated	0.124	0.090	1.340	1.554
Total	**0.506**	**0.229**	**18.212**	**18.947**

*Calculation of resources within the Del Puerto Canyon study area is preliminary but will be finalized as part of the approved jurisdictional determination process.

In addition, environmental commitments would still be implemented under Alternative 4 to ensure that downstream flows mimic the natural hydrologic regime. Combined with ongoing agricultural return flows and operational spills during the dry season, these flows are expected to maintain existing habitat conditions for state or federally protected wetlands and other waters in lower Del Puerto Creek.

This loss of state or federally protected wetlands under Alternative 4 would be a substantial adverse effect as compared to Alternative 1. Alternative 4 would have a lesser effect on state or federally protected wetlands than Alternative 2. Implementation of EPMs BIO-TERR-1a and BIO-TERR-3, which provide measures for avoiding, minimizing, and compensating for effects on state or federally protected wetlands, would reduce the impact on wetlands.

Interference with the Movement of Native Resident or Migratory Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites. Construction and operation of Alternative 4 could destroy potential western burrowing owl burrows and San Joaquin kit fox and American badger dens and/or prevent access to nursery sites, prevent golden eagles from nesting at known nest structures adjacent to the proposed roadway, and result in wildlife habitat loss and fragmentation, wildlife avoidance of the area, and collisions between wildlife and vehicles.

In addition, as discussed previously, changes in flow dynamics can influence terrestrial wildlife movement by altering the availability and quality of habitat corridors. Natural hydrologic conditions are essential for preserving connectivity between habitat patches.

During operation, environmental commitments would still be implemented under Alternative 4 to preserve flow dynamics in lower Del Puerto Creek. Combined with ongoing irrigation return flows and operational spills during the dry season, these flows are expected to maintain existing habitat conditions, including existing wildlife corridors and native wildlife nursery sites, in lower Del Puerto Creek.

However, the amount of permanent habitat loss, fragmentation, and avoidance would be greater than Alternative 1, and would result in a substantial adverse effect on potential western burrowing

owl burrows and San Joaquin kit fox and American badger dens, golden eagle nesting habitat, and wildlife movement and wildlife corridors.

Implementation of EPMs BIO-TERR-1a, BIO-TERR-1j, BIO-TERR-1o, and BIO-TERR-1p would help to avoid, minimize, and compensate for impacts on nesting western burrowing owl and San Joaquin kit fox and American badger dens. Implementation of EPMs AES-2, AES-3, BIO-TERR-4a, BIO-TERR-4b, and BIO-TERR-4c would help to avoid and minimize collisions between wildlife and vehicles and maintain wildlife movement and wildlife corridors through the Del Puerto Canyon study area and region.

Conflict with Local Policies or Ordinances Protecting Biological Resources. Because the Stanislaus County General Plan requires mitigation measures for impacts on sensitive species and habitat, including oak woodlands, proposed EPMs BIO-TERR-1a through BIO-TERR-1q for special-status species, BIO-TERR-2 for riparian habitat and other sensitive natural communities, BIO-TERR-3 for state or federally protected wetlands, and BIO-TERR-5 for the protection and enhancement of oak woodlands would avoid a conflict with plan goals.

Conflict with Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other Approved Local, Regional, or State Habitat Conservation Plan. The Del Puerto Canyon study area does not overlap the plan areas for any natural community conservation plan or other approved local, regional, or state habitat conservation plan.

Spread Invasive Plant Species Such that There Would Be a Substantial Effect on Special-Status Species, Sensitive Communities, or Wetlands. The introduction or spread of invasive species into the Del Puerto Canyon study area during construction activities would not have a substantial adverse effect on special-status species, sensitive natural communities, or wetlands because these resources would be inundated along with the other plants and habitats under operation of Alternative 4. With implementation of standard construction BMPs and pollution prevention measures required under the SWPPP, the introduction or spread of invasive species in lower Del Puerto Creek would be minimized. In addition, this alternative would minimize adverse effects from invasive species through required vegetation maintenance that would limit the spread and introduction of invasive species.

3.4.3.7 Alternative 5 (Ingram Canyon)

Substantial Adverse Effect on Special-Status Plants and Their Habitats. Alternative 5 could result in permanent and temporary loss of habitat for special-status plant species. The acreage amounts associated with impacts on potential and occupied habitat for special-status plants under Alternative 5 are presented in **Table 3.4-10**.

Table 3.4-10: Impacts on Special Status Plants Under Alternative 5

Species Name	Potential/ Occupied Habitat	Habitat Type	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
Big tarplant (*Blepharizonia plumosa*)	Occupied	Annual grassland	343	319	662
San Benito poppy (*Eschscholzia hypecoides*)	Occupied	Annual grassland	343	319	662
Lemmon's jewelflower (*Streptanthus glandulosus ssp. Lemmonii*)	Potential	Annual grassland and coastal scrub	413	349	762
Diamond-petaled California poppy (*Eschscholzia rhombipetala*)	Potential	Annual grassland and coastal scrub	413	349	762
Showy madia (*Madia elegans*)	Potential	Annual grassland and blue oak woodland	423	412	835
Shining navarretia (*Navarretia nigelliformis ssp. Radiata*)	Potential	Annual grassland and coastal scrub	413	349	762

Alternative 5 could result in direct impacts, indirect impacts, and loss of habitat for special-status plants. As listed in **Table 3.4-10**, Alternative 5 could result in the direct permanent loss of potential habitat for big tarplant, California alkali grass, San Benito poppy, Lemmon's jewelflower, diamond-petaled California poppy, showy madia, and shining navarretia. The loss of San Benito poppy, a CRPR 4.3 species, in the Ingram Canyon study area under Alternative 5 would not be considered a substantial adverse effect because the poppy is locally and regionally common.

Most of the Ingram Canyon study area lacks public access and has not been surveyed. As such, no occurrences of special-status plants have been recorded. Impact estimates shown in **Table 3.4-10** are based on potential habitat identified through desktop mapping and include the species known to occur near Ingram Canyon. Alternative 5 would require surveys for special-status plants to determine if there would be an adverse impact. Implementation of EPMs BIO-TERR 1a and BIO-TERR 1r would detect, avoid, minimize, and compensate for impacts on special-status plants.

Substantial Adverse Effect on Special-Status Wildlife and Their Habitats. Alternative 5 could result in permanent and temporary habitat loss for special-status wildlife species. The acreage amounts associated with impacts on potential habitat for special-status wildlife under Alternative 5 are presented in **Table 3.4-11**. Limited construction information is currently available to analyze temporary impacts due to Alternative 5. As such, only the estimated permanent impacts are provided in **Table 3.4-11**.

The Ingram Canyon study area lacks public access and has not been surveyed. As such, no occurrences of special-status wildlife have been recorded; however, desktop mapping indicates suitable habitat for special-status wildlife is present in the Ingram Canyon study area. Impact estimates shown in **Table 3.4-11** are based on potential habitat identified through desktop mapping and include the species known to occur near Ingram Canyon.

The Alternative 5 Project site is located approximately 2 miles east of I-5 and does not encroach upon the regional movement corridor used by San Joaquin kit fox along the I-5 and California

Aqueduct. As such, EPM BIO-TERR-1p, which was specifically developed to maintain wildlife connectivity in areas where reservoir infrastructure would disrupt this corridor, would not be implemented under Alternative 5.

If Alternative 5 is selected, more detailed habitat mapping and surveys for special-status wildlife would be required to determine the degree of adverse effects on individual species; however, the habitat information currently available within the extent of the dams and reservoir inundation area indicates that Alternative 5 would result in loss of suitable habitat for several special-status species, which would be a substantial adverse effect.

Adverse effects on special-status wildlife from injury, mortality, and disruption of normal behaviors, as well as construction, operations (e.g., lighting), and maintenance (i.e., vegetation, rodent, and erosion control and associated vehicle traffic), would be the same under Alternative 5 as those described in Section 3.4.3.3.

Although the degree of adverse effects on individual special-status wildlife species cannot be determined, given the currently available information, Alternative 5 would very likely result in substantial adverse effects on special-status wildlife species. Therefore, adverse effects on special-status wildlife under Alternative 5 would be greater than Alternative 1. As described in Section 3.4.3.3, implementation of EPMs BIO-TERR 1a through BIO-TERR-1o, and BIO-TERR 1q and EPMs AES-2 and AES-3 would help to avoid, minimize, and compensate for impacts on special-status wildlife.

Table 3.4-11: Impacts on Special Status Wildlife Under Alternative 5

Species Name	Federal Status	State Status	Habitat Type	Total Impacts (acres)
California red-legged frog (*Rana draytonii*)	T	SSC	Aquatic habitat	27.53
			Dispersal habitat	441.85
			Upland habitat	604.03
California tiger salamander (*Ambystoma californiense*)	T	T	Aquatic habitat	0.06
			Upland habitat	420.86
Northwestern pond turtle (*Actinemys marmorata*)	PT	SSC	Aquatic habitat	27.75
			Upland habitat	796.81
San Joaquin kit fox (*Vulpes macrotis mutica*)	E	T	Suitable habitat	94.39
VP brachiopod			Suitable habitat	0.22
Western spadefoot (*Spea hammondii*)	PT	SSC	Aquatic habitat	0.06
			Upland habitat	420.87
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	T	-	Riparian habitat	12.83
Foothill yellow-legged frog (*Rana boylii*)	T	E	Aquatic habitat	1.83
			Riparian habitat	2.61
Special-status reptiles	-	SSC	Grassland and shrub habitat	761.35
Monarch butterfly (*Danaus plexippus*)	PT	-	Potential migration and breeding habitat	674.69
Western burrowing owl	-	CE, SSC	Potential breeding and wintering habitat	661.86
Special-status birds and nesting migratory birds	E	E, T, FP, SSC	Potential nesting habitat	172.60
			Potential foraging habitat	661.86
Special-status and non-special-status bats	-	SSC	Potential roosting habitat	172.60
American badger	-	SSC	Suitable habitat	933.95

* Status explanations:
Federal
E = listed as endangered under the federal Endangered Species Act
T = listed as threatened under the federal Endangered Species Act
PT = proposed for listing as threatened under the federal Endangered Species Act
– = no listing

State
E = listed as endangered under the California Endangered Species Act
T = listed as threatened under the California Endangered Species Act

CT = candidate for state threatened listing under the California Endangered Species Act
FP = California fully protected species
SSC = species of special concern in California
– = no listing

Substantial Adverse Effect on Riparian Habitat or Other Sensitive Natural Community. Adverse effects on riparian habitat under Alternative 5 would be greater than Alternative 1. Construction and operation of Alternative 5 could result in the permanent loss of 12.8 acres of riparian woodland compared to the 16.3 acres of riparian woodland that would be affected by Alternative 2. Ingram Canyon generally has habitats similar to those identified in Del Puerto Canyon; however, based on an aerial photo review, Ingram Creek appears to be smaller than Del Puerto Creek. It supports smaller areas of riparian vegetation, consisting of a few individual trees. The loss of riparian woodland from construction and operation of Alternative 5 would be a potentially adverse effect. Implementation of EPMs BIO-TERR-1a and BIO-TERR-2, which provide measures for avoiding, minimizing, and compensating for effects on riparian habitat, would reduce the impact on riparian woodland.

Substantial Adverse Effect on State or Federally Protected Wetlands. Construction of Alternative 5, including the proposed roadway, main dam and saddle dams, spillway, and utility relocations, and operation of Alternative 5, including reservoir inundation, could result in the permanent loss of state or federally protected wetlands and other waters, as shown in **Table 3.4-12**.

Table 3.4-12: Impacts on Wetlands and Other Waters Under Alternative 5

Feature Type	Permanent Direct Impacts (acres)	Temporary Direct Impacts (acres)	Inundation Impacts (acres)	Total Impacts (acres)
Canal	0.35	2.31	—	2.65
Emergent Wetland	1.45	6.79	9.54	17.79
Ephemeral Stream	—	2.71	9.33	12.03
Intermittent Drainage	—	0.15	—	0.15
Intermittent Stream	1.73	5.54	8.22	15.49
Pond	—	0.06	—	0.06
Riparian Wetlands	—	2.68	10.15	12.83
Seasonal Wetland	—	0.09	0.07	0.16
Total	**3.53**	**20.33**	**37.31**	**61.16**

If Alternative 5 is selected as the preferred alternative, a request for an approved jurisdictional determination will be submitted to the USACE. The final determination about the location and extent of wetlands and other waters, as well as their regulatory jurisdiction, would ultimately be determined by the USACE at that time.

According to a desktop analysis conducted by ICF biologists (provided as **Appendix I7**), because access to the private land was not granted by the owner, Ingram Creek appears to be an intermittent stream. It does not appear to contain extensive herbaceous wetlands, as seen in the

Del Puerto Canyon study area. In addition, unlike the Del Puerto Canyon study area, seep wetlands are not evident in the aerial photographs of areas outside the Ingram Creek channel (Google 2025).

The loss of state or federally protected wetlands within the construction and inundation area for Alternative 5 would be an adverse effect. Therefore, adverse effects on state or federally protected wetlands under Alternative 5 would be greater than Alternative 1. Implementation of EPMs BIO-TERR-1a and BIO-TERR-3, which provide measures for avoiding, minimizing, and compensating for effects on state or federally protected wetlands, would reduce the impact on wetlands.

Interference with the Movement of Native Resident or Migratory Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites. Alternative 5 would result in a substantial adverse effect on wildlife movement and wildlife corridors when compared to Alternative 1. Impacts under Alternative 5 would be similar to those under Alternative 2, except that native wildlife nursery sites were not identified within the Ingram Canyon study area during the review of existing data sources or as a result of the reconnaissance-level wildlife survey. Construction and operations could result in wildlife habitat loss and fragmentation, wildlife avoidance of the Ingram Canyon study area, and collisions between wildlife and vehicles. Construction and operation of Alternative 5 would not include relocation of a roadway but would include improvements to existing roadways and require vehicle and equipment access to the Ingram Canyon study area during both operation and construction. Thus, these road-associated activities could result in alterations to wildlife behavior and pose a wildlife-vehicle collision risk similar to that of other Action Alternatives. The amount of permanent habitat loss, fragmentation, and avoidance could be lower compared to Alternatives 2, 3 and 4.

Implementation of EPMs AES-2, AES-3, BIO-TERR-4a, BIO-TERR-4b, and BIO-TERR-4c would help to avoid or minimize collisions between wildlife and vehicles and maintain wildlife movement and wildlife corridors through the Ingram Canyon study area and region.

Conflict with Local Policies or Ordinances Protecting Biological Resources. Because the Stanislaus County General Plan requires mitigation measures for impacts on sensitive species and habitat, proposed EPMs BIO-TERR-1a through BIO-TERR-1q for special-status species, BIO-TERR-2 for riparian habitat and other sensitive natural communities, BIO-TERR-3 for state or federally protected wetlands, and BIO-TERR-5 for protection and enhancement of oak woodlands would avoid a conflict with plan goals.

Conflict with Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other Approved Local, Regional, or State Habitat Conservation Plan. The Ingram Canyon study area does not overlap the plan areas for any natural community conservation plan or other approved local, regional, or state habitat conservation plan.

Spread Invasive Plant Species Such that There Would Be a Substantial Effect on Special-Status Species, Sensitive Communities, or Wetlands. The introduction or spread of invasive species into the Ingram Canyon study area during construction activities would not have a substantial adverse effect on special-status species, sensitive natural communities, or wetlands because these resources would be inundated under Alternative 5, along with other plants and

habitats. Alternative 5 would also require vegetation maintenance that would limit the spread and introduction of invasive species. There would be no adverse effects on invasive plant species under Alternative 5.

3.5 Biological Resources – Aquatic

3.5.1 Affected Environment

This section describes the aquatic biological resources environmental setting in the Del Puerto Canyon and Ingram Canyon study areas. The resources described include fisheries resources and aquatic habitats, including any fish species and aquatic habitat that could be affected by the Action Alternatives or proposed changes to Central Valley Project (CVP) operations within the Sacramento-San Joaquin Delta (Delta) and the San Joaquin, Sacramento, Feather, and lower American Rivers. Terrestrial biological resources are discussed separately in Section 3.4.1, *Biological Resources – Terrestrial, Affected Environment*.

This section incorporates by reference **Appendix I2**, *Species Lists*; **Appendix I3**, *Species Observed in the Study Area*; **Appendix I5**, *Special-Status Species Tables*; and **Appendix I6**, *Special-Status Wildlife Species Accounts* (excluding listed and fully protected species), and **Appendix J**, *Del Puerto Canyon Reservoir Modeling*. Information from reservoir operations modeling presented in Appendix F of the Final EIR is also used.

3.5.1.1 Study Area

The Del Puerto Creek study area includes Del Puerto Creek, the San Joaquin River, and the Delta (see **Figure 3.5-1)**. The Ingram Creek study area includes Ingram Creek, the San Joaquin River, and the Delta (see **Figure 3.5-2**).

Del Puerto Creek Study Area. Del Puerto Creek, a tributary to the San Joaquin River, is an intermittent stream with variable flows that are seasonally dependent upon rainfall events. Surface flows generally cease by the late spring or summer, although there are several areas where subsurface flows and seeps can maintain isolated pools and wetlands throughout the dry season.

The Del Puerto Creek study area includes the proposed reservoir inundation areas of Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF). Upstream of the proposed dam infrastructure, Del Puerto Creek has been altered by grazing, paved and dirt roads, and historic land uses (e.g., orchards and grazing). Much of the channel within the lower reservoir inundation area is characterized by an exposed shallow channel bordered by open grassland. During the dry season, fish habitat is largely confined to isolated pools because of little or no surface flow and habitat quality is limited due to the lack of channel complexity or cover.

Downstream of the proposed dam infrastructure, lower Del Puerto Creek has been altered and affected by road infrastructure and intensive agricultural activities, resulting in losses of riparian and wetland vegetation, and water quality degradation due to agricultural return flows. Historical and ongoing physical disturbances have resulted in a simple conveyance channel with little cover. Intensive agricultural activities have altered water and sediment quality in lower Del Puerto Creek, with pesticide concentrations sometimes reaching levels acutely toxic to sensitive invertebrates (Weston et al. 2008; Ensminger et al. 2009; Hall and Anderson 2018). Although agricultural return flows during the summer irrigation season generally provide more stable flow conditions than those that historically existed within lower Del Puerto Creek, these conditions most likely do not support native fish species because of their sensitivity to water quality degradation and the presence of introduced species that typically characterize low-elevation tributary and mainstem reaches of the San Joaquin River (Brown 2000).

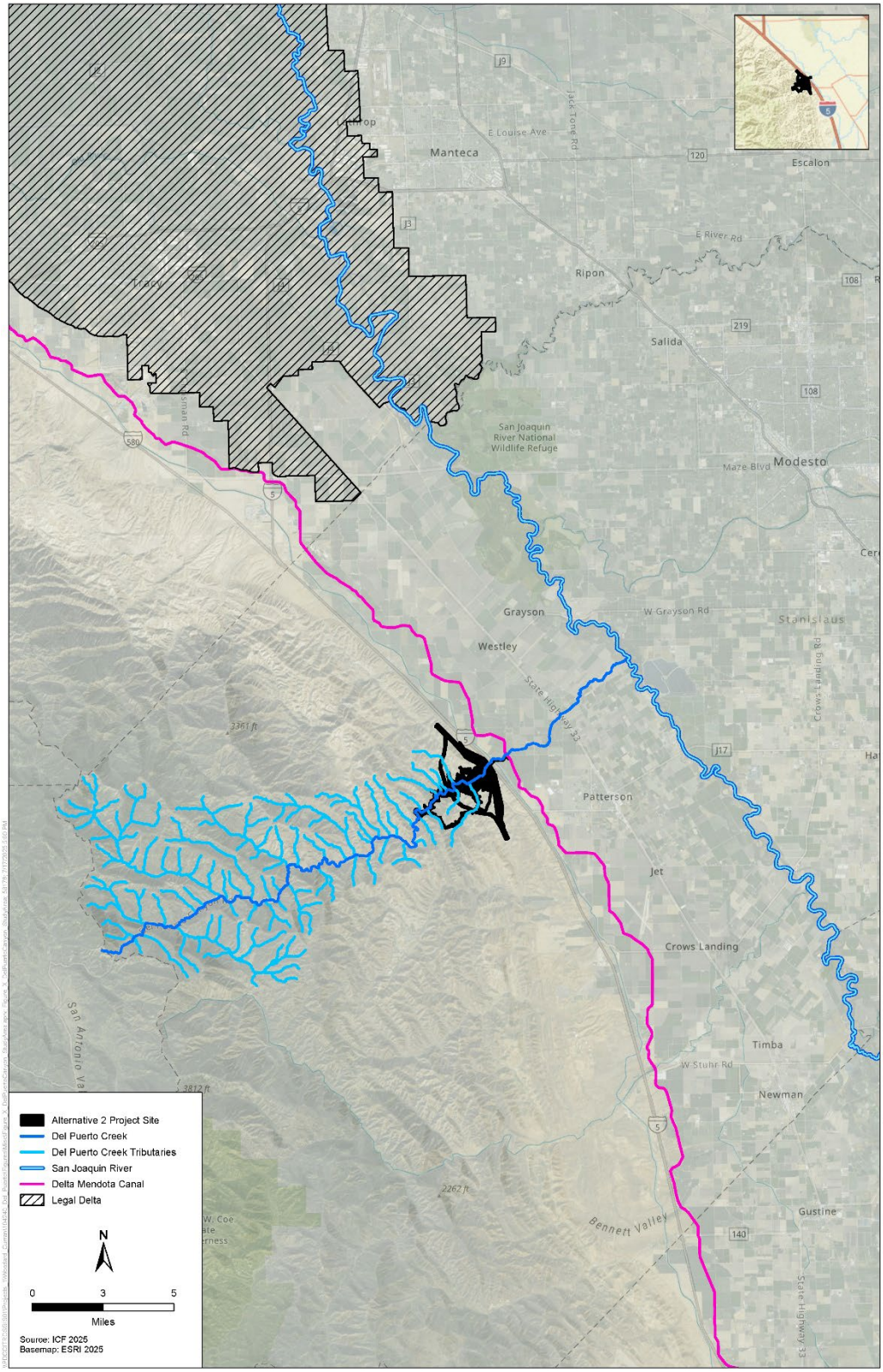

Figure 3.5-1: Aquatic Biology Del Puerto Canyon Study Area

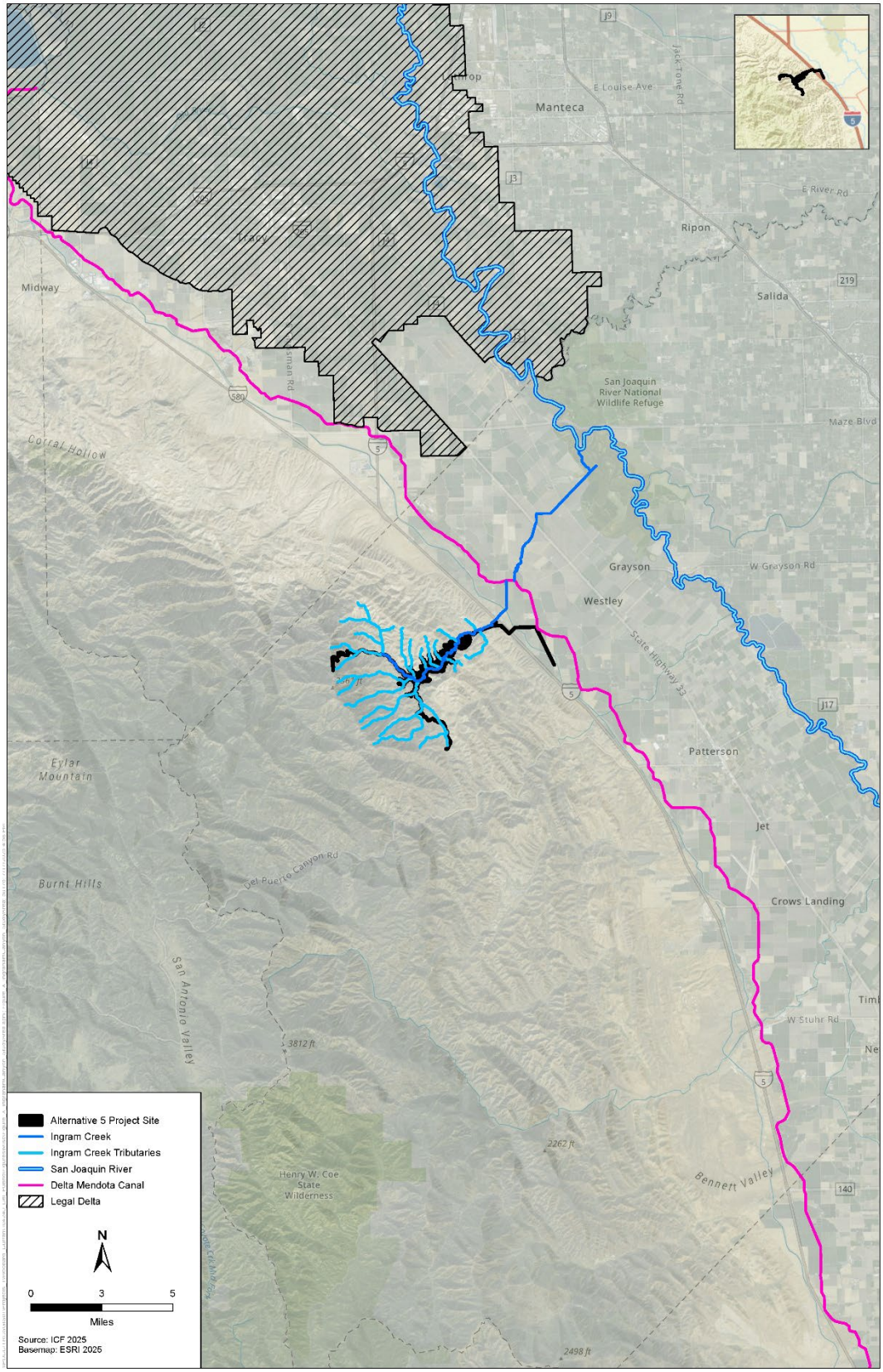

Figure 3.5-2: Aquatic Biology Ingram Canyon Study Area

Ingram Creek Study Area. Ingram Creek is an intermittent stream with highly variable flows that depend on winter rainfall events, although the magnitude of the flows is proportionally less than that in Del Puerto Creek due to Ingram Creek's smaller watershed area. The Ingram Creek stream channel is similarly unvegetated and exposed like Del Puerto Creek, although based on aerial imagery, the Ingram Creek stream channel appears to be drier, with fewer isolated pools and wetlands sustained from subsurface flows and seeps during the dry season (e.g., September 2020) (Google 2025). The Ingram Creek study area, which includes the proposed reservoir inundation area of Alternative 5 (Ingram Canyon), provides limited fish habitat for the same reasons described for Del Puerto Creek. Ingram Creek's channel has been altered primarily by livestock grazing within the proposed reservoir inundation area. There are no paved roads in the watershed.

Downstream of the proposed dam infrastructure, lower Ingram Creek, has been significantly modified by road infrastructure and intensive agricultural land use, as well as commercial development. These alterations have led to the degradation and loss of riparian and wetland vegetation, increased agricultural return flows, and diminished water quality. As discussed further in Section 3.10, *Hydrology and Water Quality*, Ingram Creek has been included on the U.S. Environmental Protection Agency's Clean Water Act 303(d) list of exceedances of water quality objectives for sediment toxicity associated with pyrethroids (SWRCB 2019). Water quality monitoring at River Road and Highway 33 has also revealed multiple contaminant exceedances, including elevated E. coli levels. In addition, although flows in lower Ingram Creek during the summer irrigation season may provide more consistent flow conditions; similar to flow conditions in lower Del Puerto Creek, these flows are unlikely to support native fish species in Ingram Creek due to the flow variability and diminished water quality.

Focal Fish Species. Many fish and aquatic species use the Del Puerto Canyon and Ingram Canyon study areas during all or some portion of their lives; however, certain fish species were selected to be the focus of this analysis based on their sensitivity and their potential to be affected by changes due to operation of the Action Alternatives considered in this EIS, as summarized in **Table 3.5-1**.

Table 3.5-1: Focal Fish Species by Region of Occurrence

Species or Population	Federal Status	State Status	Tribal, Commercial, or Recreational Importance	Occurrence within Area of Analysis
Winter-run Chinook salmon (*Oncorhynchus tshawytscha*) (Sacramento River ESU)	Endangered	Endangered	Yes	Delta
Spring-run Chinook salmon (*Oncorhynchus tshawytscha*) (Central Valley ESU)	Threatened	Threatened	Yes	Delta, San Joaquin River[a]
Steelhead (*Oncorhynchus mykiss*) (Central Valley DPS)	Threatened	None	Yes	Delta, San Joaquin River
Green sturgeon (*Acipenser medirostris*) (southern DPS)	Threatened	Species of Special Concern	Yes	Delta, San Joaquin River
Delta smelt (*Hypomesus transpacificus*)	Threatened	Endangered	No	Delta

Species or Population	Federal Status	State Status	Tribal, Commercial, or Recreational Importance	Occurrence within Area of Analysis
Longfin smelt (*Spirinchus thaleichthys*) (Bay Delta DPS)	Endangered	Threatened, Species of Special Concern	No	Delta
Fall-run/late fall–run Chinook salmon (*Oncorhynchus tshawytscha*) (Central Valley ESU)	Species of Concern	Species of Special Concern	Yes	Delta, San Joaquin River
Sacramento splittail (*Pogonichthys macrolepidotus*)	None	Species of Special Concern	No	Delta, San Joaquin River
Hardhead (*Mylopharadon conocephalus*)	None	Species of Special Concern	No	Delta, San Joaquin River, Del Puerto Creek, Ingram Creek (presumed)
Sacramento-San Joaquin roach (*Lavinia symmetricus*)	None	Species of Special Concern	No	Delta, San Joaquin River, Del Puerto Creek, Ingram Creek (presumed)
River lamprey (*Lampetra ayresi*)	None	Species of Special Concern	Yes	Delta, San Joaquin River
Pacific lamprey (*Entosphenus tridentata*)	Species of Concern	Species of Special Concern	Yes	Delta, San Joaquin River
White sturgeon (*Acipenser transmontanus*)	None	Candidate, Species of Special Concern	Yes	Delta, San Joaquin River
American shad (*Alosa sapidissima*)	None	None	Yes	Delta, San Joaquin River
Black bass (largemouth, smallmouth, spotted) (*Micropterus* spp.)	None	None	Yes	Delta, San Joaquin River
Striped bass (*Morone saxatilis*)	None	None	Yes	Delta, San Joaquin River

[a] In 2013, the National Marine Fisheries Service designated a nonessential experimental population of Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) under the ESA in portions of the San Joaquin River (i.e., upstream of its confluence with the Merced River) and established take exceptions for the nonessential experimental population for particular activities inside the experimental population's geographic range and limited take exceptions outside the experimental population geographic range (78 *Federal Register* 79622, December 31, 2013).

ESU = evolutionary significant unit
DPS = distinct population segment

3.5.1.2 Non-Special-Status Fish Species

Fish species that can maintain resident populations in the lower Del Puerto Creek portion of the Del Puerto Canyon study area are small introduced species that can tolerate the harsh environmental conditions associated with agricultural return flows and poor water quality during the summer irrigation season. These fish species include fathead minnow, green sunfish, and red shiner. Other fish species that require more permanent bodies of water, such as catfish and common carp, could enter lower Del Puerto Creek from the San Joaquin River or irrigation channels (Brown 2000).

The fish species and life stages observed in Del Puerto Creek include large concentrations of juvenile Sacramento pikeminnow (*Ptychocheilus grandis*) and smaller numbers of juvenile and adult Sacramento suckers (*Catostomus occidentalis occidentalis*). Based on general species distributions and associations, other

native species that may co-occur with Sacramento pikeminnow and Sacramento suckers include riffle sculpin (*Cottus gulosus*), rainbow trout (*Oncorhynchus mykiss*), hardhead (*Mylopharodon conocephalus*), and California roach (*Lavinia symmetricus*); the latter two species are California Department of Fish and Wildlife (CDFW) Species of Special Concern and are discussed further in Section 3.5.1.3, *Special-Status Fish Species* (Moyle 2002; Moyle et al. 2015). The presence or absence of these species could not be confirmed for this analysis. Rainbow trout and riffle sculpin are unlikely to occur because of their requirement for permanent cool streams. Steelhead (i.e., sea-run rainbow trout) are also not likely to occur because of presumed migration barriers in lower Del Puerto Creek (i.e., culverts under the California Aqueduct and Interstate 5). Although the upper portion of Del Puerto Creek was identified as historically providing suitable habitat for steelhead, based on general watershed characteristics (Lindley et al. 2006), the watershed has not been designated as critical habitat or included in the National Marine Fisheries Service (NMFS) recovery plan (NMFS 2014).

Fish species composition in Ingram Creek is assumed to be similar to Del Puerto Creek, assuming subsurface flows and seeps maintain isolated pools and wetlands throughout the dry season. Several isolated pools during the dry season (e.g., September 2020) were noted from aerial photographs of Ingram Creek (Google 2025). Ingram Creek could support Sacramento pikeminnow, Sacramento suckers, riffle sculpin, rainbow trout, hardhead and California roach.

3.5.1.3 Special-Status Fish Species

Hardhead and California roach are special-status fish species and CDFW Species of Special Concern that could occur within Del Puerto Creek and Ingram Creek. Downstream of Del Puerto Creek and Ingram Creek, the San Joaquin River is designated as critical habitat for the threatened California Central Valley steelhead and as essential fish habitat (EFH) for Chinook salmon as well as supports eight special-status fish species. These species include federally listed, state listed, state candidate, and CDFW designated species of special concern, as listed in **Table 3.5-1**. Additionally, there are three fish species of tribal, commercial, or recreational importance in the San Joaquin River below the confluence with Del Puerto Creek and Ingram Creek: striped bass (*Marone saxatilis*), American shad (*Alosa sapidissima*), and black bass (*Micropterus* spp.).

3.5.1.4 Delta

The Delta is a natural wetland that covers 1,315 square miles and drains approximately 40 percent of California's water (Department of Water Resources [DWR] 2015). The Delta comprises a complex web of channels and islands at the confluence of the Sacramento and San Joaquin Rivers. Hydrological conditions in the Delta are affected by structures that route water through the Delta toward the major water diversions in the south Delta. Diversion patterns for the major facilities are regulated to maintain Delta water quality and protect fish listed under the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA), including threatened or endangered species.

The Delta provides unique and, in some places, productive habitats for a variety of fish species, including resident species and anadromous species. All special-status fish species listed in **Table 3.5-1** spend at least a portion of their life cycle in the Delta. For anadromous species, the Delta is used by adult fish during upstream migration and by rearing juvenile fish as they migrate downstream to the ocean. Conditions in the Delta influence the abundance and productivity of all fish populations that use the system.

3.5.1.5 San Joaquin River

The San Joaquin River flows 100 miles from Friant Dam to the Delta. Since construction of Friant Dam was completed in 1942, substantial changes in physical (fluvial geomorphic) processes have occurred, along with substantial reductions in streamflows in the San Joaquin River, resulting in large-scale alterations to the river channel and associated aquatic, riparian, and floodplain habitats. Throughout the area, physical barriers, reaches with poor water quality or no surface flow, and false migration pathways have reduced habitat connectivity for anadromous and resident native fishes. As a result, there has been a general decline in both the abundance and distribution of native fishes, with several species extirpated from the system (Moyle 2002).

Anadromous species include fall-run Chinook salmon, spring-run Chinook salmon (experimental non-essential population only), steelhead, green sturgeon, striped bass, American shad, white sturgeon, and several species of lamprey (Bureau of Reclamation [Reclamation] et al. 2004; NMFS 2021). Spawning by salmonids in the San Joaquin River Basin occurs in the tributaries to the San Joaquin River, including the Merced, Tuolumne, and Stanislaus Rivers (Yoshiyama et al. 1998).

A recent study by USGS documented the importance of Del Puerto Creek, both as a major source of gravel to the lower San Joaquin River between the Merced and Stanislaus Rivers and as an area for the maintenance of spawning habitat for white sturgeon (Marineau et al. 2017). Adult white sturgeon occupy the San Joaquin River, but successful spawning was only recently demonstrated from the capture of eggs and larvae between 2011 and 2016 (Jackson et al. 2016). White sturgeon typically spawn in deep water over gravel substrates or in rocky pools with swift currents (Moyle et al. 2015). Surveys of the physical characteristics of selected spawning reaches between 2011 and 2014 detected large quantities of gravel downstream of Del Puerto Creek on bars and in the adjacent bed of the sand-dominated San Joaquin River. Bed-material sampling in Del Puerto Creek and Orestimba Creek indicated that Del Puerto Creek was the primary source of this gravel (Marineau et al. 2017). Ingram Creek, which was described in the USGS study as draining a smaller watershed area than Del Puerto and Orestimba creeks and generally having a more poorly defined channel in the flatter area of the valley floor, was not identified in the USGS study as being a major source of gravel to the lower San Joaquin River (Marineau et al. 2017).

Green sturgeon spawning in the San Joaquin River Basin has not been documented, although one of two confirmed adult green sturgeon observed in the basin was captured in a fyke trap placed in the San Joaquin River near the mouth of the Merced River during the known spawning period for southern DPS green sturgeon (NMFS 2021). Green sturgeon were also identified in the Stanislaus River in 2024 (Dahl 2025).

3.5.2 Regulatory Setting

See **Appendix E** for a description of federal policies and regulations pertaining to terrestrial and aquatic biological resources.

3.5.3 Environmental Consequences

3.5.3.1 Methodology

To further understand the potential impacts on Reclamation's operations and the fishery resources within Reclamation's purview, Project Sponsors developed hydrologic modeling in cooperation with Reclamation to depict potential changes in operations resulting from Alternative 2. Modeling was performed for Alternative 2, the Project Sponsors preferred alternative, using water

operations/hydrologic models (e.g., California Water Resources Simulation Model 3 [CalSim 3] and GoldSim). **Appendix J** describes anticipated changes to estimated flows in the San Joaquin River at Vernalis as well as CVP/State Water Project (SWP) Delta operations.

The CalSim 3 model simulates monthly simulations of actual daily (or even hourly) operations of CVP and SWP results; however, several limitations of the model are not reflected within the model results. Model results must be used in a comparative manner due to these limitations. CalSim 3 model outputs include minor fluctuations of up to 5 percent due to model assumptions and approaches. Therefore, if quantitative changes between a specific Action Alternative and Alternative 1, the No Action Alternative, are 5 percent or less, conditions under the specific alternative would be considered to be "similar" to conditions under the Alternative 1. Changes that are less than 5 percent are not substantive enough to distinguish between the Action Alternatives. Therefore, for this analysis, changes in flow, including within the Delta and San Joaquin River, were evaluated using a threshold of 5 percent or greater to indicate potential substantial changes in simulated mean monthly flows.

In addition, GoldSim relies on CalSim outputs as input data for the GoldSim model. As a result, comparative fluctuations observed in GoldSim are consistent with those in CalSim 3 and are subject to similar limitations. Additional details regarding modeling are provided in Section 3.10, *Hydrology*, of this EIS.

Because the Action Alternatives would intercept runoff above their respective dams, the flow in their respective creeks would be altered; at times, this would affect flows to the San Joaquin River and into the Delta. Modeling for these altered flows is depicted in Section 3.10, *Hydrology*, of this EIS and **Appendix J**, which shows that under Alternatives 2, 3 and 4 Del Puerto Creek flows would be reduced by up to 0.04 percent, which is far less than the accuracy of the CalSim model and is thus not considered to be a measurable change. Alternative 5 would result in even smaller flow reductions in Ingram Creek. In addition, under existing conditions, Del Puerto Creek and Ingram Creek experience extended dry periods each year, with minimal surface flow. Most flow contributions during dry years result from agricultural return flows and operational spills, which are expected to remain unchanged under all Action Alternatives. In wet years, natural runoff may reach the lower reaches of Del Puerto Creek and potentially contribute flow to the San Joaquin River; however, flow contributions to the San Joaquin River are anticipated to be negligible (estimated at 0.073 percent of the river flows) and would not significantly differ between Alternative 1 and the Action Alternatives.

The focus on CVP/SWP Delta operations stems from the conclusion that the Action Alternatives would also have a minimal effect on water exports from the Delta because the flow contributions from the Action Alternatives to both the Delta and the San Joaquin River are extremely small, representing only a very minor percentage of total river flow.

Because the Action Alternatives would be consistent with the Coordinated Operations Agreement and would only have a minimal effect on existing CVP/SWP Delta pumping operations, the impact analysis does not evaluate changes to reservoirs or conveyance facilities within the CVP system upstream or exports downstream of the Action Alternatives.

Overall, the Action Alternatives would work alongside the Coordinated Operations Agreement, developing water storage downstream of Jones Pumping Plant and allowing management of CVP supplies. Thus, there would be no adverse effects on the Delta or areas upstream of the Delta.

3.5.3.2 Environmental Protection Measures

The Environmental Protection Measure (EPM) for aquatic biological resources is described below. This EPM is only applicable to Alternatives 2-4 because Alternative 5 would not have an effect on spawning gravels in the San Joaquin River.

33 **BIO-FISH-1: Spawning Gravel Monitoring and Mitigation.**

For action alternatives affecting Del Puerto Creek, a spawning gravel mitigation and monitoring plan shall be developed and implemented by the Project Sponsors to address potential impacts on white sturgeon spawning habitat in the San Joaquin River. The goal of the plan will be to ensure no long-term deficits in the supply of gravel from Del Puerto Creek to the San Joaquin River. The plan shall include pre- and post-project measurements of bedload transport rates, channel morphology, and bed composition in lower Del Puerto Creek and an implementation plan for augmenting gravel in this reach if monitoring detects a significant reduction in gravel loads to the San Joaquin River.

The purpose of pre-project monitoring would be to define baseline bedload transport rates and channel and bed characteristics prior to dam construction and operation. These measurements would serve as a reference point for evaluating changes in the sediment budget of lower Del Puerto Creek following dam construction. Existing modeling results of the sediment transport capacity of Del Puerto Creek near the proposed dam site and near its confluence with the San Joaquin River would be used to establish initial estimates of gravel transport loads associated with the proposed environmental flow releases (≥ 500 cubic feet per second [cfs]) (Woodard & Curran 2019). These estimates would be used in combination with pre- and post-Project measurements of sediment transport and channel and bed characteristics to evaluate changes in the supply of gravel to the San Joaquin River.

A professional geomorphologist shall develop a detailed geomorphic monitoring and assessment plan that will be included as part of the mitigation and monitoring plan. Key components of the plan will include a statement of the goals and objectives, pre-project surveys to establish sediment transport and channel monitoring stations, and a detailed description of the sampling design and pre- and post-project monitoring and assessment methods. The number and location of monitoring stations shall be sufficient to characterize pre- and post-project trends in gravel inputs, storage, and outputs in lower Del Puerto Creek as well as associated changes in channel form (e.g., cross sections) and size composition of the bed material.

The need for post-project gravel augmentation will be based on the detection of significant changes in gravel transport loads, channel form, and bed composition in lower Del Puerto Creek. Because the proposed environmental flow releases are expected to maintain the sediment transport capacity of the creek, any major deficits in the supply of gravel to the channel downstream of the dam would be expected to result in reductions in gravel transport loads and potential changes in channel and bed characteristics such as bed incision, bank widening, and bed coarsening. The following criteria are proposed as thresholds to determine substantial sediment deficits and the need for gravel augmentation:

- Post-project measurements of gravel transport loads during peak flow releases indicate that loads have been substantially reduced (> 10 percent) relative to pre-project levels,
- A comparison of pre- and post-project channel characteristics (bed elevations, channel widths, and slopes) indicates a substantial change (> 10 percent) in channel morphology associated with a sediment deficit, and

- A comparison of pre- and post-project bed composition measurements indicates a substantial reduction (> 10 percent) in the amount of gravel (2- to 64-millimeter diameter) available for transport in the active channel of lower Del Puerto Creek.

Because the frequency of monitoring will be dictated by the frequency of major flow events and environmental releases, sediment and channel monitoring will be conducted over a sufficient period to encompass at least three major flow events (≥ 500 cfs) during the post-project monitoring period. Repeated measurements of sediment and channel characteristics over a number of years are necessary to detect major shifts in the sediment regime amid the variability in scour and fill dynamics that may occur over shorter time frames. Although it would be ideal to monitor an equal number of pre-project events, this will most likely not be possible because of the limited time frame before implementation of the chosen Action Alternative. In this case, the modeled or estimated sediment transport capacity of the creek and the characterization of pre-project channel and bed characteristics will serve as the primary reference conditions for the post-project evaluation.

The spawning gravel mitigation and monitoring plan shall also include a description of the spawning gravel augmentation program that would be implemented if monitoring detects a significant reduction in the supply of gravel to the San Joaquin River. The plan will include a list of potential gravel sources (borrow or spoil sites),[1] a description of the methods for determining the locations of gravel placement sites, a description of the monitoring methods that will be used to ensure the effectiveness of mitigation, and a description of the implementation schedule, agency coordination requirements, funding commitments, reporting, and regulatory/permitting requirements of the program.

3.5.3.3 Alternative 1 (No Action)

Under Alternative 1, it is expected that the hydrology would remain similar to existing conditions. No effects on aquatic biological resources are expected and there would be no refuge water supply benefits, as described in Section 3.10, *Hydrology and Water Quality*, of this EIS.

3.5.3.4 Alternative 2 (DPCR 82-TAF)

Substantial Adverse Effect on Candidate, Sensitive, or Special-Status Species. Construction and operation of Alternative 2 could result in adverse effects to aquatic biological resources as compared to Alternative 1.

Construction. Alternative 2 could result in temporary, localized construction-related effects on fish resources, including special-status fish species. Construction activities that have the potential to impact fish and aquatic habitat include:

- Excavation, grading, and vegetation removal;
- Vehicle, equipment, and materials staging and storage;
- Road relocation, including culvert and bridge construction;
- Site preparation, including installation and operation of a piped bypass for creek diversion;

[1] Existing sites include the spoil site that is currently used for ongoing channel maintenance activities in Del Puerto Creek (DWR 2015).

- Main and saddle dam construction, including the main dam spillway, inlet/outlet works, foundation, and embankment;
- Conveyance facilities construction, including pipeline, intake/outfall structure, and pumping plant construction; and
- Site restoration.

Potential construction-related impacts on fish resources include direct harm to individuals; erosion, sedimentation, and turbidity from releases into Del Puerto Creek; exposure to hazardous materials and chemicals from releases into Del Puerto Creek; physical and visual disturbance; and habitat modification at Del Puerto Creek or the lower San Joaquin River. The potential for these impacts to occur and the magnitude of their effects would depend on the proximity of construction disturbance areas to waterways; the extent, timing, and duration of construction activities; the specific construction methods used; and the specific EPMs implemented to avoid or minimize impacts.

Direct Harm. Construction that occurs in or adjacent to stream channels where surface water is present could result in direct injury or mortality for fish. Potential mechanisms include fish being impinged or crushed by vehicles or equipment operating in the stream channel or fish being stranded or entrained in pumps during dewatering of the stream channel. However, the potential for direct harm would be avoided or minimized by connecting Del Puerto Creek to temporary stream diversion structures (e.g., bypass pipes) during the dry season (Chapter 2, *Description of Alternatives*), which would prevent fish from being exposed to in-channel activities during construction.

Erosion, Sedimentation, and Turbidity. Construction activities that disturb soil and sediments in stream channels, riparian zones, and adjacent upland areas can increase erosion and mobilization of sediments, potentially resulting in increased turbidity and suspended sediment in streams. Potential impacts on fish and aquatic habitat include physiological and behavioral effects on fish and reductions in habitat quality and prey resources (aquatic invertebrates) from increased turbidity and sedimentation. All construction activities that occur in or adjacent to stream channels (e.g., excavation, grading, and vegetation removal) have the potential to cause erosion and contribute sediment to Del Puerto Creek and its tributaries. However, with implementation of standard construction best management practices (BMPs) and sediment and the erosion BMPs that would be required as part of the Stormwater Pollution Prevention Plan (Section 2.4.7), potential impacts on fish and aquatic habitat would be minimized.

Hazardous Materials and Chemicals. Hazardous materials and chemicals such as gasoline, engine oil, lubricants, or other fluids used during construction and maintenance activities could enter stream channels through seepage, leaks, or accidental spills. An accidental discharge of hazardous materials and chemicals could harm fish that may be present in the immediate vicinity or downstream of construction activities. However, with implementation of standard construction BMPs and other pollution prevention and control BMPs that would be required as part of the Stormwater Pollution Prevention Plan (Section 2.4.7), potential impacts on fish and aquatic habitat would be minimized.

Physical and Visual Disturbance. Construction noise, vibrations, artificial light, and other physical disturbances can harass fish, disrupt normal activities (e.g., feeding), cause fish to move into lower-quality habitats, and increase exposure or vulnerability to predators. However, potential exposure of fish to such disturbances would be minimized by bypassing streamflow around construction areas.

Habitat Modification. Construction of Alternative 2 would result in modifications to stream habitat from channel disturbance, vegetation removal, and dewatering. Channel disturbance, including installation and operation of stream diversions, would temporarily reduce the amount of stream area available to fish. Temporary impacts would occur along approximately 1.6 linear miles of ephemeral stream channels within the construction limits of Alternative 2. Generally, such losses would result in impacts on physical habitat, food production, cover, channel complexity, and flow continuity between upstream and downstream reaches. Similar to habitat quality in lower Del Puerto Creek, the habitat quality in the channel within the dam and spillway construction area is low because the channel is dry much of the year and generally lacks complexity (e.g., pools) or cover. The losses would not substantially affect the overall quantity and quality of habitat available to native fish because of the small proportion of channel area affected, the low quality of habitat within the construction areas, and the maintenance of streamflow to downstream reaches from the inlet/outlet tunnel.

Operation – Del Puerto Creek Operation of Alternative 2 could result in permanent impacts on fish resources in Del Puerto Creek. Potential impacts from operations include the permanent loss of aquatic habitat within the footprints of facilities, permanent modification of aquatic habitat within the reservoir inundation area, and potential flow-related effects on aquatic habitat in lower Del Puerto Creek and the San Joaquin River. Operations are also evaluated for impacts on special-status fish in the Delta.

Habitat Loss or Modification: Inundation Area. As shown in **Table 3.5-2**, The proposed dam and ancillary structures would result in the permanent loss of approximately 0.38 linear miles of Del Puerto Creek. The proposed roadway and utility relocations would result in the permanent loss of approximately 0.01 linear miles of intermittent stream channels and 0.04 linear miles of ephemeral stream channels that connect to Del Puerto Creek. These losses would not substantially affect the overall quantity and quality of habitat due to the small channel area and low quality of the habitat within these areas. Habitat quality is low because the channels are dry much of the year; in general, they lack physical complexity (e.g., pools), as well as instream and overhead cover. No impacts are expected to occur within the tributary channels because of the ephemeral nature of these drainages and thus the inability to support fish populations.

Table 3.5-2: Impacts on Aquatic Resources under Alternative 2

Feature Type	Permanent Impacts (linear miles)	Temporary Impacts (linear miles)	Inundation Impacts (linear miles)	Total Impacts (linear miles)
Del Puerto Creek	0.38	—	3.93	4.31
Ephemeral Stream	0.04	1.60	—	1.64
Intermittent Stream	0.01	0.07	—	0.08
Total	**0.43**	**1.67**	**3.93**	**6.03**

Filling and operation of the reservoir would result in permanent modification of aquatic habitat by replacing intermittent and ephemeral stream habitat above the dam with a permanent body of water that would be subject to fluctuations in volume, depth, and surface area. The reservoir would permanently inundate approximately 4 miles of Del Puerto Creek, resulting in the loss of isolated stream segments and pools that potentially support native fish through the summer, based on the presence of juvenile suckers and pikeminnows in July 2019. Although fish stocking is not planned and would not be allowed, the potential exists for future introductions of nonnative species through

the transfer of water or accidental or deliberate introductions. The reservoir is likely to provide suitable habitat for the native Sacramento pikeminnow and Sacramento sucker, which both have established populations within Del Puerto Creek and persist in reservoirs. Nonnative predatory fish that are accidentally or deliberately introduced to the reservoir may pose a competitive and predatory threat to native species in the reservoir. Although existing stream habitat within the upper reservoir inundation area would be lost, native fish populations would be expected to continue to persist in Del Puerto Creek.

Habitat Loss or Modification: Downstream Effects. Proposed dam and reservoir operations could also adversely affect downstream fish resources by altering the amount and timing of flows to the San Joaquin River. Although Del Puerto Creek contributes minimally to the San Joaquin River's overall flow and lacks habitat for anadromous fish, it plays an important role in sediment transport, especially gravel, which is critical for white sturgeon spawning habitat in the San Joaquin River in the vicinity of the Del Puerto Creek confluence. CalSim modeling of existing conditions, based on historic hydrology from 1921 to 2003, shows that average annual San Joaquin River flow is 3,137 thousand acre-feet (TAF), while average annual Del Puerto Creek flow into the San Joaquin River is 2.1 TAF (0.0669 percent of San Joaquin River flow). Under Alternative 2, average annual Del Puerto Creek flows in the San Joaquin River would decrease to about 0.4 TAF.

During operation of Alternative 2, major flow events in Del Puerto Creek would continue to occur downstream of the proposed dam. These environmental flow requirements include operation of the dam to bypass major flow events in a pattern that preserves key components of the peak flow events (Chapter 2, *Description of Alternatives*).

Del Puerto Creek is very likely the primary source of gravels suitable for spawning in the lower San Joaquin River. (Marineau et al. 2017). Therefore, the environmental release rules for Alternative 2 aim to maintain periodic peak flow events that mobilize gravel-sized sediment, which is a critical component of white sturgeon spawning habitat in the San Joaquin River. Flows of 500 cfs[1] or more will be released from the reservoir but with a gradual reduction over 6 days to mimic natural flow patterns. These flows will help transport gravel, reduce contaminants, support native species, and eliminate non-native species. Although Del Puerto Creek contributes a small fraction of the San Joaquin River's flow, preservation of these flows would continue to support the flow management goals and objectives of ongoing species recovery and habitat restoration programs for the San Joaquin River (e.g., San Joaquin River Restoration Program).

The proposed dam and reservoir on Del Puerto Creek under Alternative 2 could trap coarse sediment (e.g., gravel) that currently flows into the lower San Joaquin River. This gravel very likely serves an important role in maintaining potential spawning habitat for white sturgeon (Marineau et al. 2017). Although it is unclear how much of the gravel comes from above or below the proposed dam site, if the proposed dam reduces the gravel supply, this would be considered a substantial adverse effect. Implementation of BIO-FISH-1, Spawning Gravel Monitoring and Mitigation, would ensure no long-term deficits in the supply of gravel from Del Puerto Creek to the San Joaquin River.

Reservoirs can also alter water temperature, dissolved oxygen (DO) levels, and other physical and chemical properties of the water released into receiving streams, which can affect the natural flow

[1] Based on historical daily flows measured at the Del Puerto Creek gauging station (U.S. Geological Survey 11274630); there were 12 peak flow events of 500 cfs or more during the 55-year historical flow record.

of sediment and nutrients downstream (Spence et al. 1996). In general, reservoirs increase the water surface area as well as the heating of surface waters; depending on the withdrawal depth, this can raise temperatures downstream. However, most water would be released from the proposed reservoir during colder months when temperatures are lower, which would reduce adverse effects related to water temperature and DO levels in Del Puerto Creek. In addition, as discussed in Section 3.10, *Hydrology and Water Quality*, reservoirs can also exhibit conditions conducive to harmful algal blooms (HABs), which occur when toxic cyanobacteria grow rapidly. If HABs occur in the reservoir, they could cause injury or mortality for fish populations in aquatic habitats in several ways, including an increase in toxins and the consumption of DO, which can lead to hypoxic conditions downstream (U.S. Environmental Protection Agency 2025). If HABs do occur, they would be temporary and seasonal and would degrade over time. In addition, the reservoir management plan, described in Section 2.4.2.1, would provide effective early warning of the potential occurrence of algal blooms in the reservoir and ensure algal blooms would not be exported from the reservoir. However, if HABs are transported downstream, this would be considered a substantial adverse effect.

Operation – Delta. A spreadsheet tool, using CalSim 3 data, was developed for Alternative 2 and used to evaluate Delta outflow resulting from Alternative 2's storage and use of Delta and Del Puerto Creek flows (see Appendix J). Modeling shows that Alternative 2 operations would not affect outflow in the Delta or export rates at CVP or SWP facilities above the 5 percent threshold. Modeling shows operation of Alternative 2 would not affect water temperature in the Delta. Since modeled changes to the San Joaquin River and Delta are below the 5% threshold, operation of Alternative 2 will not impact San Joaquin River flows or any life stage of aquatic species including delta smelt, longfin smelt, Chinook salmon, Central Valley steelhead, or green sturgeon compared to Alternative 1.

Operation – Refuges. Releasing water into wildlife refuges revitalizes wetland habitats and the complex ecosystems that depend on them, especially during critical periods like droughts. The increased availability of water to wildlife refuges leads to improved water quality and healthy food webs, supporting diverse food supplies that can in turn provide food to fish and other aquatic-dependent species, including native fish species (e.g., Chinook salmon, steelhead, sturgeon) that migrate, spawn, and/or rear in the San Joaquin River to which these wetlands ultimately drain to. Under Alternative 2, average annual refuge water supply would increase by 21,100 acre-feet per year compared to Alternative 1 and refuge water supply increases would be realized in all water-year types, as shown in **Table 3.10-6** of Section 3.10, *Hydrology and Water Quality*, of this EIS.

Conclusion. As discussed previously, BMPs would be implemented as part of Alternative 2 to avoid impacts on Del Puerto Creek that could affect fish. Permanent loss of habitat from Del Puerto Creek inundation would not result in adverse effects due to the limited quantity and quality of existing habitat for native fish in the inundation area and the presence of suitable habitat in upper Del Puerto Creek. Peak flows below the dam would not be substantially altered because of the environmental commitment to preserve peak flow events and support the habitat needs of native fish species. However, the proposed dam and reservoir could have a long-term impact on the supply of coarse-grained sediment to the San Joaquin River, resulting in the potential for adverse effects on white sturgeon spawning habitat. Implementation of BIO-FISH-1 would reduce the potential for adverse effects on white sturgeon spawning habitat by augmenting gravel supplies as necessary to maintain existing contributions of gravel to the San Joaquin River. Under Alternative 2, refuge water supply would be maximized and would occur in all water-year types.

Interference with the Movement of Native Resident or Migratory Fish or Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites. Channel dewatering and the diversion of Del Puerto Creek at the Alternative 2 Project site during construction would result in adverse effects to fish movement when compared to Alternative 1. However, given the presence of existing fish passage impediments, the poor quality of existing habitat, and low utilization of lower Del Puerto Creek by native fish, this does not pose a substantial threat to native fish populations, which are maintained largely by watershed and stream conditions above the dam site. The proposed saddle dams would not pose barriers to fish movement because of the ephemeral nature of construction and lack of suitable habitat for fish in the affected stream channels.

Once completed, Alternative 2's infrastructure on Del Puerto Creek would create a permanent barrier to fish migration but would most likely not have a substantial effect on native fish populations for the reasons stated above. Del Puerto Creek does not provide spawning or rearing habitat for anadromous fish.

During operation of Alternative 2, sediment would most likely be deposited in the upper reaches of the reservoir, potentially creating a migration barrier for fish. Reservoirs cause reductions in stream energy where streams enter the upper reaches of reservoirs, causing sediment to settle and form a delta. If the reservoir's water level fluctuates, these deltas could become exposed, further blocking fish migration. However, because native fish populations are supported primarily by habitats above the reservoir, the lack of fish passage between the reservoir and upper Del Puerto Creek is not expected to harm these populations. In addition, because of the presence of suitable habitat for maintaining existing native fish populations above the reservoir inundation area, the lack of fish passage between the reservoir and upper Del Puerto Creek would not be critical for maintaining these populations.

3.5.3.5 Alternative 3 (Limited Action)

Construction and operation of a reservoir under Alternative 3 would result in adverse effects as compared to Alternative 1; Alternative 3 would result in similar effects as compared to Alternative 2. However, under Alternative 3, Reclamation would not participate as a funding partner and there would be no water supply allocated to refuges. Alternative 3 would result in reduction in flows on Del Puerto Creek, but this would represent a minimal change to San Joaquin River flows. Potential impacts due to construction and operation would be similar to those described under Alternative 2; however, there would be no refuge water supply benefits. Permanent impacts on Del Puerto Creek and the intermittent and ephemeral drainages that connect to Del Puerto Creek would be the same as those under Alternative 2.

3.5.3.6 Alternative 4 (DPCR 40-TAF)

Construction and operation of a smaller reservoir under Alternative 4 would result in adverse effects as compared to Alternative 1; however, Alternative 4 would result in similar or lesser effects as compared to Alternative 2.

Substantial Adverse Effect on Candidate, Sensitive, or Special-Status Species. Under Alternative 4, construction activities would result in adverse effects to fish resources, including direct harm to fish, erosion, sedimentation, turbidity, hazardous material exposure, and disturbance. Adverse effects would be greater under Alternative 4 when compared to Alternative 1; however, temporary habitat modification under Alternative 4 would be slightly less than that described for Alternative 2 due to the smaller footprint of the dam and reservoir under Alternative 4. As such, temporary impacts

to the intermittent stream channel (Del Puerto Creek) within the construction limits of the proposed dam and spillway under Alternative 4 would be less than Alternative 2. In addition, under Alternative 4, potential impacts during operation would be similar to those of Alternative 2. However, the extent of impacts on aquatic habitat under Alternative 4 would be less than that of Alternative 2 due to the smaller dam and smaller reservoir inundation area.

As shown in **Table 3.5-3**, filling of the reservoir under Alternative 4 would result in a permanent loss of approximately 3 miles of Del Puerto Creek. The permanent loss of intermittent and ephemeral channels from proposed roadway and utility relocations would be the same as under Alternative 2. In addition, in the Delta, Alternative 4 would divert less water, resulting in lower export rates at CVP or SWP facilities. In the San Joaquin River, Alternative 4 would utilize flows from Del Puerto Creek, similar to Alternative 2.

Table 3.5-3: Impacts on Aquatic Resources under Alternative 4

Feature Type	Permanent Impacts (linear miles)	Temporary Impacts (linear miles)	Inundation Impacts (linear miles)	Total Impacts (linear miles)
Del Puerto Creek	0.11	—	3.01	3.12
Ephemeral Stream	0.04	1.60	—	1.64
Intermittent Stream	0.01	0.07	—	0.08
Total	**0.16**	**1.67**	**3.01**	**4.84**

As detailed in Section 3.10, *Hydrology*, modeling conducted for Alternative 2 showed negligible impacts to downstream flows, with reductions in Del Puerto Creek flows occurring primarily during wet weather events. Given its smaller reservoir footprint, Alternative 4 is expected to have less influence on downstream flows than Alternative 2. As such, flows under Alternative 4 are not expected to affect outflow or water temperatures in the San Joaquin River and the Delta due to the Del Puerto Creek's limited contribution to flows in both the San Joaquin River and the Delta. As such, no adverse effects on fish species in the Delta or San Joaquin River are anticipated.

Flow-related effects on aquatic habitat would be similar to those of Alternative 2, with major flows still released to meet CVP Settlement contracts and other legal requirements (detailed in Section 1.1.1 of Chapter 1, *Introduction*, of this EIS), thereby minimizing adverse effects due to changes in flows in Del Puerto Creek, the San Joaquin River, and the Delta. Potential reductions in the gravel supply to the San Joaquin River, which would affect white sturgeon spawning habitat, would be similar to those under Alternative 2. Implementation of BIO-FISH-1, Spawning Gravel Monitoring and Mitigation, would ensure no long-term deficits in the supply of gravel from Del Puerto Creek to the San Joaquin River.

Because Alternative 4 provides a smaller reservoir footprint than Alternative 2, the volume of water allocated to refuges would be approximately half the amount allocated under Alternative 2. As such, compared to Alternative 1, average annual refuge water supply would likely increase by approximately 10,300 acre-feet per year under Alternative 4. Both Alternative 2 and Alternative 4 would improve water supply reliability for refuges compared to the No Action Alternative; however, Alternative 2 would provide greater operational flexibility and support for refuges, particularly during dry years.

Interference with the Movement of Native Resident or Migratory Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites. Channel dewatering and diversion of Del Puerto Creek around the dam construction site would preclude movements of fish during the construction period, and the proposed dam on Del Puerto Creek would create a permanent barrier to fish migration but would most likely not have a substantial effect on native fish populations for the same reasons stated above for Alternative 2.

3.5.3.7 Alternative 5 (Ingram Canyon)

Construction and operation of a reservoir under Alternative 5 would result in adverse effects as compared to Alternative 1; Alternative 5 would result in similar effects as compared to Alternatives 2 through 4.

Substantial Adverse Effect on Candidate, Sensitive, or Special-Status Species. Under Alternative 5, construction and operational activities would result in temporary, localized impacts on fish resources. Potential impacts on fish resources include direct harm to individuals; erosion, sedimentation, and turbidity from releases into Ingram Creek; exposure to hazardous materials and chemicals from releases into Ingram Creek; and physical and visual disturbance. However, temporary habitat modification and the potential impacts during operation would be slightly less than those described for Alternative 2 because of the smaller footprint of the dam under Alternative 5.

As shown in **Table 3.5-4**, Alternative 5 would result in the permanent loss of approximately 3.38 linear miles of Ingram Creek, 1.19 linear miles of other intermittent streams, and 4.91 linear miles of ephemeral tributaries due to inundation. Ingram Creek is a highly intricate hydrological system, with extensive intermittent and ephemeral streams. In addition, the elongated shape of Alternative 5 affects a significantly greater linear footage of stream channels compared to Alternative 2. As a result, the permanent modification of aquatic habitat under Alternative 5 would be more extensive, despite its smaller storage capacity (40-TAF reservoir versus 82-TAF reservoir). This disparity in habitat loss is due to the differences in stream network complexity, as well as the surface area of the proposed reservoir. However, despite these differences, the affected aquatic habitat in the Ingram Creek study area is generally of lower quality and suitability for native fish due to Ingram Creek's highly variable flows and diminished water quality. As discussed previously, Ingram Creek has been included on the U.S. Environmental Protection Agency's Clean Water Act 303(d) list of exceedances of water quality objectives for sediment toxicity associated with pyrethroids (SWRCB 2019). Water quality monitoring at River Road and Highway 33 has also revealed multiple contaminant exceedances, including elevated E. coli levels. In addition, Ingram Creek contains fewer isolated pools and wetland features than Del Puerto Creek.

Table 3.5-4: Impacts on Aquatic Resources under Alternative 5

Feature Type	Permanent Impacts (linear miles)	Temporary Impacts (linear miles)	Inundation Impacts (linear miles)	Total Impacts (linear miles)
Ingram Creek	0.61	1.19	2.77	4.57
Ephemeral Stream	—	1.61	4.91	6.52
Intermittent Stream	—	—	1.19	1.19
Total	**0.61**	**2.80**	**8.87**	**12.28**

Under Alternative 5, the majority of Ingram Creek flows would be captured, with flow reductions occurring primarily during wet weather events. Water would be stored from the DMC and Ingram Creek, then released back to the DMC for delivery to Project Sponsors. Compared to Alternative 1, Alternative 5 would result in adverse effects due to flow reductions in Ingram Creek; however, these effects are anticipated to be less than those under the other Action Alternatives due to the reduced reservoir size and smaller upstream watershed at Ingram Creek (11,160 acres vs. 46,499 acres). With implementation of construction-related BMPs, adverse effects on fish and aquatic habitat in lower Ingram Creek would be minimized under Alternative 5.

As described above, modeling conducted for Alternative 2 showed negligible impacts to downstream flows, with reductions in Del Puerto Creek flows occurring primarily during wet weather events. While modeling was not performed for Alternative 5, it is anticipated that reductions in Ingram Creek flows would likely occur at a smaller magnitude but with similar timing to Del Puerto Creek (i.e. primarily during wet weather events). As such, Alternative 5 is expected to have negligible effects on flows to the San Joaquin River and Delta and would not require new infrastructure or modifications to CVP facilities other than the turnout on the DMC that would be constructed as part of this Alternative. Because Alternative 5 would have negligible effects on downstream flows in Ingram Creek, flow-related effects on aquatic habitat due to downstream water temperature and DO levels under Alternative 5 are not anticipated. Major flows would still be released to meet CVP Settlement contracts and other legal requirements.

In addition, unlike Del Puerto Creek, Ingram Creek has not been identified as a major contributor of coarse sediment to the San Joaquin River (Marineau et al. 2017). Further, a review of aerial photographs (Google 2025) shows that the lower 2.25 miles of Ingram Creek flows through the San Joaquin River National Wildlife Refuge, an area where the channel is characterized by extensive low-gradient reaches with abundant riparian vegetation and joins Hospital Creek and a relict dry channel of the San Joaquin River before flowing to the river. The relatively flat and abundant riparian vegetation suggest that any coarse sediment transported in Ingram Creek is most likely deposited in these floodplain habitats before reaching the San Joaquin River. Therefore, operation of the dam and reservoir under Alternative 5 is not likely to have an adverse effect on potential white sturgeon spawning habitat in the San Joaquin River due to the capture of coarse sediments by the dam and reservoir.

Alternative 5 would also provide additional water for refuges compared to Alternative 1. Annual refuge water supply would likely increase by approximately 10,300 acre-feet per year under Alternative 5, which would be well below the 21,100 acre-feet per year increase projected for Alternative 2.

Adverse effects would occur under Alternative 5 when compared to Alternative 1 due to the permanent loss of fish and aquatic habitat within the inundation area of the proposed reservoir. While Ingram Creek's complex hydrologic system may suggest a higher potential for ecological impacts, the Alternative 5 Project site contains less suitable habitat for native fish than the Alternative 2 Project site. In addition, anticipated flow-related effects, such as changes in water temperature and DO, are expected to be negligible in lower Ingram Creek due to the minimal reductions in flow and the implementation of construction-related BMPs. As a result, adverse effects under Alternative 5 would be less than those under Alternative 2.

Interference with the Movement of Native Resident or Migratory Fish or Wildlife Species, or Established Native Resident or Migratory Wildlife Corridors, or Use of Native Wildlife Nursery Sites. Adverse effects to fish movement during construction or operation of Alternative 5 would be greater than Alternative 1; however, adverse effects to fish movement would be similar to Alternatives 2 through 4. Channel dewatering and the diversion of Ingram Creek around the dam construction site would preclude the movement of fish during the construction period. However, given the presence of existing fish passage impediments, the poor quality of existing habitat, and low utilization of lower Ingram Creek by native fish, construction of the dam and reservoir would not pose a substantial threat to native fish populations. Furthermore, fish passage between the reservoir and upper Ingram Creek would not be critical for maintaining fish populations in Ingram Creek for the same reasons stated for Alternative 2.

3.6 Cultural Resources

3.6.1 Affected Environment

This section describes the affected environment for cultural resources related to the Del Puerto Canyon Reservoir Project (Project) within the study areas of the Action Alternatives (Alternatives 2–5). Title 54 United States Code [USC] §306108, commonly known as Section 106 of the National Historic Preservation Act, and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800 requires the federal government to take into consideration the effects of their action on historic properties. The term *historic property*, as defined in the National Historic Preservation Act (NHPA) (54 USC §300308), refers to any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (National Register, or NRHP), including artifacts, records, and material remains related to such a property or resource." The term historic property also includes National Historic Landmarks (NHLs) as well as properties of traditional religious and cultural importance to tribes that meet National Register criteria. Historic property is a term used to describe both "archaeological sites," depicting evidence of past human use of the landscape through material culture, and architectural or "built-environment" resources, as represented in buildings, structures such as dams and roadways, and objects such as monuments.

This section is based on the *Cultural Resources Inventory and Evaluation Report of the Del Puerto Reservoir Project, Stanislaus County, California* (ICF 2025), the *Cultural Resources Record Search and Literature Review for Ingram Canyon Reservoir Alternative* (ICF 2020); and Appendix E, *Regulatory Setting*.

3.6.1.1 Cultural Setting

Prehistoric Context. In the late 19th and early 20th centuries, knowledge of Delta prehistory was based largely on amateur collections, which laid the foundation for a three-phase chronological model of central California prehistory. Professional archaeology in the 1920s–30s refined this model into Early, Transitional (Middle), and Late horizons, based on artifacts and burial practices. This evolved into the Central California Taxonomic System (CCTS), which categorized cultural traits over time.

Later research introduced absolute dating and revealed that some cultural phases were contemporaneous, prompting a shift from chronological to functional classifications. This approach was advanced by Fredrickson, who used the term pattern to describe an "adaptive mode extending across one or more regions, characterized by particular technological skills and devices, and particular economic modes." Three patterns were introduced: Windmiller, Berkeley, and Augustine. These patterns, while generally corresponding to the Early, Middle, and Late horizons within the Central Valley, were conceptually different and free of spatial and temporal constraints. However, both models relied heavily on large village sites, limiting understanding of broader economic systems. More research is needed at smaller, less permanent sites.

The taxonomic framework of the Sacramento Valley has been described in the following sections in terms of archaeological patterns, following Fredrickson's system. A pattern is a general mode of life characterized archaeologically by technology, particular artifacts, economic systems, trade, burial practices, and other aspects of culture. Fredrickson's periods are also employed in the discussion of

Paleoindian (12,000–8000 BP), Lower Archaic (8000–5000 BP), Middle Archaic (5000–2500 BP), Upper Archaic (2500–950 BP), Lower Emergent (950–450 BP), and Upper Emergent (450–150 BP) (White et al. 2002: Figure 15). In Fredrickson's use, periods served as arbitrary intervals that could be used to compare patterns over space and time. Only with the clear identification of pervasive temporal patterns would periods acquire specific archaeological meaning (ICF 2025).

Terminal Pleistocene and Early Holocene: 13,500–7000 BP. At the end of the Pleistocene (circa 13,500–10,500 BP), the Central Valley served as a key travel corridor for humans and animals, though archaeological evidence from this period is scarce—likely due to deep sediment burial. Some early artifacts, such as those from the Farmington Complex near the Mokelumne River, suggest human presence, but recent studies question whether these remains are truly from the Pleistocene or from later Holocene deposits.

Early inhabitants hunted large Pleistocene mammals, similar to others in western North America. Environmental changes also transformed the landscape, replacing pine forests with modern vegetation and forming the Delta marshes. To survive without large game, people had to change their food procurement strategies to make use of a more diverse range of smaller plants and animals (ICF 2025).

Middle to Late Holocene: 7000–1200 BP. Using a wider range of smaller resources meant people had to have access to larger areas of land to hunt and collect the food and other resources they needed. Small groups of people probably moved through the valley, foothills, and Sierra Nevada to take advantage of seasonally available resources and resources limited to particular ecozones. This mobile foraging strategy was essential to their survival.

As large game became scarce after the Pleistocene, early Central Valley inhabitants adopted a mobile foraging lifestyle, relying on a wide range of smaller, seasonal resources. This required access to large territories and the development of specialized tools. Around 6000 BP, during the Lower Archaic Period, increasing population pressures led to a shift toward more intensive and localized resource use.

This transition is reflected in the Windmiller Pattern (ca. 4500–2800 BP), which shows a mixed economy of hunting, fishing, and plant gathering, including acorns. Windmiller sites, often located near rivers, suggest semi-sedentary lifestyles with formal cemeteries and rich grave goods. These communities adapted to riverine and wetland environments and engaged in regional trade.

As populations continued to grow, the Berkeley Pattern (ca. 3500–2500 BP) emerged, marked by more permanent settlements, deeper midden deposits, and increased reliance on acorns. Technological innovations included mortars and pestles, improved fishing tools, and a more developed bone industry.

Burial practices shifted toward flexed positions with fewer grave goods, and trade networks expanded to support more specialized economies. Transported resources and commodities became more visible in the archaeological record. It is possibly in this period where we begin to see evidence of seasonal cultural use in the Del Puerto Canyon study area. The bedrock mortars along Del Puerto Creek (P-50-000343, P-50-000344, P-50-000374, P-50-000375, DP-003, and DP-006) may have been used to process foods such as pine nuts and acorns (ICF 2025).

Late Holocene: 1200 BP to Historic Period. During the Late Horizon, in the Central Valley, particularly the Delta region, continued population growth and increasing territorial definition

resulted in some of the highest population densities in North America. This period was marked by ongoing trends of technological specialization, social complexity, and regional exchange. These developments culminated in the emergence of the Augustine Pattern around 1200 BP, which closely resembles the lifeways of historically documented Native Californian groups.

The Augustine Pattern reflects a shift in subsistence and land-use strategies, influenced in part by the southward migration of Wintuan populations into the Sacramento Valley. This pattern is characterized by a highly specialized economy with an intensified reliance on acorns, evidenced by the widespread use of shaped mortars, pestles, and hopper mortars. Material culture from this period includes flanged tubular smoking pipes, harpoons, clam shell disc beads, bone awls for basketry, whistles, stone pipes, and a distinctive baked clay industry featuring figurines and pottery vessels known as Cosumnes brownware. The presence of small projectile points, such as the Gunther Barbed series, indicates the use of the bow and arrow.

Social and ceremonial life also became more elaborate, with the development of social stratification, formalized mortuary rituals—including the burning of offerings in grave pits—and increased village permanence. Exchange networks expanded significantly, and a rudimentary monetary economy emerged, with shell beads serving as a standard medium of exchange. Burial practices during this time typically involved flexed interments with variable orientations and generally lacked grave goods, reflecting evolving cultural values and social structures (ICF 2025).

Ethnographic Context. The study areas were aboriginally inhabited by the Northern Valley Yokut, whose territory is bound by the crest of the Diablo Range to the west and the Sierra Nevada foothills to the east. The southern boundary is approximately where the San Joaquin River bends northward, and the northern boundary is roughly halfway between the Calaveras and Mokelumne Rivers.

The Northern Valley Yokut population is estimated to have ranged from 11,000 to over 31,000, with settlements concentrated along waterways, especially on the east side of the San Joaquin River. These communities were organized into 30 to 40 tribelets, each speaking its own dialect and governed by a headman. Villages were typically located on low mounds near rivers and included family dwellings, sweathouses, and ceremonial structures. The abundance of riverine resources supported a largely sedentary lifestyle.

Their subsistence strategy centered on fishing, waterfowl, small game, and plant foods like acorns and tule roots. Trade was vital for acquiring non-local goods such as obsidian, shell beads, and baskets, facilitated by overland trails and tule rafts.

European contact began in the late 1700s with Spanish exploration. The mission system disrupted Yokut culture through forced relocation, disease, and cultural assimilation. The Gold Rush further devastated the population through displacement, violence, and environmental changes. Many Yokut became laborers or were relocated to reservations like the Fresno and Tule River Reserves.

Today, the Northern Valley Yokut are descendants of these tribes, once numbering up to 35,000 across 63 groups. The Miumne, possibly the closest group to the region, ranged from the San Joaquin River to the Mount Diablo range. While a cultural representative exists, the Northern Valley Yokut do not appear to have a formally organized tribal government (ICF 2025).

Historic Context. Background research revealed several key themes that frame the historical context for the study areas: regional development, ranching and mining in Del Puerto Canyon, irrigation, and electrical transmission development.

European exploration began in 1806 with Gabriel Moraga. During the Mexican period, land was divided into ranchos, including Rancho Del Puerto, granted in 1844. After California became part of the U.S. in 1848, American settlement surged due to the Gold Rush. Early economic activity focused on cattle and sheep ranching, which later shifted to crop farming due to environmental challenges and legal changes like the "No Fence Law."

Stanislaus County was officially formed in 1854, and the arrival of the Central Pacific Railroad in 1870 spurred the growth of Modesto. John D. Patterson acquired Rancho Del Puerto in 1866, developing it into a major ranching operation. His heirs later founded the town of Patterson in 1908, promoting small-scale agriculture supported by irrigation infrastructure. By the early 20th century, irrigation transformed agriculture in the region, enabling diverse crop production. Mining in Del Puerto Canyon was briefly profitable between 1915 and 1920, after which grazing resumed.

Beginning in the 1920s, Pacific Gas & Electric (PG&E) expanded electrical infrastructure west of Patterson by acquiring regional power companies and constructing the Manteca-Salinas 110 kV transmission line, completed in 1926. After World War II, PG&E launched a major statewide expansion, which included building the Salado Substation in 1951 to support growing demand in the San Joaquin Valley.

In the 1970s, the transmission system was reconfigured to include the Tesla Substation, forming the Tesla-Salado-Manteca line. Additional infrastructure included the Tesla-Salado #1 115 kV line (built between 1951–1963) and the Quinto Switching Station-Westley 230 kV line (circa 1960), both serving the Patterson and Del Puerto Canyon areas.

Further expansion in the late 1960s added the Tesla-Los Banos #1 and Tracy-Los Banos 500 kV lines, which run parallel to earlier lines at the base of Del Puerto Canyon. The Tracy-Los Banos line, originally called Tesla-Los Banos #2, was rerouted through the Tracy Substation between 1987 and 1993.

The Central Valley Project (CVP) in 1933 and State Water Project (SWP) in 1960 presented additional changes to the study areas in the twentieth century. The CVP was launched by the Bureau of Reclamation (Reclamation). The CVP is a substantial system of large canals and reservoirs that moves surplus water from the Sacramento River to the San Joaquin region, providing agricultural and residential irrigation water.

Although the CVP was larger than any previous water project in California, it did not address all of California's water storage needs. Construction on the Feather River Project, later renamed the SWP, began in 1960. Built between 1960 and 1974, the California Aqueduct was designed and constructed as the main conduit for the system, running 444 miles from the Sacramento Delta to Riverside County. The California Aqueduct was completed by 1967. The California Aqueduct shares an intertie with the DMC, which helps control water between the CVP and the SWP (ICF 2025).

3.6.1.2 Study Area

Two study areas — the Del Puerto Canyon study area and the Ingram Canyon study area — were established to encompass the maximum possible area of direct and indirect effects on historic properties resulting from the Action Alternatives. This includes the inundation area, spillway, tie-ins to existing canals, access roads, relocated roadway, borrow areas, and all other elements of the Action Alternatives (ICF 2025).

The areas affected by the proposed Action Alternatives include the footprints for reservoir infrastructure, maximum inundation areas, areas where utilities may need to be relocated, and any areas of potential disturbance. The Del Puerto Canyon study area (see **Figure 3.6-1**) was established to identify cultural resources within the footprints of Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF) Project sites, and encompasses approximately 2,803 acres. The vertical study area for Del Puerto Canyon consists of the maximum aboveground and belowground extents of disturbance. The aboveground study area may extend 153 feet to account for main dam and saddle dam construction as well as utility relocation. However, the vertical study area for Del Puerto Canyon varies, depending on the nature and location of construction activities with depths up to 200 feet for construction of the spillway.

The Ingram Canyon study area (see **Figure 3.6-2**) was established for Alternative 5 (Ingram Canyon) and encompasses approximately 1,075 acres. The terrain within Ingram Canyon is characterized by steep to gentle rolling hills that empty into Ingram Creek. The study area may extend 153 feet aboveground and up to 200 feet below the ground surface to account for main dam and saddle dam construction, including construction of the spillway.

3.6.1.3 Issues of Environmental Concern

Issues of environmental concern for historic properties are adverse effects on such properties, including architectural built-environment historic resources as well as archaeological resources, and inadvertent disturbance of human remains.

3.6.1.4 Characterization

The effort to identify cultural resources and historic properties in the study areas for the Action Alternatives included multiple record searches; a review of the archaeological, ethnographic, and historical literature; consultation with the Native American Heritage Commission (NAHC) as well as Native American representatives from federally recognized tribes; correspondence with other interested parties; examination of historical maps and aerial imagery; archival research; and field surveys.

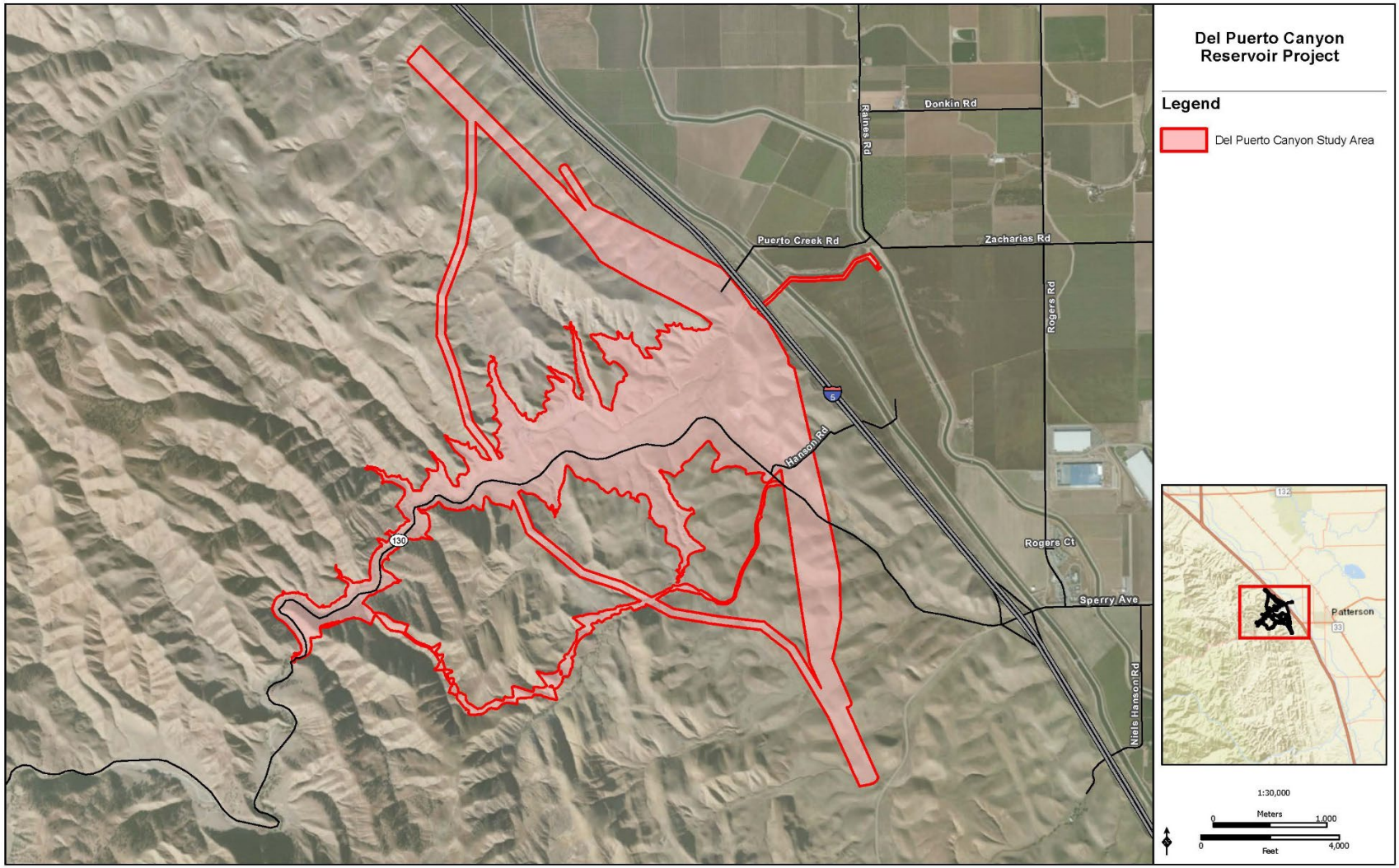

Figure 3.6-1: Del Puerto Canyon Study Area

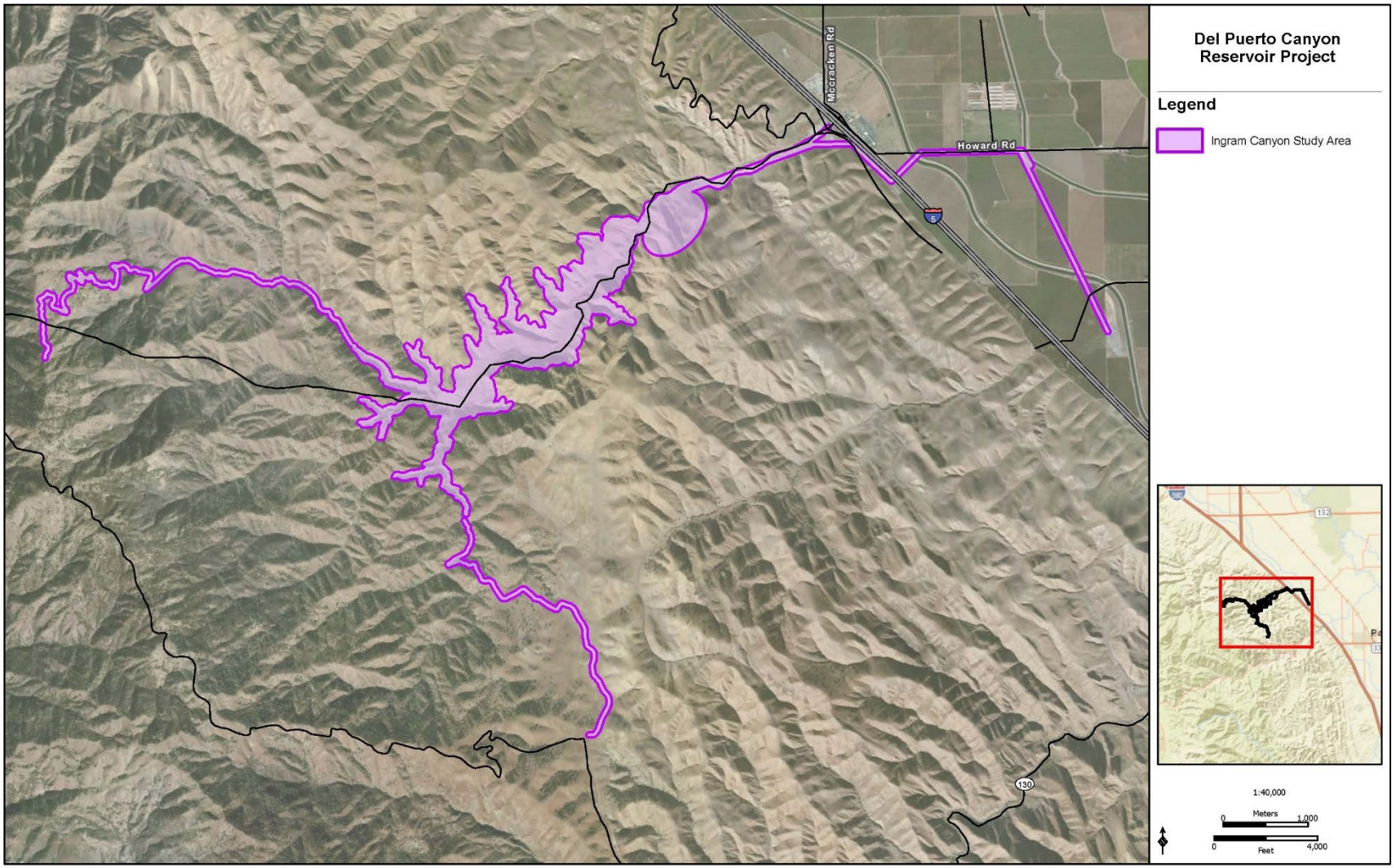

Figure 3.6-2: Ingram Canyon Study Area

Del Puerto Canyon Study Area

Native American Consultation. A Sacred Lands File (SLF) search request was submitted to the NAHC on June 5, 2019. The results, received on July 17, 2019, did not identify any sacred sites within the Del Puerto Canyon study area. Outreach to the Tule River Indian Tribe and Santa Rosa Rancheria Tachi-Yokut Tribe—identified as Indian tribes who may attach religious and cultural significance to historic properties within the Del Puerto Canyon study area—occurred between August 2, 2019, and November 6, 2019. The Southern Sierra Miwok Nation and Northern Valley Yokut-Ohlone Tribe was also contacted on August 2, 2019, requesting their assistance in identifying historic properties within the Del Puerto Canyon study area. Between November 1 and 12, 2019, the Santa Rosa Rancheria Tachi-Yokut Tribe and Northern Valley Yokut-Ohlone Tribe expressed concerns regarding cultural sites within the Del Puerto Canyon study area. On December 11, 2019, a site visit was conducted with the Santa Rosa Rancheria Tachi-Yokut Tribe and Northern Valley Yokut-Ohlone Tribe, resulting in the identification of an additional cultural resource with religious and cultural significance at archaeological site P-50-0374.

Records Search and Literature Review. A records search of the Del Puerto Canyon study area was conducted between April 9, 2019, and February 6, 2024, by staff at the Central California Information Center (CCIC) of the California Historical Resources Information System (CHRIS). The CCIC identified 16 cultural resources that have been previously recorded within a 0.25-mile radius of the Del Puerto Canyon study area. The previously recorded resources within the Del Puerto Canyon study area consist of prehistoric bedrock milling station and habitation sites, historic ranching sites, isolated machinery, railroad segments, canals, and aqueducts (2). Additional sources of information consulted include historic maps from the U.S. Geological Survey and General Land Office, the National Park Service's National Register of Historic Places Digital Archive website, Office of Historic Preservation's (OHP) Californian Historical Landmarks website, OHP's Historic Property Data File for Stanislaus County, and OHP's Archaeological Determinations of Eligibility for Stanislaus County. The OHP's Historic Property Data File for Stanislaus County identified one property within the study area.

Field Survey. Several field surveys were conducted of the study area between May 6, 2019, and March 27, 2025. The surveys consisted of a maximum 15-meter-wide transects. Attempts were made to revisit and update all previously recorded resources located within the Del Puerto Canyon study area. As a result of the field surveys, nine previously recorded archaeological sites, eight previously recorded built environment resources, and six newly recorded archaeological sites were identified. In September and October of 2019, six of the eight prehistoric sites identified within the study area were tested for subsurface deposits. Full details regarding identification efforts can be found in the Cultural Resources Inventory and Evaluation Report of the Del Puerto Reservoir Project (ICF 2025).

Ingram Canyon Study Area

Native American Consultation. If Alternative 5 is chosen, an SLF search request will be submitted to the NAHC in order to identify any sacred sites within the Ingram Canyon study area.

Record Search and Literature Review. A records search of the Ingram Canyon study area was conducted on March 11, 2020, and February 25, 2025, by staff members at the CCIC of the CHRIS. The CCIC identified six previously recorded cultural resources within a 0.25-mile radius of the Ingram Canyon study area. The previously recorded resources within the Ingram Canyon study area consist of

prehistoric bedrock milling stations and habitation sites, along with a historic-era refuse scatter, transmission lines, canals, and aqueducts. In addition, the records search also indicated that small portions of the Ingram Canyon study area had been previously studied; however, these studies were more than 17 years old and therefore not considered current.

Additional sources of information consulted include historic maps from the U.S. Geological Survey and General Land Office, the National Park Service's National Register of Historic Places Digital Archive website, OHP's Californian Historical Landmarks website, OHP's Historic Property Data File for Stanislaus County, and OHP's Archaeological Determinations of Eligibility for Stanislaus County. A review of previous studies, archival research, and field surveys conducted for Alternative 5 identified at least seven structures from the early 1900s; maps used in the literature search indicated historic habitation. The literature and background search indicated that the Ingram Canyon study area, primarily along Ingram Creek, had been inhabited as early as the 1920s. Remains of these structures and associated operations may still exist and could contain intact built-environment resources and/or archaeological components. The Cultural Resources Record Search and Literature Review for Ingram Canyon Reservoir Alternative are on file at the Reclamation Region 10, California, Great Basin office in Sacramento.

Field Surveys. A field survey was conducted in the Ingram Canyon study area on May 16, 2024. Ground-surface transects, a maximum of 10 feet wide, were closely inspected along public right-of-way segments on Howard Road, Ingram Creek Road, and the private driveways for the Ingram Canyon pipeline alignment. During the pedestrian survey, most of the public right-of-way segments were accessible and surveyed with good to poor surface visibility (5 to 70 percent). However, one small portion of the study area, located along Ingram Creek Road, could not be surveyed because of a locked gate, which prevented access to the western portion of the study area. No new evidence of prehistoric (i.e., Native American) and/or historic resources was encountered as a result of the intensive field survey. If Alternative 5 is chosen, additional cultural resource surveys would be conducted within the portions of the study area not covered by the previous survey. Based on record search results, the literature review, and previous cultural studies, the types of cultural resources that may be encountered within the Ingram Canyon study area include prehistoric bedrock milling stations and habitations sites, isolated machinery, and historic ranching sites.

3.6.1.5 Archaeological Resources

Del Puerto Canyon Study Area. As a result of the identification efforts, nine previously recorded and six newly recorded archaeological sites were identified within the Del Puerto Canyon study area (**Table 3.6-1**). The sites contained prehistoric bedrock mortars and lithic scatters, historic structure foundations, and features associated with ranching and farming activities (ICF 2025).

Table 3.6-1: Archaeological Site Evaluation Results In the Del Puerto Canyon Study Area

Primary/Trinomial	Age	Resource Description	NRHP/CRHR Eligibility
P-50-000128 CA-STA-0042	Prehistoric	Occupation site	Recommended ineligible
P-50-000343 CA-STA-000260	Prehistoric	Occupation site (bedrock mortars, cupules, midden of fire-cracked rock)	Recommended ineligible
P-50-000344 CA-STA-000261	Prehistoric	Occupation site (bedrock mortars, lithic scatter, midden)	Recommended eligible (NRHP Criterion D)
P-50-000369 CA-STA-000286H	Historic	Ranch site	Recommended ineligible
P-50-000370 CA-STA-000287H	Historic	Ranch site	Recommended ineligible

P-50-000372 CA-STA-000289	Prehistoric	Bedrock mortar site	Recommended ineligible
P-50-000373 CA-STA-000290	Prehistoric	Bedrock mortar site (not relocated)	Recommended ineligible
P-50-000374 CA-STA-000291	Prehistoric	Bedrock mortar site	Recommended ineligible
P-50-000375 CA-STA-000292	Prehistoric	Bedrock mortar site	Recommended ineligible
DP-001	Historic	Concrete structure footings	Recommended ineligible
DP-002	Historic	Windmill and metal water tank	Recommended ineligible
DP-003	Prehistoric	Isolated bedrock mortars and groundstone fragment	Recommended ineligible
DP-004	Historic	Windmill, concrete water tank, and cattle trough	Recommended ineligible
DP-005	Historic	Del Puerto Fire Control Station remains (three poured-concrete foundation pads, eucalyptus trees, and concrete well)	Recommended ineligible
DP-006	Prehistoric	Isolated bedrock mortar	Recommended ineligible

NRHP = National Register of Historic Places
CRHR = California Register of Historical Resources

Attempts were made to locate three previously recorded prehistoric sites: P-50-000128, P-50-000372, and P-50-000373; however, no indications were found from the survey and subsurface testing efforts. Attempts were also made to locate two previously recorded isolates: P-50-0000011 and P-50-0000300; the isolates could not be located during the surveys. The farm equipment associated with P-50-0000300 had been removed since the original recording, and no indications of the cobbles or possible flakes were observed at or near the recorded location. In addition, isolates are generally not eligible for the NRHP because they do not have the potential to satisfy NRHP Criteria A through D.

Twelve archaeological sites were evaluated using a combination of subsurface testing, background research, and site assessment. As a result of the evaluations, 11 sites were recommended as not eligible for listing in the NRHP or California Register of Historical Resources (CRHR), and one site was recommended as eligible (prehistoric habitation site P-50-000344).

Ingram Canyon Study Area. The records search results identified one previously recorded prehistoric archaeological site (P-50-001883) within the Ingram Canyon study area. The resource was described as consisting of bedrock mortars, midden, and human remains. Given the constraints associated with the Ingram Canyon study area (i.e., lack of property access), identification efforts were limited.

3.6.1.6 Built-Environment Resources

Del Puerto Canyon Study Area. As a result of identification efforts, eight historic-era (i.e., 50 years of age or older) built-environment resources were identified within the Del Puerto Canyon study area. Of the eight built-environment properties, five were recommended as not eligible for listing in the NRHP or CRHR, and one was recommended as eligible for listing in the NRHP and CRHR (Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie). Two properties (the DMC and the California Aqueduct) were previously identified as eligible for listing in the NRHP and CRHR (see **Table 3.6-2**).

Table 3.6-2: Built Environment Historic Properties in the Del Puerto Canyon Study Area

Resource Name	P Number	NRHP/CRHR Eligibility	Prior CHRSC
DMC	P-50-001904	A/1 and C/3	2S
California Aqueduct	P-50-001903	A/1 and C/3	2S
Elfers Ranch	P-50-000059	Recommended ineligible	3S
Patterson and Western Railroad/Del Puerto Canyon Road	P-50-000371	Recommended ineligible	N/A
Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie (two circuits; one per tower)	N/A	A/1 and C/3	2S2
Tesla-Salado 115 kV power line	N/A	Recommended ineligible	N/A
Quinto Switching Station-Westley 230 kV transmission line (part of Los Banos-Westley)	N/A	Recommended ineligible	N/A
Tesla-Salado-Manteca 115 kV power line	P-50-002328	Recommended ineligible	6Z

NRHP = National Register of Historic Places
CRHR = California Register of Historical Resources
CHRSC = California Historical Resource Status Code
2S = Individual property determined eligible for NRHP by the Keeper. Listed in the CRHR.
2S2 = Individual property determined eligible for NRHP by consensus through the Section 106 process. Listed in the CRHR.
3S = Recommended eligible for NRHP as an individual property through survey evaluation.
6Z = Recommended ineligible for the NRHP, CRHR, or local designation through survey evaluation.

Ingram Canyon Study Area. As a result of the identification efforts associated with the Ingram Canyon study area, eight historic-era (i.e., 50 years of age or older) built-environment properties were identified. Of the eight built-environment resources, five were recommended as not eligible for listing in the NRHP or CRHR, one was recommended as eligible for listing in the NRHP and CRHR (Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie), and two properties (the DMC and the California Aqueduct) were previously identified as eligible for listing in the NRHP and CRHR (see **Table 3.6-3**). Given the limitations within the study area (i.e., the lack of property access), the identification research provides the extent of information available for a constraints-level study.

Table 3.6-3: Built Environment Historic Properties in the Ingram Canyon Study Area

Resource Name	P Number	NRHP/CRHR Eligibility	Prior CHRSC
DMC	P-50-001904	A/1 and C/3	2S
California Aqueduct	P-50-001903	A/1 and C/3	2S
Tesla-Salado-Manteca 115 kV power line	P-50-002328	Recommended ineligible	6Z

NRHP = National Register of Historic Places
CRHR = California Register of Historical Resources
CHRSC = California Historical Resource Status Code
2S = Individual property determined eligible for NRHP by the Keeper. Listed in the CRHR.

6Z = Recommended ineligible for the NRHP, CRHR, or local designation through survey evaluation.

3.6.2 Regulatory Setting

See Appendix E for the laws and regulations at the federal level that may apply to cultural resources.

3.6.3 Environmental Consequences

3.6.3.1 Methodology

The method used to analyze effects on historic properties is the Criteria of Adverse Effect found in 36 CFR 800.5(1):

> *Criteria of Adverse Effect.* An adverse effect is found when a project may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the project that may occur later in time, be farther removed in distance, or be cumulative.

In addition to the Criteria of Adverse Effect, 36 CFR 800.5(2) includes a series of examples of adverse effects.

Examples of Adverse Effects. Adverse effects on historic properties include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's standards for the treatment of historic properties (36 CFR Part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

The Criteria of Adverse Effect have been applied to one archaeological site (P-50-000344) located in the Del Puerto Canyon study area and three built-environment properties that are eligible or have been recommended as eligible for listing in the NRHP (Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie, the DMC, the California Aqueduct,) located in the Del Puerto Canyon study area and Ingram Canyon study area. A brief description of these resources is provided below.

P-50-000344 (CA-STA-000261; Prehistoric Occupation Site). Site P-50-000344 (CA-STA-000261) is a prehistoric occupation site recommended eligible for listing in the NRHP. The

prehistoric occupation site lies within the area designated for inundation under Alternatives 2, 3, and 4, where fluctuating water levels—ranging from 336 to 450 feet above mean sea level (amsl)—could erode or destroy significant archaeological features, including both surface and subsurface components.

Alternatives 2, 3 and 4, through inundation and fluctuating water levels, would result in direct physical destruction of or damage to the character-defining features of P-50-000344 that contribute to its eligibility for listing in the NRHP. The character-defining features that could be damaged are the artifactual constituents found in Unit 01 and any other densely buried deposits in the area of the unit. An adverse effect to P-50-000344 is anticipated as a result of Alternatives 2, 3, and 4.

Delta-Mendota Canal. The DMC is considered eligible for listing in the NRHP under Criterion A for its role in the CVP and under Criterion C for its engineering significance. Its character-defining features include its alignment, setting, and continued function as a water conveyance system.

California Aqueduct. The California Aqueduct is eligible for listing in the NRHP under Criterion A for its role as part of the SWP and Criterion C for its significance in engineering related to design and construction. Character-defining features of the aqueduct necessary to illustrate its significance and integrity include the structure's setting, its historic alignment, and continued function as a water conveyance system.

Tesla-Los Banos #1/Tracy-Los Banos 500 kV (Pacific Intertie). The Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission line (Pacific Intertie) segments are recommended eligible for listing in the NRHP under Criterion A as contributing segments to the first transregional extra-high-voltage (EHV) transmission grid in the country by integrating federal, municipal, and investor-owned transmission networks and Criterion C as contributors to the comprehensive design and development of EHV alternating-current and high-voltage direct-current transmission technologies. The segments are not individually eligible for the NRHP under any criteria on their own merit. Character-defining features that are necessary to illustrate significance and integrity of the Tesla-Los Banos #1 and Tracy-Los Banos segments include their spatial alignment, repetition of features, tower types, setting, and continued function as an electrical power transmission system as well as their continued association with the Tesla-Los Banos #1 and Tracy-Los Banos circuits and overall Pacific Intertie system. Though important for their contribution to themes of design and technological innovation, the association with—and contribution to—the historical significance of the Pacific Intertie under NRHP Criterion A (important events in history) is arguably the primary association for which the segments are historically significant.

3.6.3.2 Environmental Protection Measures

Environmental Protection Measures (EPMs) for historic properties are listed below. EPMs CULT-1 and CULT-2 are applicable to Alternatives 2-4; EPMs CULT-3 and CULT-4 are applicable to all Action Alternatives.

34 **CULT-1: Treatment Plan for Site P-50-0344.**

Prior to construction, a Historic Properties Treatment Plan shall be implemented for site P-50-0344. The treatment plan will be developed under a Memorandum of Agreement in consultation with appropriate consulting parties, which will establish the procedures and documentation needed to carry out data recovery for the resource. The treatment plan will include the field methods required for data recovery excavations as well as requirements and procedures for recordation, analysis, curation, reporting, and any other documentation or methods used for adequately mitigating adverse effects on the site. Collectively, the treatment plan shall characterize the nature of the assemblage and data potential at the site as well as synthesize and capture data that may be lost due to the construction and operational impacts of the chosen Action Alternative.

35 **CULT-2: Avoidance Measures for Feature at Site P-50-0374.**

Avoidance measures shall be implemented during construction of the reservoir for an additional cultural resource identified during Native American consultation as having religious and cultural significance: site P-50-0374. Prior to any ground-disturbing activity, a 100-foot avoidance area will be established around the feature and no grading for borrow material or ground disturbing activities shall occur within this designated area. Protective fencing will be installed around the feature, delineating the area of avoidance.

36 **CULT-3: Implement Measures to Protect Previously Unidentified Cultural Resources.**

Construction will stop if potential cultural resources are encountered. If signs of an archaeological site, such as any unusual or large amount of bone, stone, shell, lumber, ceramics, cans, bottles, or any other prehistoric (Native American) or historic cultural resources are uncovered during grading or other construction activities, work will be halted within 100 feet of the find and the Del Puerto Water District and San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) will be notified. A qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology shall be retained to evaluate the significance of the find and shall have the authority to modify the temporary 100-foot no-work radius as appropriate, using professional judgment. A qualified archaeologist will be consulted for an on-site evaluation. If the site is or appears to be eligible for listing in the CRHR or NRHP, additional mitigation, further testing for evaluation, and/or data recovery may be necessary. In the event that historic properties are identified and deemed eligible for listing on the NRHP, reasonable efforts to avoid, minimize, or mitigate adverse effects to such properties shall be implemented pursuant to 36 CFR Part 800.13(b). If the qualified archaeologist determines that the find does not represent a cultural resource, then work may resume immediately, and no further agency coordination is required. During operations, a qualified archeologist will conduct a pedestrian survey of the reservoir shore (i.e., the primary area where the water level fluctuates) during periodic maintenance periods at the reservoir or facilities (once every 5 years). The pedestrian survey will determine if unknown buried archaeological resources have been exposed during water-level fluctuations. If cultural resources are found, the archaeologist will determine whether the resource is or appears to be eligible for listing in the CRHR and significant pursuant to

Appendix G of the California Environmental Quality Act (CEQA) Guidelines, Section 15064.5, and Public Resources Code (PRC) Section 21083.2. If the resources are determined to be eligible and significant, the archaeologist will recover the resource(s) pursuant to standard data recovery practices prior to refilling of the reservoir.

37 **CULT-4: Implement Measures if Construction Activities Inadvertently Discover or Disturb Human Remains.**

If human remains, including disarticulated or cremated remains, are discovered during any stage of construction, the construction contractor will immediately cease all ground-disturbing activities within 100 feet of the remains and notify the Del Puerto Water District and the Stanislaus County Coroner. In accordance with California Health and Safety Code Section 7050.5, no further disturbance will occur until the following steps have been completed:

The Stanislaus County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98.

If the remains are determined by the coroner to be Native American, the coroner has notified the NAHC within 24 hours.

A professional archaeologist with Native American burial experience has conducted a field investigation of the specific site and consulted with the most likely descendant, if any, identified by the NAHC. As necessary and appropriate, the professional archaeologist may provide technical assistance to the most likely descendant, including assistance regarding excavation and removal of the remains.

Under the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001) and implementing regulations 43 CFR Part 10, Reclamation is responsible for the protection of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are discovered on Reclamation lands. All human remains and potential human remains must be treated with respect and dignity at all times. In the event that suspected human remains are discovered during construction activities on Reclamation land, all activities in the immediate area will cease, and appropriate precautions will be taken to protect the remains and any associated cultural items from further disturbance. Reclamation will follow the procedures outlined in 43 CFR Part 10.4, Inadvertent Discoveries. The Reclamation Region 10 Regional Environmental Officer will be immediately notified by telephone and will take responsibly for the discovery by contacting the appropriate law enforcement and Reclamation officials. Within three (3) working days of confirmation of the discovery (see 43 CFR Part 10.4[d][1][iii]), the Regional Cultural Resource Officer will ensure that Indian tribes likely to be affiliated with the discovered human remains (e.g., lineal descendant, culturally affiliated Indian tribe, Indian tribe with other cultural relationship, and Indian tribe that aboriginally occupied area) are notified by telephone or in person, with written confirmation. Treatment and handling of the remains will be determined through consultation between Reclamation and consulting tribes.

3.6.3.3 Alternative 1 (No Action)

Under Alternative 1, no reservoir or dam facilities would be constructed. As a result, there would be no impacts to cultural resources.

3.6.3.4 Alternative 2 (DPCR 82 TAF)

Architectural Built-Environment Resources. Alternative 2 would result in construction and operation of a new reservoir and ancillary facilities in the Del Puerto Canyon study area. Alternative 2 involves ground disturbances and modifications to existing infrastructure.

DMC. Alternative 2 involves constructing and operating facilities adjacent to and connected with the DMC; however, it would not result in an adverse effect on the canal because the canal would remain physically intact, continue to operate in its original capacity, and retain both its historical alignment and agricultural setting. In addition, although Alternative 2 includes building a diversion/outfall structure at the canal's existing concrete lining, this modification would not compromise the DMC's character-defining features. The canal would not be relocated, and its use and setting would remain consistent with its historical significance.

Temporary construction noise and the visibility of new infrastructure, such as the main dam, would not diminish the DMC's integrity. The surrounding environment already includes agricultural, industrial, and transportation-related elements, such as traffic noise from I-5. The saddle dams and fluctuating reservoir water levels would not be visible from the DMC due to intervening topography, further preserving the canal's historic character.

Alternative 2 would not lead to neglect or deterioration of the DMC because it will continue to be operated and maintained by the San Luis & Delta-Mendota Water Authority under agreement with Reclamation. Moreover, there would be no transfer, lease, or sale of the property out of federal ownership or control. As such, Alternative 2 does not meet any of the criteria for adverse effects under 36 CFR 800.5, and the DMC's historical integrity and significance would remain preserved.

California Aqueduct. The California Aqueduct would remain physically intact and in its historic location, with no alterations that would compromise its integrity or historical significance under Alternative 2. It would continue to operate along the same alignment within a predominantly agricultural setting. Although Alternative 2 may result in some construction noise and visual changes, including the visibility of the main dam, these changes would not diminish the aqueduct's character-defining features. The surrounding environment already includes similar infrastructure and noise sources, such as I-5 and nearby industrial and agricultural activities. In addition, the saddle dams and fluctuating reservoir water levels would not be visible from the aqueduct due to intervening topography.

Alternative 2 would not lead to neglect or deterioration of the aqueduct because it will continue to be maintained by the California Department of Water Resources. There would also be no transfer, lease, or sale of the property out of federal ownership or control. As such, Alternative 2 does not meet any of the criteria for adverse effects under 36 CFR 800.5, and the California Aqueduct's historical integrity and significance would remain preserved.

Tesla-Los Banos #1/Tracy-Los Banos 500 kV (Pacific Intertie). A portion of the Pacific Intertie would be relocated as a result of Alternative 2. This relocation would change the historic alignment of two transmission lines and permanently change the alignment of approximately 0.7 mile of the

Pacific Intertie. However, the relocation would have no long-term operational effects. The change in alignment would be relatively minor and close to the original alignment (approximately 0.6 mile to the east). The relocated section of the Pacific Intertie would remain in a rural setting and continue to carry 500 kV of electricity. As such, with this minor relocation, no character-defining features that qualify the Pacific Intertie as a historic property would be significantly changed. In addition, creek levels would generally be within the range of fluctuations occurring under Alternative 1. Therefore, under Alternative 2, no character-defining features that qualify the Pacific Intertie as a historic property would be significantly changed.

Archaeological Resources. Alternative 2 meets several criteria for adverse effects on site P-50-00e under 36 CFR 800.5. It would cause direct physical destruction of character-defining features, alter the site in ways inconsistent with preservation standards, and potentially lead to the removal of artifacts through erosion, even though the site itself would not be relocated. Although the setting for the site would be altered by the damming and inundation, the setting is not considered a contributing factor to the site's historical significance. In addition, Alternative 2 would not introduce visual, atmospheric, or audible elements that would diminish the site's integrity. However, the submersion and fluctuating water levels would lead to deterioration of the site's significant features, especially the buried deposits. Therefore, an adverse effect on P-50-000344 is anticipated as a result of Alternative 2. A Memorandum of Agreement to resolve the adverse effect would need to be developed with the State Historic Preservation Officer (SHPO) and appropriate consulting parties, as would a treatment plan that establishes the procedures and documentation needed to resolve the adverse effect. EPM CULT-1 implements a treatment plan for site P-50-000344 that establishes the procedures and documentation needed to carry out data recovery for the resource.

As part of Native American outreach, the Northern Valley Yokut-Ohlone Tribe and the Santa Rosa Rancheria Tachi Yokut Tribe, along with staff members from ICF, Reclamation, the Del Puerto Water District, and Woodard & Curran, took part in field visits to the Del Puerto Canyon study area on December 11, 2019. As a result of the field visits, an additional cultural resource identified as having religious and cultural significance was identified by tribal members at site P-50-000374.

EPM CULT-2 implements avoidance measures for the cultural resource identified by tribal members as having religious and cultural significance at site P-50-00374. If cultural resources are inadvertently discovered during construction, EPM CULT-3 will be implemented.

Human Remains. The results of the records search, Native American outreach, and the pedestrian surveys indicate that human remains are not present in the Del Puerto Canyon study area. Therefore, Alternative 2 is not expected to disturb human remains. However, if human remains are inadvertently discovered during construction activities, EPM CULT-4 will be implemented.

3.6.3.5 Alternative 3 (Limited Action)

Under Alternative 3, Reclamation would not participate as a funding partner in construction of Del Puerto Canyon Reservoir. Reclamation would cooperate with any required construction, right-of-way, or other permits required in order to construct the appropriate connecting conveyance and pumping structures. It is assumed that the Project Sponsors would choose to move forward with constructing the 82 TAF reservoir without Reclamation funding. Adverse effects on architectural built-environment resources, archaeological resources, and human remains would be the same as those described under Alternative 2.

3.6.3.6 Alternative 4 (DPCR 40 TAF)

Architectural Built-Environment Resources. Alternative 4 would result in construction and operation of a new reservoir and ancillary facilities in the Del Puerto Canyon study area. Alternative 4 would not result in an adverse effect on the DMC, the California Aqueduct, or the two segments of the Pacific Intertie (Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie). Because Alternative 4 would be reduced in size and located in the same study area as Alternative 2, it would not have the potential to adversely affect historic properties, if present. Alternative 4 does not meet any of the criteria for adverse effects under 36 CFR 800.5. The historical integrity and significance of the DMC and California Aqueduct would remain preserved. In addition, no character-defining features that qualify the Pacific Intertie as a historic property would be significantly changed by Alternative 4.

Archaeological Resources. Because the reservoir would inundate site P-50-000344, a Memorandum of Agreement to resolve the adverse effect would need to be developed with the SHPO, including a treatment plan that establishes the procedures and documentation needed to resolve the adverse effect. EPM CULT-1 implements a treatment plan for site P-50-000344 that establishes the procedures and documentation needed to carry out data recovery for the resource. If unidentified cultural resources are discovered during construction, EPM CULT-3 will be implemented.

In addition to site P-50-000344, the reservoir would inundate site P-50-000374. This site was identified by the Northern Valley Yokut-Ohlone Tribe and the Santa Rosa Rancheria Tachi Yokut Tribe as having religious and cultural significance during the 2019 field visit. EPM CULT-2 implements avoidance measures for the cultural resource identified by tribal members as having religious and cultural significance at site P-50-00374. If cultural resources are inadvertently discovered during construction, EPM CULT-3 would be implemented.

Human Remains. The results of the records search, Native American outreach, and the pedestrian surveys indicate that human remains are not present in the Del Puerto Canyon study area. Therefore, Alternative 4 is not expected to have the potential to disturb human remains. If human remains are unearthed during construction activities, EPM CULT-4 will be implemented.

3.6.3.7 Alternative 5 (Ingram Canyon)

Architectural Built-Environment Resources. Alternative 5 includes construction of a dam and a reservoir in the Ingram Canyon study area. This alternative would also include construction of conveyance facilities but would not require relocation of a public road. Because of the similar landscape and proximity to the Central Valley, sensitivity for historic properties under Alternative 5 is generally similar to Alternatives 2-4.

The records search identified one historic-era (i.e., 50 years of age or older) built-environment resource in the Ingram Canyon study area. The historic-era built-environment resource, the Tesla-Los Banos #1 and Tracy-Los Banos 500 kV transmission lines/Pacific Intertie, was also identified in the records search for Alternative 2. As stated previously, the Pacific Intertie was evaluated as eligible for listing in the NRHP and CRHR. However, the Pacific Intertie would not be relocated as a result of Alternative 5. As such, no character-defining features that qualify the Pacific Intertie as a historic property would be significantly changed.

Archaeological Resources. A review of archival research and field surveys conducted for Alternative 5 did not identify any previously recorded cultural resources within the Ingram Canyon study area. However, the location (along Ingram Creek) and geology/geography of the Ingram Canyon study area (flat areas in proximity to the creek) suggest that some areas could have supported prehistoric habitation. In addition, similar to aerials of Del Puerto Canyon, aerials of Ingram Canyon indicate that possible bedrock outcrops are located along the creek in areas where bedrock mortar features could be found. The possibility also exists that Native American cultural resources could be found in Ingram Canyon, with the greatest potential near waterways such as Ingram Creek and Cedar Spring Gulch.

The records search results identified one previously recorded prehistoric archaeological site (P-50-001883) within the Ingram Canyon study area. This prehistoric archaeological resource was not revisited during the pedestrian survey and has not been evaluated for listing in the NRHP or CRHR. No further testing has been completed at this site. It is anticipated that Alternative 5 would result in direct physical destruction of or damage to site P-50-001883. As such, if Alternative 5 is chosen, cultural resource surveys of the Ingram Canyon study area would be conducted. Should historic properties be identified, an effects analysis would be conducted, and any adverse effects on historic properties would be mitigated through the implementation of a Cultural Resources Treatment Plan, which would be developed under a Memorandum of Agreement.

Human Remains. The pedestrian survey did not identify human remains within the study area. However, the records search results identified one prehistoric archaeological site (P-50-001883) where human remains were identified and recorded within the study area. The Stanislaus County Sheriff Coroner removed the remains the day the site was recorded. Although the human remains have been removed, Alternative 5 has the potential to disturb human remains. If additional human remains are present, treatment will conform to the requirements of state law under California Health and Safety Code Section 7050.5 and PRC Section 5097.98, as provided in EPM CULT-3.

3.6.3.8 Indian Trust Assets

The Action Alternatives do not have a potential to affect Indian Trust Assets. The nearest Indian Trust Asset is the Chicken Ranch Rancheria, approximately 50 miles northeast of the study areas. Because there are no Indian Trust Assets within the study areas, further evaluation is not necessary.

3.7 Energy Resources

3.7.1 Affected Environment

This section describes the affected environment as it relates to energy resources.

3.7.1.1 Study Area

Implementation of any of the Action Alternatives would require energy resources. Construction and operational equipment would require fossil fuels or electricity. Because fuel for construction equipment and vehicles would be purchased locally, the study area for construction fuels would include Stanislaus County. Operational energy for the Action Alternatives could be supplied by either the Turlock Irrigation District (TID) or Pacific Gas & Electric (PG&E). The Del Puerto Canyon study area for operational energy includes the pumping plant site where the electrical substation would be constructed, and the power supply line connecting the substation to existing power lines (see **Figure 3.7-1**). For Action Alternatives within Del Puerto Canyon the pumping plant and electrical substation are within the TID service area. Maintenance trips to the Del Puerto Canyon dam site would also consume limited amounts of fuel, and thus **Figure 3.7-1** also shows the maintenance route from the DPWD office to the Del Puerto Canyon reservoir site. The Alternative 5 study area for operational energy includes the pumping plant and power supply line connecting the electrical substation to existing PG&E power lines because the Ingram Canyon Reservoir pump station site is located within the PG&E service area. **Figure 3.7-1** shows the maintenance route from the DPWD office to the Ingram Canyon reservoir site.

3.7.2 Regulatory Setting

Laws and regulations at the Federal, state, and local level that may apply to the proposed Action are presented in **Appendix E, Regulatory Framework**.

3.7.3 Environmental Consequences

3.7.3.1 Environmental Protection Measures

No Environmental Protection Measures (EPMs) have been identified specific to energy resources. However, mitigation measure AIR-1: Reduce NO_X Emissions, as described in Section 3.3 of this EIS, would reduce potential impacts to energy resources.

3.7.3.2 Alternative 1 (No Action)

Alternative 1 would not require energy for construction or operation, but a portion of the water that would have been pumped into a reservoir as part of the proposed Project would continue to be pumped into the San Luis Reservoir, so there would be ongoing energy requirements associated with Alternative 1. No vehicle trips associated with ongoing operation and maintenance would be needed.

3.7.3.3 Alternative 2 (DPCR 82 TAF)

Construction of Alternative 2 would require energy for construction and operation. Activities associated with construction of the reservoir and conveyance facilities and relocation of the utilities and roadway, including excavation, grading, and vehicle travel, would require the use of an estimated

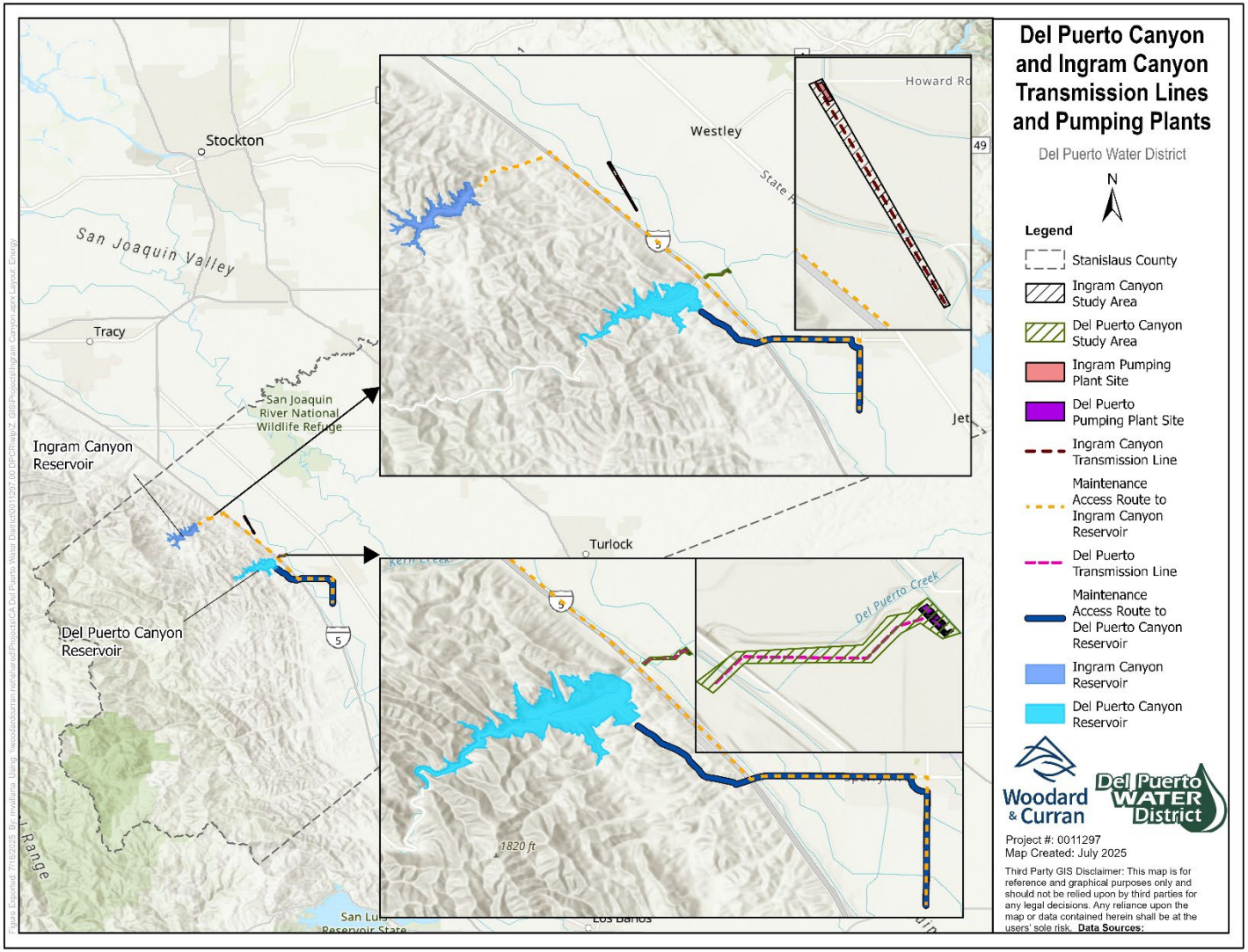

Figure 3.7-1: Study Areas for Del Puerto Canyon and Ingram Canyon

4.5 million gallons of fuel. Estimates of fuel use are based on the detailed projections of equipment use for on-site construction equipment and for haul trucks and worker vehicles traveling to and from the Project site (see Appendix F). Traffic impacts associated with haul truck and worker vehicles traveling to the site are addressed in the Traffic and Transportation section.

Conveyance facility operational power requirements are estimated to be 31,700 MWhr annually. The Project Sponsors would pay for power from TID. Maintenance trips associated with routine reservoir inspections and maintenance tasks are estimated to consume 22 gallons of gasoline in year 1 (for weekly inspections), 11 gallons of gasoline in years 2-5 (for bi-weekly inspections), and 5 gallons of gasoline in years 6+ (for monthly inspections). This estimate assumes a 10-mile round trip to the reservoir site from the neighboring City of Patterson, and a vehicle fuel efficiency of 24 miles-per gallon (mpg), consistent with the average fuel efficiency of gasoline-powered light-duty truck use in Stanislaus County (CARB 2017).[1] Roadway realignment would result in decreased vehicle miles traveled and associated reduced gas consumption with about 320 fewer gallons per year consumed by passenger vehicles traveling on the roadway.

Alternative 2 would be constructed to maximize energy efficiency during construction and operation—and would therefore be consistent with state and local energy efficiency plans.

3.7.3.4 Alternative 3 (Limited Action)

Under Alternative 3, Reclamation would not participate as a funding-partner in the construction of the proposed Project. Reclamation would cooperate with any required construction, right-of-way, or other permits required in order to construct the appropriate connecting conveyance and pumping structures. It is assumed that the Project Sponsors would choose to move forward with the Project without Reclamation funding and impacts would be similar to those described under Alternative 2.

3.7.3.5 Alternative 4 (DPCR 40 TAF)

Construction and operation of Alternative 4 would require energy for construction and operation. Construction activities associated with construction of the reservoir and conveyance facilities and relocation of the utilities and roadway, including excavation, grading, and vehicle travel, would require the use of an estimated 2.5 million gallons of fuel, which is less than Alternatives 2 and 3 (see Appendix F for estimated equipment and construction vehicle use). Because construction methods and level of effort would be similar, fuel use for construction of the relocated transmission lines and roadway is not expected to be different from Alternatives 2 and 3.

Conveyance facility operational power requirements are estimated to be less than half of Alternative 2, or about 11,900 MWhr annually. Maintenance trips under Alternative 4 are assumed to be the same as for Alternative 2 and are estimated to consume 22 gallons of gasoline in year 1 (for weekly inspections), 11 gallons of gasoline in years 2-5 (for bi-weekly inspections), and 5 gallons of gasoline in years 6+ (for monthly inspections). This estimate assumes a 10-mile round trip to the reservoir site from the neighboring City of Patterson, and a vehicle fuel efficiency of 24 miles-per gallon (mpg), consistent with the average fuel efficiency of gasoline-powered light-duty truck use in Stanislaus County (CARB 2017). Roadway realignment would result in reduced vehicle miles

[1] Fuel efficiency estimates use the California Air Resources Board Mobile Source Emissions Inventory (MSEI) modeled estimates for light-duty trucks (less than 3,750 pounds) in Stanislaus County in 2019.

traveled and associated reduction in gas consumption by an estimated 320 gallons per year consumed by passenger vehicles traveling on the roadway.

This alternative would also be constructed to maximize energy efficiency during construction and operation—and would therefore be consistent with state and local energy efficiency plans.

3.7.3.6 Alternative 5 (Ingram Canyon)

Construction and operation of Alternative 5 would require energy. Construction activities associated with construction of the reservoir and conveyance facilities including excavation, grading, and vehicle travel, would require the use of an estimated 5.2 million gallons of fuel (see Appendix F for estimated equipment and construction vehicle use).

Conveyance facility operational power requirements are estimated to be about 33,300 MWhr annually, which is more than the operational energy requirement of Alternative 2 for a reservoir about half the size. The Project Sponsors would pay for power from PG&E. Maintenance trips would be at a similar frequency to maintenance for Alternative 2, but the site is further from the Del Puerto Water District in Patterson. Trips are estimated to consume 65 gallons of gasoline in year 1 (for weekly inspections), 32.5 gallons of gasoline in years 2-5 (for bi-weekly inspections), and 15 gallons of gasoline in years 6+ (for monthly inspections). This estimate assumes a 30-mile round trip to the reservoir site from the City of Patterson, and a vehicle fuel efficiency of 24 miles-per gallon (mpg), consistent with the average fuel efficiency of gasoline-powered light-duty truck. No road realignment is required so this alternative would not result in a change in vehicle miles traveled on public roads, but a small number of rural residents living west of the Alternative 5 reservoir site would experience increased travel distances, resulting in a minor increase in gas consumption.

This alternative would also be constructed to maximize energy efficiency during construction and operation—but because there is an alternative with substantially lower annual energy use, this alternative would not be consistent with state and local energy efficiency plans.

Table 3.2-1 summarizes construction and operational energy requirements for each Action Alternative.

Table 3.2-1: Energy Use by Action Alternatives

Alternative	Construction Fuel Use	Operation (Mwhr/year)
Alternative 2 (DCPR 82 TAF)	4.5 million gallons	31,700
Alternative 3 (Limited Action)	4.5 million gallons	31,700
Alternative 4 (DCPR 40 TAF)	2.5 million gallons	11,900
Alternative 5 (Ingram Canyon)	5.2 million gallons	33,300

3.8 Geology and Soils

3.8.1 Affected Environment

This section describes geology and soils in the study area and potential impacts the proposed Project may have on these resources. Baseline conditions for geology and soils were based on the Final EIR for the Del Puerto Canyon Reservoir Project, including Appendix E, Geotechnical Memorandum for the Del Puerto Canyon Reservoir (Gannett Fleming 2019), the Geologic Conditions Technical Memorandum prepared for the Del Puerto Canyon Road Relocation (Haley & Aldrich 2025), the Ingram Canyon Alternative Site Geologic Map (TERRA/GeoPentech 2023), and information developed during design of the Del Puerto Canyon Reservoir, including the Geotechnical Interpretive Report for the Del Puerto Canyon Reservoir (TERRA/GeoPentech 2025).

3.8.1.1 Study Area

The region of influence for geology and soils includes the area in which Project facilities would be constructed plus the surrounding area where there are faults that could generate seismic events that would affect Project facilities. The study area for Alternatives 2, 3, and 4 is centered around Del Puerto Canyon, while the study area for Alternative 5 centers on Ingram Canyon.

For Alternatives 2-5, the Project site would not be located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special Publication 42; however, there are two active faults within 10 miles of the proposed dam sites – Great Valley 07/Orestimba (San Joaquin) and Great Valley 08/Quinto (San Joaquin). The Great Valley/Orestimba fault is mapped 0.2 miles east of the proposed dam for Alternatives 2-4. For Alternative 5, the Great Valley 08/Quinto (San Joaquin) is 1.9 miles from the dam (see **Table 3.8-1**).

3.8.1.2 Issues of Environmental Concern

Issues of environmental concern for geologic and soils resources are erosion or soil loss, slope instability, effects of earthquakes (fault rupture, ground shaking, liquefaction and landslide); slumps, adverse soil conditions such as compressible, expansive or corrosive soils and long-term soil productivity loss.

3.8.1.3 Characterization

Topography. Both study areas extend from the DMC on the fairly level western edge of the San Joaquin Valley westward into the foothills of the Coast Ranges. Del Puerto Canyon and Ingram Canyon study areas occupy canyons bounded by fairly steep hillsides. They extend from an elevation of about 220 feet above mean sea level at the eastern end, with the western ends of the reservoirs at elevations of 450 feet in Del Puerto Canyon and 790 feet in Ingram Canyon. For Alternatives 2, 3, and 4, the relocated segment of Del Puerto Canyon Road would traverse a series of hills located south of the reservoir and would reach elevations up to about 1,260 feet.

Table 3.8-1: Potential Fault Sources

Fault	Fault Type	Recency of Movement	Mmax	Approximate Distance to DPCR Dam (miles)	Approximate Distance to Ingram Dam (miles)
Great Valley 07/Orestimba (San Joaquin)	Reverse	Late Quaternary	6.6 to 6.9	0.2	5.3
Great Valley 08/Quinto (San Joaquin)	Reverse	Late Quaternary	6.6 to 6.8	4.6	1.9
Great Valley 09/Laguna Seca (San Joaquin)	Reverse	Late Quaternary	6.6 to 6.8	46.88	51.7
Ortigalita	Strike Slip	Latest Quaternary	6.9 to 7.1	24.7	29.3
Greenville Connected	Strike Slip	Undifferentiated Quaternary (<1.6 Ma)	6.8 to 7.0	29.5	18.5
Calaveras North + Central + South	Strike Slip	Holocene	6.84 to 7.03	47.0	46.7
Calaveras North + Central	Strike Slip	Holocene	6.8 to 7.0	47.0	46.7
San Andreas North + Peninsula +South	Strike Slip	Holocene	7.8 to 7.9	71.9	66.2

Geology. The Project is located on the transition between the Coast Ranges Geomorphic Province and the Great Valley Geomorphic Province. The Coast Ranges Geomorphic Province is distinguished by a series of tectonically controlled north-northwest trending ranges and valleys and extends for approximately 600 miles. The Project is located on the eastern flank of the Diablo Range, a mountain range within the Coast Range Geomorphic Province that extends southeast from the Carquinez Straight to Antelope Valley. The geology of the eastern flank of the Coast Range within the study areas consists of a sequence of faulted, folded and in some cases mildly metamorphosed Upper Mesozoic (65 to 145 million years ago) marine sedimentary rocks known as the Great Valley Group, which are faulted against the underlying Franciscan Complex (Bartow 1990).

The Great Valley Geomorphic Province is a nearly featureless alluvial plain that extends north-northwest and encompasses the California Central Valley. It consists of a thick accumulation of marine and nonmarine clastic rocks of Jurassic to early Paleocene age (i.e. marine sedimentary rocks of the Great Valley Goup). Sedimentation in the basin began around the late Jurassic (about 145 million years ago) and continued with little interruption through the Cretaceous and into the early Paleocene. Alluvial materials could present a geologic hazard to structures founded on them, if they are susceptible to liquefaction.

Soils. Soils in both the Del Puerto Canyon and Ingram Canyon study areas can be split broadly into two categories based on slope steepness:

- Nearly level to gently sloping (0-8% slope) soils on hills, terraces, alluvial fans, footslopes and basin floors. Overall, these soils associations are well-drained, have low runoff potential,

and slow to moderately-slow permeability. The majority of these soil associations are located at and downslope of the proposed main dam.

- Steep (8-75% slope) soils on mountain slopes, hills, terraces and backslopes. Overall, these soils associations are well-drained, have medium- to high runoff potential, and moderate- to moderately rapid permeability. The majority of these soil associations are found upslope of the proposed main dam.

Expansion and contraction of expansive soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to shallow founded structures and equipment. Issues with expansive soils typically occur near the ground surface where changes in moisture content typically occur. There is low potential for shrink-swell conditions in the study areas.

Faults. Active faulting and tectonics of California are dominated by the transform plate boundary between the Pacific and North American plates. Much of the deformation along this boundary is accommodated by major strike-slip faults associated with the San Andreas fault system, which includes the primary faults San Andreas, Hayward, and Calaveras all of which are located to the west of the study areas (see **Figure 3.8-1**). Locally, the Ortigalita fault exhibits strike slip displacement with normal and reverse mechanisms observed based on focal mechanism solutions (O'Connell et al, 2004). Fault sources in the study areas are controlled by local sources in the Eastern Diablo Range and distant, major, strike-slip faults associated with the Pacific-North America plate boundary. As described by O'Connell et al (2004), three main types of potentially active faults are documented near the reservoir sites: strike-slip faults associated with the Ortigalita fault zone; buried, west dipping blind-thrust faults associated with the uplifted eastern margin of the Diablo Range; and east-dipping bedding-plane reverse faults within the Great Valley sequence.

Table 3.8-1 lists selected potential fault sources located in the study areas. This table lists the active fault name, fault type, recency of movement, M_{max} value, and closest distance from the two dam sites. Information is based on USGS 2008 Update of the United States National Seismic Hazard Maps (Peterson et al, 2008). The values presented in **Table 3.8-1** are provided for information regarding the ground motion levels that the study areas may experience.

Landslides and Slope Failure. A substantial number of landslides are found within the Del Puerto Canyon Project site. The majority of these landslides are located within units of the Cretaceous Moreno formation, upstream from the proposed main dam (Bartow 1985). At least seven landslides are mapped within the inundation area of the Del Puerto Canyon Reservoir but there are no mapped landslides within the Ingram Canyon Reservoir study area. Southeast of the Ingram Canyon Reservoir, there is one landslide area (QIs) located within Panoche Formation (Kp), downstream from the proposed main dam.

Liquefaction and Lateral Spreading. Liquefaction is a process by which alluvium below the water table temporarily loses strength during an earthquake and behaves as a viscous liquid rather than a solid. Liquefaction is restricted to certain geologic and hydrologic environments, primarily recently deposited alluvium (sand and silt) in areas with high groundwater levels.

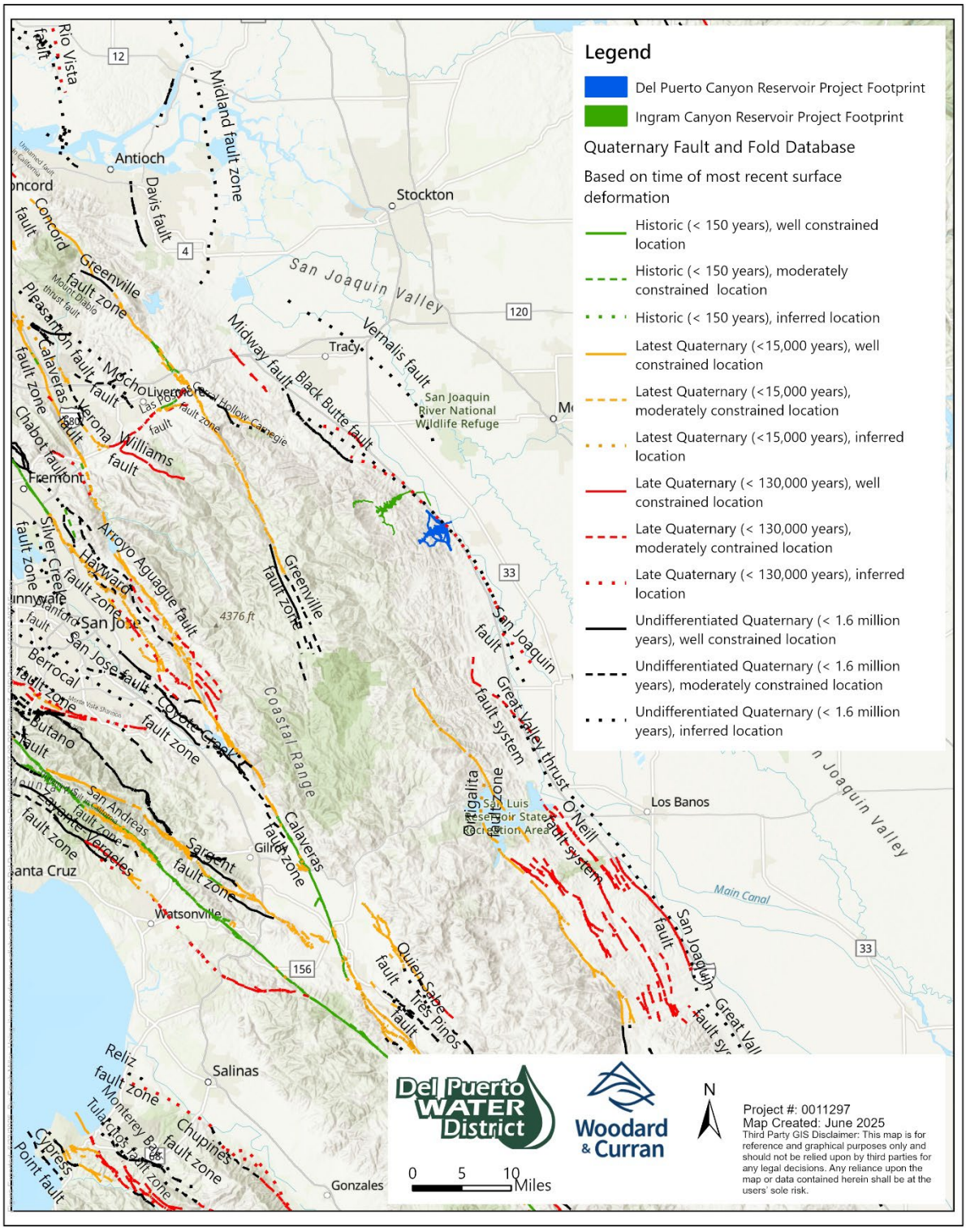

Figure 3.8-1: Regional Fault Map

3.8.2 Regulatory Setting

A description of the regulatory setting is included in the Appendix E, Regulatory Framework.

3.8.3 Environmental Consequences

3.8.3.1 Environmental Protection Measures

Environmental Protection Measures (EPM)s for geology and soils are the following:

38 GEO-1: Perform Design-Level Geotechnical Evaluations for Seismic Hazards

During the design phase for the proposed Action, the Project Sponsors shall prepare a design level Geotechnical Investigation and Report. The Geotechnical Investigation and Report shall further investigate and evaluate subsurface conditions, potential geohazards, and provide further Project specific information for development of excavation and construction plans and procedures. The geotechnical evaluations shall include appropriate site-specific geotechnical investigations including those focused on the geologic units and soils of the Project site that could become unstable as a result of the Project and shall be based on the site conditions, location, and professional opinion of the geotechnical engineer. Investigations may include subsurface drilling, soil testing, and analysis of site seismic response to determine appropriate and feasible measures to be incorporated into the Project design. A geotechnical interpretive report shall be prepared to detail the findings of the evaluations. The performance standard to be used in the geotechnical evaluations will be minimization of the hazards associated with seismic ground shaking, landslides, and subsidence. If the results of the geotechnical investigations indicate the presence of hazards, appropriate support and protection measures shall be designed and implemented.

Potential landslide EPMs that could be considered include avoidance of the feature, or reduction of vulnerability to the Project through engineering design. Engineered mitigation options may include subdrains, dewatering, and/or systems to prevent surface water infiltration, and/or design of appropriate stabilization approaches to reduce driving forces and/or increase resisting forces, including retaining walls and mechanically stabilized embankments. Monitoring of the hazardous features including performance of any mitigation option will be included as part of the long-term operation and maintenance of the proposed Project.

Recommendations provided in the Geotechnical Investigation and Report shall be incorporated into the final construction plans and specifications and shall augment the design and construction requirements of the California Department of Water Resources Division of Safety of Dams (DSOD) dam safety guidelines. Design of the Project shall comply with all measures required by DSOD.

39 GEO-2: Prepare and implement a SWPPP and associated BMPs

Before any ground-disturbing activities begin, the Project Sponsors shall prepare a Project Specific SWPPP that will be implemented as part of the Construction General Permitting Process. The contractor hired by the Project Sponsors to implement the

SWPPP shall review and certify they will implement the BMPS identified on the SWPPP, including an erosion control plan, and measures to eliminate construction waste measures to ensure that waters of the United States and the state are protected. The SWPPP shall include site design measures to minimize off-site stormwater runoff that might otherwise affect surrounding habitats. The Central Valley Regional Water Quality Control Board will review and monitor the effectiveness of the SWPPP through mandatory reporting by the Project Sponsors and the construction contractor as required.

The SWPPP shall be prepared with the following objectives:

- Identify all pollutant sources, including sources of sediment, that may affect the quality of stormwater discharges from construction of the Project.
- Identify BMPs that effectively reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the site during construction to the Best Available Technology/Best Control Technology standard.
- Provide calculations and design details as well as BMP controls for site run-on that are complete and correct.
- Identify Project discharge points and receiving waters.
- Provide stabilization BMPs to reduce or eliminate pollutants following construction.

The construction contractor shall implement the SWPPP, including all BMPs, and shall inspect all BMPs during construction. Potential SWPPP BMPs could include but would not be limited to the following:

- Preserve existing vegetation where possible.
- Roughen the surfaces of final grades to prevent erosion, decrease runoff, increase infiltration, and aid in vegetation establishment.
- Place riparian buffers or filter strips along the perimeter of the disturbed area to intercept pollutants before off-site discharge.
- Place fiber rolls around on-site drain inlets to prevent sediment and construction related debris from entering inlets.
- Place fiber rolls along down-gradient disturbed areas of the site to reduce runoff flow velocities and prevent sediment from leaving the site.
- Place silt fences down-gradient of disturbed areas to slow down runoff and retain sediment.
- Stabilize the construction entrance to reduce the tracking of mud and dirt onto public roads by construction vehicles.

- Stage excavated and stored construction materials and soil stockpiles in stable areas and cover or stabilize materials to prevent erosion.
- Stabilize temporary construction entrances to limit transport/introduction of invasive species and control fugitive dust emissions.

40 GEO-3: Site-specific geotechnical investigation for soil expansion

The design-level geotechnical evaluation shall consider the potential for expansive soils and include measures that would ensure that structures are not damaged by expanding and contracting soils. Feasible measures would include removal and replacement of soil, deep foundations, or deep mixing of compressible or expansive soils with stabilizing agents. All measures included in the geotechnical evaluation shall be incorporated into Project design specifications.

41 GEO-4: Preparation and implementation of a Paleontological Resources monitoring and protection plan

A Paleontological Resources, Monitoring, and Protection Plan (Paleontological Plan) shall be prepared for the proposed Project by a paleontologist or similar professional. The Paleontological Plan shall include BMPs to be followed by the contractor during construction of the proposed Project. The Paleontological Plan may include, but is not limited to:

- Processes and requirements for the observation of grading and earth disturbing activities to watch for fossils or other paleontological resources including identification of those construction activities/components of the proposed Project that might require monitoring.
- A process to follow if paleontological resources are discovered, including:
    - Stop all work and salvage unearthed fossil remains including simple excavation of exposed specimens or, if necessary, plaster-jacketing of large and/or fragile specimens, or richly fossiliferous deposits
    - Record stratigraphic and geologic data to provide a context for the recovered fossil remains, typically including a detailed description of all paleontological localities within the Project site, as well as the lithology of fossil-bearing strata within the measured stratigraphic section, if feasible, and photographic documentation of the geologic setting
    - Prepare collected fossil remains for curation, to include cleaning the fossils by removing the enclosing rock material, stabilizing fragile specimens using glues and other hardeners, if necessary, and repairing broken specimens;
    - Curate, catalog and identify the fossil remains to the lowest taxon possible, inventory specimens, assign catalog numbers, and enter the appropriate specimen and locality data into a collection database; and

- Transfer the cataloged fossil remains to an accredited institution (museum or university) in California that maintains paleontological collections for archival storage and/or display. The transfer shall include copies of relevant field notes, maps, stratigraphic sections, and photographs.
- Prepare a Paleontological Resources Mitigation Report summarizing the field and laboratory methods used, the stratigraphic units inspected, the types of fossils recovered, and the significance of the fossils collected, and provide this report to the Project Sponsors, Stanislaus County, and appropriate paleontological programs/institutions near the proposed Project site such as the University of California (Berkeley) Museum of Paleontology or the Natural History Museum of Los Angeles County.
- The Paleontological Plan shall be reviewed and implemented by Project Sponsors and the contractor.

3.8.3.2 Alternative 1 (No Action)

Alternative 1 would not have any impacts related to ground failure, soil erosion, unstable soil, expansive soil, or paleontological resources.

3.8.3.3 Alternative 2 (DPCR 82 TAF)

Ground Failure Including Liquefaction and Landslides. Under Alternative 2, structures including the pump station, dams, and pipelines, would be subject to damage from earthquakes. The intensity of such an event would depend on which fault the earthquake occurs, the distance of the epicenter from the Project site and the magnitude and duration of shaking. While the Project is not located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special Publication 42, there are two active faults within 10 miles of the dam – Great Valley 07/Orestimba (San Joaquin) and Great Valley 08/Quinto (San Joaquin) (see **Table 3.8-1**).

The Del Puerto Canyon study area would likely experience strong ground shaking in the future. The most severe loadings a dam usually experiences are due to earthquake induced ground shaking. Strong ground shaking can result in damage and instability of the dam embankment, strength loss of the foundation, instability of the natural reservoir rim, and reservoir overtopping the dam caused by a seiche. No active faults are mapped within the Project site. The Great Valley/Orestimba fault is mapped 0.2 miles east of the dam (see **Table 3.8-1**). Strong ground shaking and potential surface fault rupture/tectonic deformation associated with the Coast Ranges-Sierran Block boundary zone or nearby faults may impact the Project under Alternative 2 (**Figure 3.8-2**). **Table 3.8-1** includes the potential fault sources near Alternative 2.

As noted in EPM GEO-1, the Project under Alternative 2 would be designed to meet all DSOD requirements. Specific recommendations and considerations that shall be addressed include but are not limited to measures to ensure foundation stability, management of seepage, adequate capacity of the spillway and outlet works, and rim stability. The main dam and saddle dam and all associated structures would be designed to remain stable during an earthquake.

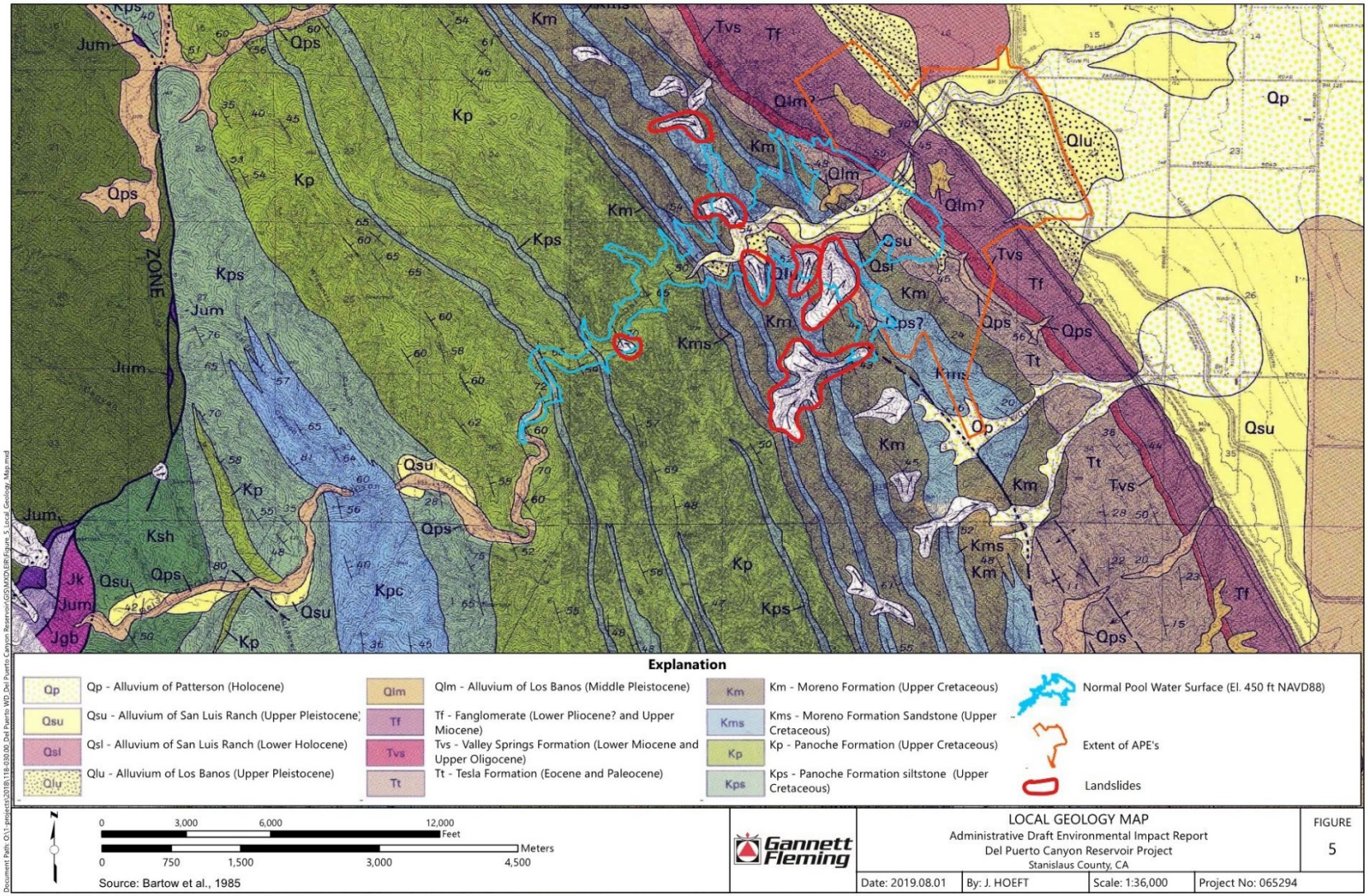

Figure 3.8-2: Site Geologic Map –Alternative 2

Potential hazards could result from secondary ground failure (i.e., seismically induced settlement) associated with the expected level of seismic ground shaking, landslides, and subsidence. These hazards could result from either local geologic conditions or Project construction and operations. The dam foundation would be founded upon bedrock and is not susceptible to liquefaction. The conveyance facilities are sited on dense sandy and gravelly material above the groundwater table and are thus also not susceptible to liquefaction. There is a risk of substantial adverse effects due to strong seismic ground shaking, seismic-related ground failure and landslides. With implementation of EPM GEO-1, seismic-related impacts would be reduced.

Soil Erosion. Alternative 2 includes the construction of reservoir facilities, and the relocation of Del Puerto Canyon Road and existing utility corridors. In total, about 1,600 acres of land would be disturbed by construction of facilities (including utility and road relocation) or inundated by water behind the dams. Construction activities would require excavation, soil relocation, grading, trenching, and other activities that would result in the temporary disturbance of soil and would expose disturbed areas to storm events. Rain of sufficient intensity and duration could dislodge soil particles, generate runoff, and cause localized erosion. Soil disturbance could result in loss of topsoil because of wind erosion and heavy rain events. Heavy equipment traffic in the Project sites could result in soil compaction which would reduce the water holding capacity of the soil, increasing the potential for runoff and erosion. Because Alternative 2 would disturb more than 1 acre of land during construction, coverage under the State of California General Construction Storm Water Permit (Construction General Permit, Order No. 2009-0009-DWQ as modified by Order No. 2010-0014-DWQ and 2012-0006-DWQ) would be required.

Operation of the Project under Alternative 2 would not include scheduled or regular disturbance of soil. Dam faces would be designed to minimize the risk of erosion to maintain structural integrity. Other Project facilities, such as the pump facilities and electrical components, would be designed using BMPs to reduce the risk of erosion. Operational impacts are therefore negligible. There is a risk of substantial adverse effects due to soil erosion or loss of topsoil. However, through the implementation of EPM GEO-2, the construction of the Project components would comply with the site specific and approved SWPPP to reduce the risk and impact associated with soil erosion and loss of topsoil to an acceptable level.

Unstable Soil. As described above, the Project facilities lie in an area susceptible to seismic activity, landslides, lateral spreading, subsidence, and collapse. At least seven landslides are mapped within the inundation area of the proposed reservoir at Del Puerto Canyon. It is expected that additional small landslides and movement of existing landslides would occur as a result of reservoir infilling and operations. These landslides would be expected to experience continuous deformation without some form of stabilization/mitigation. The reservoir would be designed and managed to address the potential for landslide activity. The dam foundation would be founded upon bedrock and is not susceptible to liquefaction. The conveyance system (pipeline and pump station) would be founded on dense sandy and gravelly material above the groundwater table and is thus not susceptible to liquefaction. Design of the road alignment has focused on increasing stability and reducing the impact of seismically triggered landslides to reasonably decrease disruptions and damage to the roadway. There is a risk of substantial adverse effects due to the proposed Project location on a geologic unit or soil that is unstable or potentially unstable. However, through the implementation of EPM GEO-1, the design of the Project components would use the design and

construction measures from the Geotechnical Investigation and Report to mitigate potential on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse from geologic units or soils that are unstable or could become unstable due to the proposed action.

Expansive Soil. There is limited potential for expansive soils in the Del Puerto Canyon study area, and expansive soils are not expected to adversely affect the Project. Expansive soils would be considered during the design of the Project. The risk of substantial adverse effects due to the Project location on expansive soil creating substantial direct or indirect risk of life or property is minimal. Through the implementation of EPM GEO-4, the design of the Project components would address direct or indirect risks to life or property due to expansive soils and ensure that structures are designed to avoid damage from soil expansion and contraction.

Paleontological Resources. Alternative 2, including the pump station, conveyance, road and utility relocation, and the dam and inundation area has the potential to disturb approximately 1,600 acres. One Pleistocene horse, one Mosasaur, 1 Hadrosaur, and 1 Miocene antelope have been found within the Del Puerto Canyon study area (Mitchell 2005; Hilton 2003). Therefore, many of the geologic units in the study areas are sensitive for paleontological resources. If fossils are present where development is planned, they could be damaged by earth-disturbing activities during construction, such as excavation for foundations, placement of fills, trenching for utility systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources. Alternative 2 includes the construction of several facilities requiring earth-disturbing activities such as trenching and the installation of pipelines and dams. Due to these activities, there is a risk of directly or indirectly destroying unique paleontological resources, sites, or unique geologic features.

Through the implementation of EPM GEO-5, the Projects Sponsors and the contractor would implement the Paleontological Plan to mitigate impacts to paleontological resources. Preservation and recordation of paleontological resources would reduce impacts.

3.8.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be the same as described above for Alternative 2.

3.8.3.5 Alternative 4 (DPCR 40 TAF)

The Project facilities under Alternative 4 lie in an area susceptible to seismic activity, landslides, lateral spreading, subsidence, and collapse. The Alternative 4 main dam would be at the same location as the Alternative 2 main dam, so the distances to nearby faults would be the same (see **Table 3.8-1**). Although smaller, Alternative 4 would still entail similar geotechnical constraints and would require EPMs to ensure dam safety and protection from ground failure, unstable and expansive soil, and paleontological resources similar to the proposed action. Thus impacts under Alternative 4 would be the same as described above for Alternative 2, although they would apply to a smaller area.

3.8.3.6 Alternative 5 (Ingram Canyon)

Ground Failure Including Liquefaction and Landslides. Alternative 5 structures would be subject to damage from earthquakes. While Alternative 5 is not located within a Fault-Rupture Hazard Zone designated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 and Special

Publication 42, there are three active faults within 10 miles of the dam (Great Valley/Orestimba fault and Great Valley/Quinto fault).

No active faults are mapped within the Ingram Canyon study area. The Great Valley/Quinto fault is mapped 1.9 miles east of the dam. Strong ground shaking and potential surface fault rupture/tectonic deformation associated with the Coast Ranges-Sierran Block boundary zone or nearby faults may impact Alternative 5 (**Figure 3.8-3)**. **Table 3.8-1** includes the potential fault sources near Alternative 5. This alternative would be designed to meet all DSOD requirements and implement EPM GEO-1. With implementation of EPM GEO-1, seismic-related impacts would be reduced.

Soil Erosion. Alternative 5 includes structures, including pump station, dam, and pipelines, that would be subject to damage from earthquakes. In total, 435 acres of land would be disturbed or inundated by water behind the dam. Construction would result in temporary disturbance of soil, and the potential for runoff, erosion, and loss of topsoil. More than 1 acre of land would be disturbed during construction, so coverage under the State of California General Construction Storm Water Permit would be required.

Operation of Alternative 5 would entail minimal risk of erosion and the design of facilities would incorporate BMPs to reduce the risk of erosion. There is a risk of substantial adverse effects due to soil erosion or loss of topsoil during construction, but with implementation of EPM GEO-2, impacts would be minimized.

Unstable Soil. The Project facilities lie in an area susceptible to seismic activity, landslides, lateral spreading, subsidence, and collapse. There are no landslides mapped within the inundation area of the proposed Ingram Canyon reservoir, and it is thus not expected that landslides and movement of existing landslides would occur. The dam foundation and conveyance would not be susceptible to liquefaction. However, there is still a possible risk of substantial adverse effects due to this alternative's location on a geologic unit or soil that is unstable or potentially unstable without mitigation. With implementation of EPM GEO-1, design would use measures to mitigate potential landslide, lateral spreading, subsidence, liquefaction, or collapse from geologic units or soils that are unstable or could become unstable.

Expansive Soil. There is limited potential for expansive soils in the Ingram Canyon study area, and expansive soils are not expected to adversely affect the Project facilities. Expansive soils would be considered during the design. There is a minimal risk of substantial adverse effects due to the location on expansive soil creating substantial direct or indirect risk of life or property. Through the implementation of EPM GEO-4, design would address risks due to expansive soils and ensure that structures are designed to avoid damage from soil expansion and contraction.

Paleontological Resources. The Alternative 5 Project facilities and inundation area have the potential to disturb approximately 435 acres. Within the Ingram Canyon study area, 461 Miocene vertebrate fossils were found. Therefore, geologic units within the study area are sensitive for paleontological resources. Fossils, if present, could be damaged during construction. There is a risk of directly or indirectly destroying unique paleontological resources, sites, or unique geologic

features. This alternative would implement EPM GEO-5 to mitigate impacts to paleontological resources. Preservation and recordation of paleontological resources would reduce impacts.

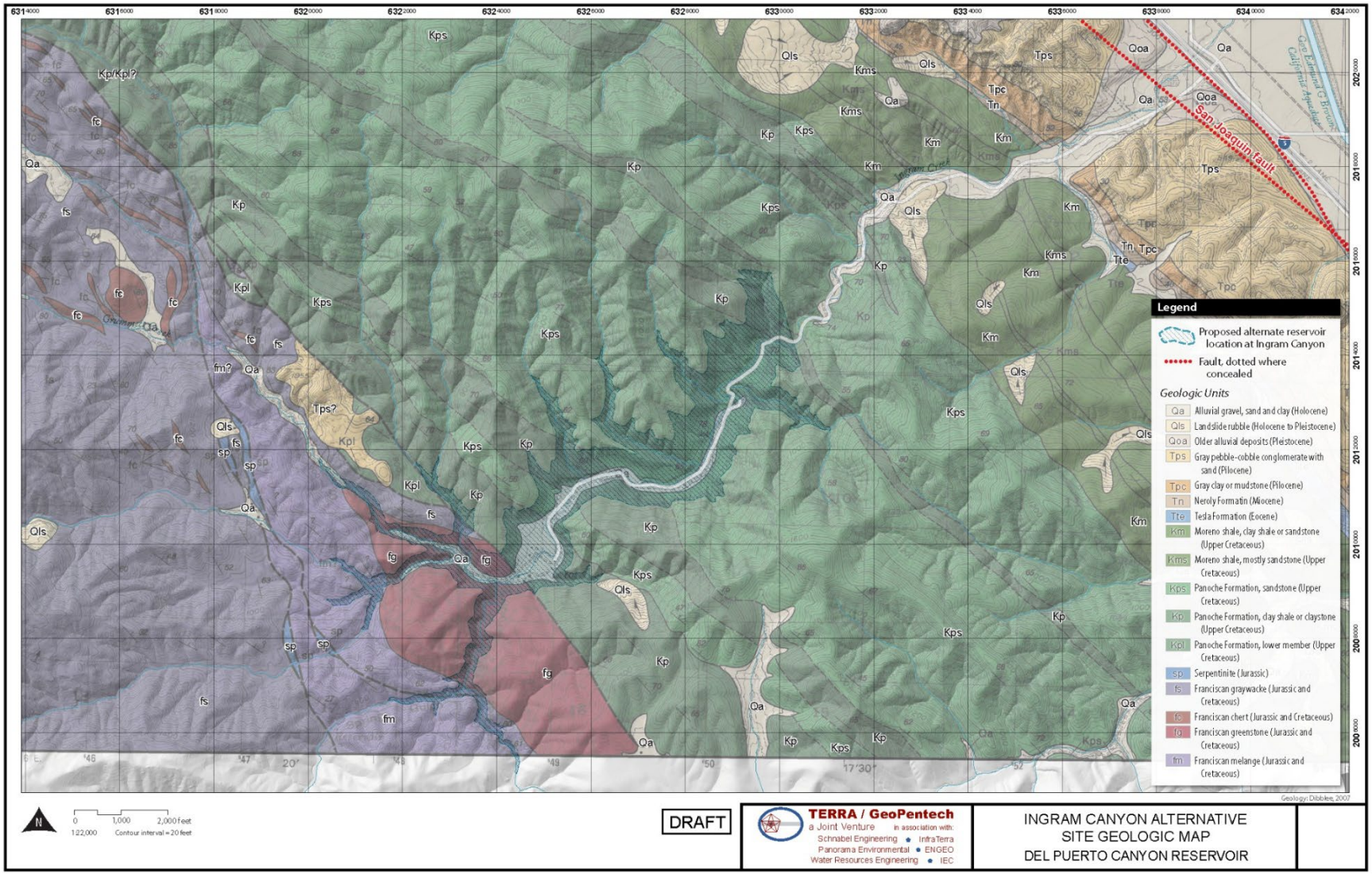

Figure 3.8-3: Site Geologic Map – Alternative 5

3.9 Hazards and Hazardous Materials

3.9.1 Affected Environment

This section describes the affected environment related to hazards and hazardous materials.

3.9.1.1 Study Area

The Del Puerto Canyon study area (see **Figure 3.9-1**) includes the Alternative 2, Alternative 3, and Alternative 4 Project sites. The Ingram Canyon study area includes the Alternative 5 site (**Figure 3.9-2**). The evaluation of the study areas includes an assessment for the presence of hazardous materials sites including known contamination sites and utility lines such as gas and petroleum pipelines that could present a hazard during construction.

3.9.1.2 Issues of Environmental Concern

Issues of environmental concern for hazards and hazardous materials are hazardous materials that would be used or stored on site during construction and operation, potential for accidental hazardous substance release, and presence of other health-threatening factors.

3.9.1.3 Characterization

The area affected by the action includes the footprints of the proposed Project infrastructure, areas where utilities may need to be relocated, and any areas of potential disturbance related to constructing the proposed Project alternatives, and any hazards or hazardous materials located within these areas.

A search of the EnviroStor and GeoTracker databases shows no known contamination sites within 1,000 feet of the Del Puerto Canyon study area.

The EnviroStor database indicated that Modesto Energy operated a Hazardous Waste Facility, located at 4549 Ingram Creek Road, which is approximately 0.13 miles from the proposed conveyance pipeline in the Ingram Canyon study area. However, the facility shut down in January 2000. The site was remediated via a cleanup program completed on March 30, 2007 (DTSC 2025).

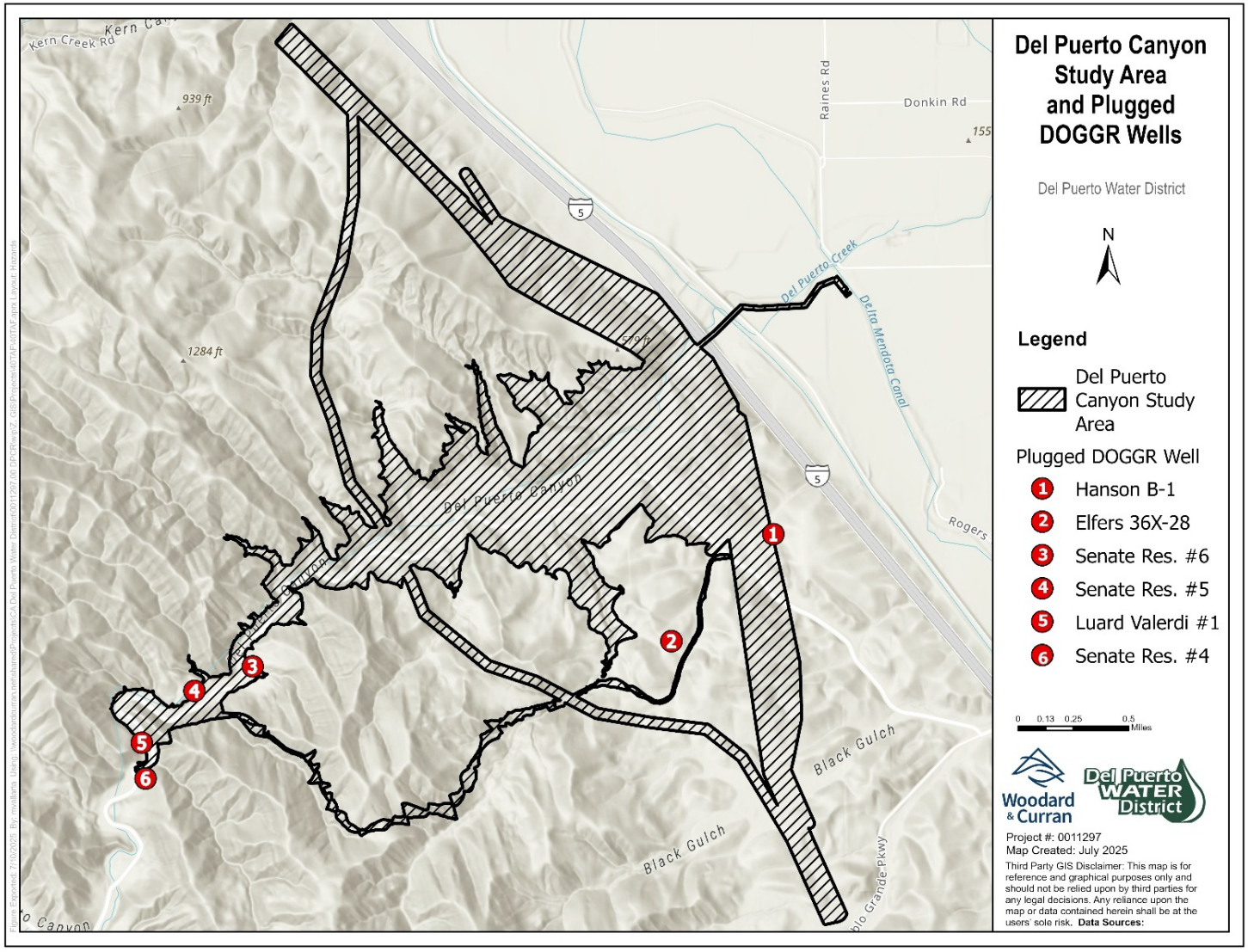

Figure 3.9-1: Del Puerto Canyon Study Area and Plugged DOGGR Wells

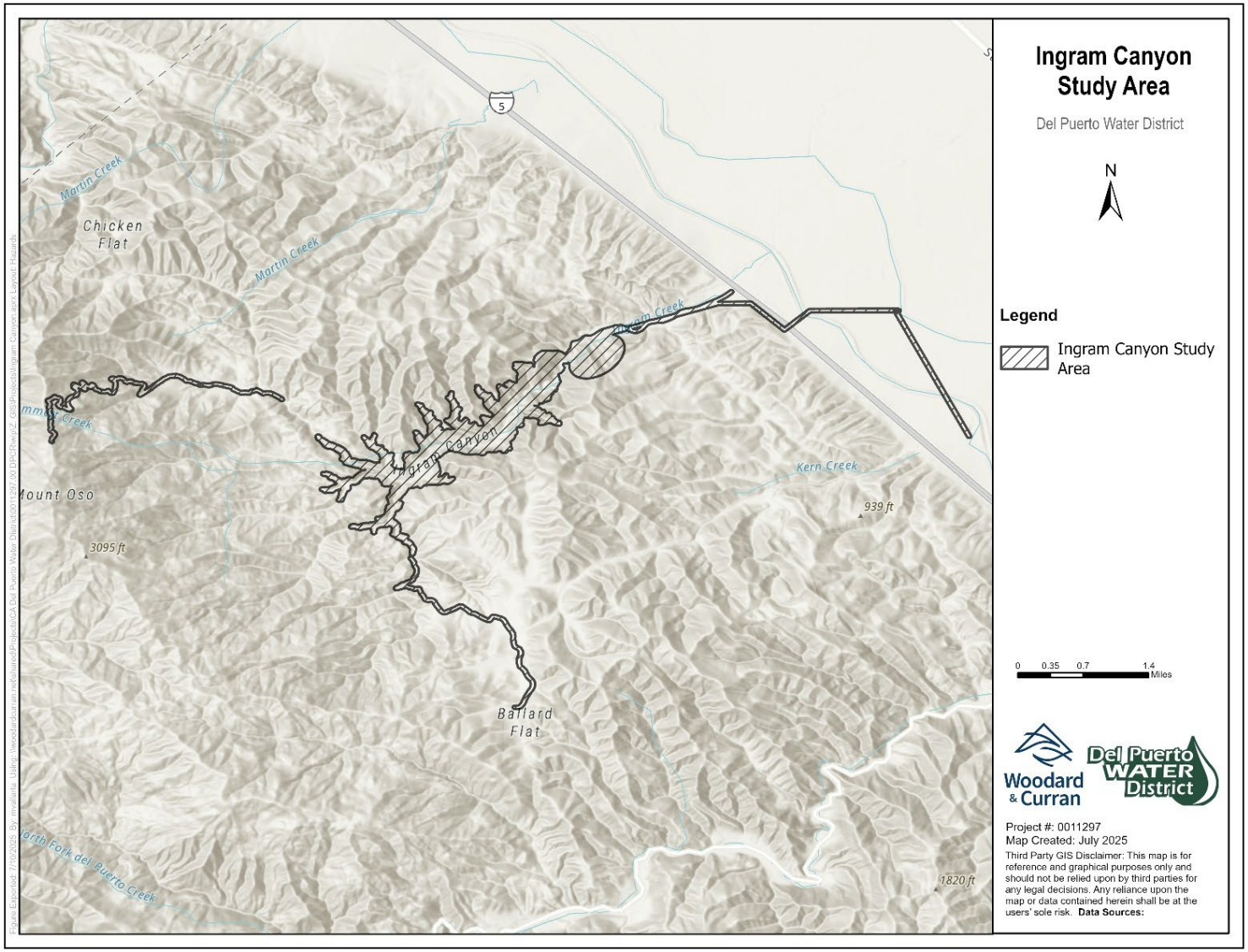

Figure 3.9-2: Ingram Canyon Study Area

The GeoTracker database indicated four clean-up sites near Alternative 5 facility locations (SWRCB 2025):

- Westley Fuel Service (4549 Ingram Creek Road): 0.13 miles from the conveyance pipeline. The Leaking Underground Storage Tank (LUST) Cleanup Site was completed, and the case is closed as of April 10, 2018.
- Ameri Oil (4507 Howard Road): 0.14 miles from the conveyance pipeline. The LUST Cleanup Site was completed, and the case is closed as of November 22, 1999.
- Westley Triangle Truck Stop (7051 McCracken Road): 0.5 miles from the conveyance pipeline. The LUST Cleanup Site was completed and the case closed as of May 17, 2002.
- BP Station #30267 (7143 McCraken Road): 0.5 miles from the conveyance pipeline. LUST Cleanup Site completed, and the case is closed as of July 20, 2001.

Existing potentially hazardous utilities within Del Puerto Canyon study area include a PG&E natural gas pipeline and petroleum pipeline operated by Crimson Pipeline Company.

There are six dry plugged oil wells within the Del Puerto Canyon study area indicated on the Division of Oil, Gas, and Geothermal Resources website. Well locations and associated oil well sumps need to be verified prior to construction. There are no existing oil wells within the Ingram Canyon study area.

The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for the fire management within the Del Puerto Canyon and Ingram Canyon study areas. Lands within these study areas are designated as Medium and High Fire Severity Zones (CAL FIRE 2025).

3.9.2 Regulatory Setting

Laws and regulations at the Federal, state, and local level that may apply to the Proposed Action are presented in Appendix E.

3.9.3 Environmental Consequences

3.9.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) for hazards and hazardous materials are listed below. EPMs HAZ-1c and HAZ-1d are applicable to Alternatives 2, 3 and 4. EPMs HAZ-1a, HAZ-1b, and HAZ-1e, are applicable to all Action Alternatives.

42 **HAZ-1a: Hazardous Materials Management and Spill Control Plan**

Before construction begins, the Project Sponsors shall require all construction contractors to develop and implement a Hazardous Materials Management and Spill Control Plan (HMMSCP) that includes a Project-specific contingency plan for hazardous materials and waste operations, including management of contaminated soil. The HMMSCP shall be reviewed and approved by Project Sponsors and shall establish policies and procedures

consistent with applicable codes and regulations, including but not limited to the California Building and Fire Codes, as well as federal OSHA and Cal/OSHA regulations. Any substance defined by the California Accidental Release Program as extremely hazardous would also require preparation of a Risk Management Plan. Elements of the HMMSCP shall include, but not be limited to the following:

- A discussion of hazardous materials management, including delineation of hazardous material storage areas, access and egress routes, waterways, emergency assembly areas, and temporary hazardous waste storage areas;
- Notification and documentation of procedures; and
- Spill control and countermeasures, including employee spill prevention/response training.

43 **HAZ-1b: Preparation of Hazardous Materials Business Plan**

If Project operations involve the use, handling or storage of hazardous materials in excess of threshold quantities, prior to operation of the new facilities, Project Sponsors shall prepare and implement a Hazardous Materials Business Plan (HMBP) for the proposed Project. The plan shall be prepared in accordance with the Hazardous Materials Business Plan Program (California Health and Safety Code, Section 25500, et seq., and the related regulations in CCR Title 19 Section 2620, et seq.), and shall be filed with the California Environmental Reporting System. The HMBP shall include a hazardous materials inventory, site plan, an emergency response plan, and requirements for employee training.

44 **HAZ-1c: Implement Avoidance and Minimization Measures for Impacts Related to the Abandoned Oil Wells**

During the Project design phase, Project Sponsors shall verify exact locations of all wells where Project construction would disturb the soil above the well location and shall mark the locations of wells for future reference. Special attention shall be paid to Wells 3 and 6, which are potentially located in the footprint of the reservoir inundation area and roadway realignment, respectively. For any well that is outside the Project footprint but within 100 feet of the proposed construction area, Project Sponsors shall impose a 10-foot, no-build buffer zone around the well. If any wells are within the area that would be affected by construction or operation of the Project. Project Sponsors shall determine if avoidance is feasible, and if the avoidance is not possible, **Measure HAZ-1d** shall be implemented**.**

45 **HAZ-1d: Management of Abandoned Oil Wells**

For any wells determined to be within the proposed footprint of Project facilities, Project Sponsors shall work with the Geologic Energy Management Division (CalGEM) to ensure that any abandoned well within the inundation area of the Del Puerto Canyon Reservoir is abandoned to current standards. CalGEM will conduct a lease and site inspection for the well. If the well is determined to be hazardous it shall be re-abandoned to current

standards. If any unknown wells are discovered during Project construction CalGEM shall be notified immediately. Work on abandoned wells shall be permitted and approved by CalGEM, including any modifications, re-abandonment, or mitigation of leaking fluids or gas. Project Sponsors shall communicate pertinent information from CalGEM to the appropriate county recorder for inclusion in the title information of the subject real property. Physical access to any abandoned well shall be maintained in the event re-abandonment becomes necessary in the future. Rig access shall be maintained to allow a well servicing rig and associated necessary equipment to reach the well without disturbing the surrounding infrastructure. Requirements for physical access shall be considered during design and shall be coordinated with CalGEM.

46 **HAZ-1e: Soil Sampling and Disposal**

Prior to acquiring property or obtaining easements for construction of Project facilities, Project Sponsors shall complete a Phase I Environmental Site Assessment for soil and groundwater contamination and potential hazardous materials in structures. The recommendations set forth in the Phase I assessment shall be implemented to the satisfaction of applicable agencies before construction begins. If Phase I assessments indicate the potential for contamination, a Phase II Environmental Site Assessment shall be completed before construction begins. The Phase II assessment may include building material, soil and/or groundwater sampling and analysis for any anticipated contaminants. If the Phase I assessment identifies potential presence of contamination from agricultural activities, the Phase II Assessment would include evaluation of abandoned orchards to test for the presence of organochlorine pesticides (OCPs) in accordance with DTSC's Interim Guidance for Sampling Agricultural Properties. The Phase II sampling is intended to identify how to dispose of any potentially harmful material from excavations, and to determine if construction workers need specialized personal protective equipment while constructing the pipeline through that area. Contaminated soil will not be reused for backfill following excavation. If soil or groundwater contaminated by potentially hazardous materials is exposed or encountered during construction that was not identified in the Phase I assessment, the appropriate hazardous materials agencies shall be notified. If contaminated soils must be excavated and removed from the site, the removal of contaminated soil would be subject to the measures described under **Measure HAZ-1a**.

3.9.3.2 Alternative 1 (No Action)

Under Alternative 1 there would be no impacts associated with hazardous waste or hazardous materials.

3.9.3.3 Alternative 2 (DPCR 82 TAF)

Construction of Alternative 2 could release hazardous materials through accidental release of hazardous materials during construction, relocation of utilities, and construction near abandoned oil wells. Construction would involve the use and storage of diesel fuels and minor amounts of paints, solvents, and glues. While there are no known contaminant sites within the study area, construction activities such as excavation, trenching, and other ground disturbances could potentially unearth previously unidentified contaminated soil or encounter contaminated groundwater, including

potential contaminants associated with abandoned oil wells. Implementation of the EPMs above would mitigate the potential adverse effects from impacts of Alternative 2.

Additionally, relocating the petroleum pipeline could unearth contaminated soil. However, the existing pipeline would be shut down and removed in accordance with federal, state, and local standards, including proper sampling and clean-up of any potentially contaminated soil that may be encountered during excavation of the pipeline.

3.9.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be the same as those described above for Alternative 2.

3.9.3.5 Alternative 4 (DPCR 40 TAF)

Construction activities for Alternative 4 would involve ground disturbing activities (excavation, trenching) that could encounter contaminated soil or groundwater. Alternative 4 would only affect two of the six dry plugged oil wells in the Del Puerto Canyon study area. The petroleum pipeline would be relocated to the same location as with Alternative 2. The existing pipeline would be shut down and removed in accordance with federal, state, and local standards. Implementation of EPMs (see Section 3.10.2.2) would mitigate the potential adverse effects of impacts from Alternative 4.

3.9.3.6 Alternative 5 (Ingram Canyon)

Construction of Alternative 5 would also include ground disturbing activities that could potentially encounter contaminated soil or groundwater. However, the relocation of the petroleum pipeline would not be required because the dam and reservoir would be located west of those facilities. Additionally, the Ingram Canyon Site does not contain any abandoned well sites (CDOC 2025). If any unknown wells are discovered during Project construction CalGEM would be notified immediately. All the sites reported in the Envirostor and GeoTracker databases are closed, but implementation of EPM **HAZ-1a** would minimize the risk of hazardous materials and accidents by requiring the contractor to develop a Hazardous Materials Management and Spill Prevention and Control Plan.

3.10 Hydrology and Water Quality

3.10.1 Affected Environment

This section describes the hydrology and water quality in the Project study areas and the potential impacts the Project alternatives may have on these resources.

3.10.1.1 Study Area

The study areas for hydrology and water quality include the Project sites for each alternative where facilities would be constructed and operated. The Del Puerto Canyon study area includes Del Puerto Creek both within and downstream of the reservoir footprint. The Ingram Canyon study area includes Ingram Creek both within and downstream of the reservoir footprint. Both study areas include the Delta-Mendota Canal (DMC), San Luis Reservoir, and the San Joaquin River where operations could alter flows and affect water quality or hydrology (see **Figure 3.10-1**).

3.10.1.2 Issues of Environmental Concern

Issues of environmental concern for hydrology and water quality are impacts from construction including dewatering activities, effects on groundwater, possible water quality impacts associated with harmful algal blooms (HABs), potential for inundation as a result of a dam breach, potential downstream impacts to Del Puerto Creek, Ingram Creek, and the San Joaquin River, and the potential for effects on CVP and SWP operations.

3.10.1.3 Characterization

Surface Water Conditions. The study areas are located within the San Joaquin River Basin (Basin). The Action Alternatives could impact several water bodies, including Del Puerto Creek, Ingram Creek, the San Joaquin River, the DMC, and the San Luis Reservoir, depending on the alternative. Conditions of the Delta would not be impacted as a result of the Project, as discussed in detail in Section 2.4.2.

Del Puerto Creek is an intermittent creek that runs through the Del Puerto Canyon study area and is a tributary to the San Joaquin River. The watershed for the creek spans 47,842 acres. Flows within Del Puerto Creek vary highly and data is measured and recorded at the United States Geological Survey (USGS) Gaging Station 11274630, which is approximately 1,000 feet upstream from Interstate 5 (I-5). Del Puerto Creek does not have a specific beneficial use designation defined in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan) prepared by the California Regional Water Quality Control Board Central Valley Region. Therefore, Del Puerto Creek has the default beneficial use designation as municipal and domestic supply.

Ingram Creek is a 14-mile-long tributary to the San Joaquin River, dominated by agricultural discharges. The watershed for Ingram Creek spans 29,677 acres. It originates in the Diablo Range and flows through Ingram Canyon before joining a slough of the San Joaquin River at an elevation of 46 feet. Beneficial uses of Ingram Creek are defined in the Basin Plan, and include warm freshwater habitat and municipal and domestic supply.

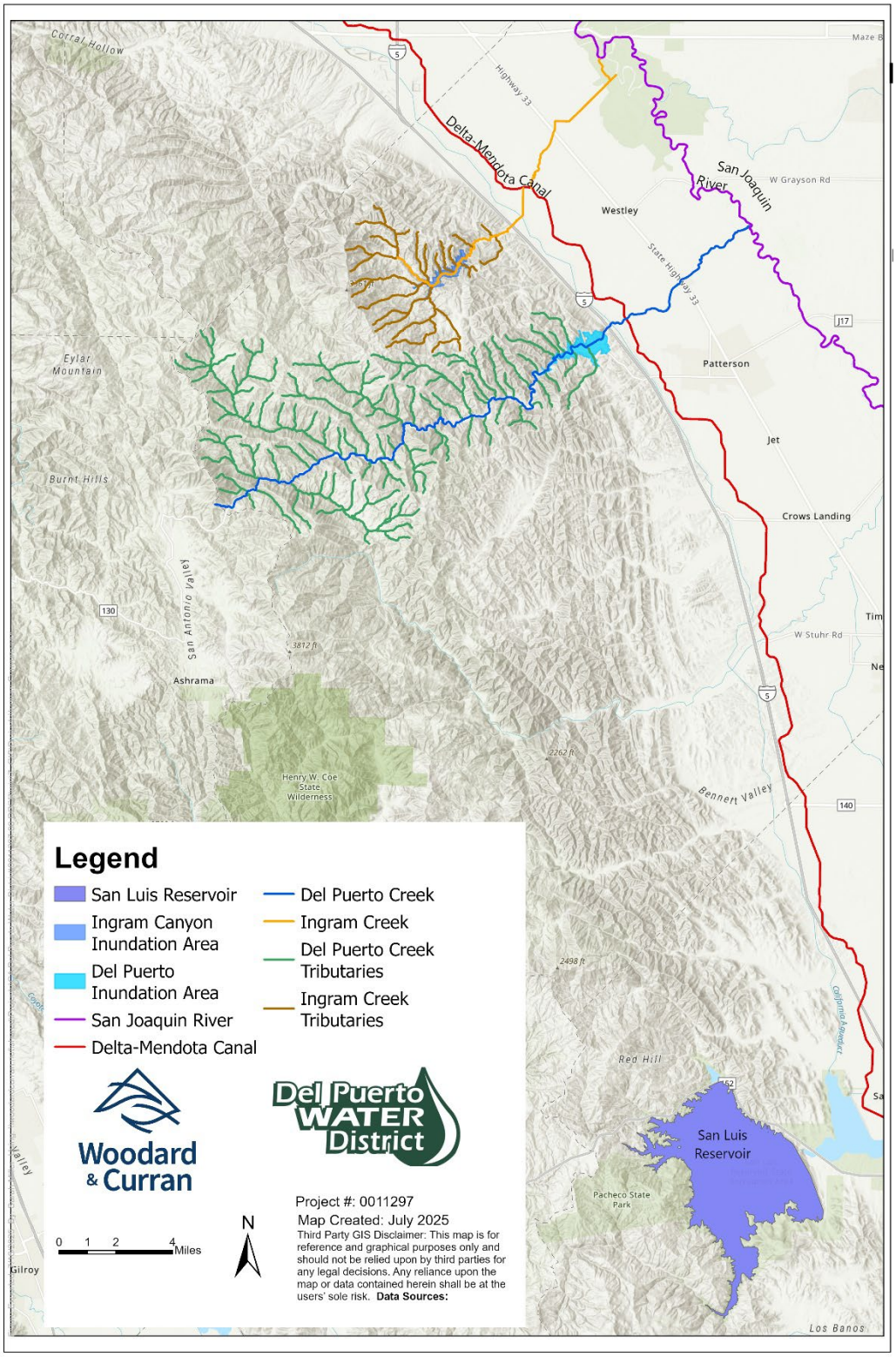

Figure 3.10-1: Study Areas for Del Puerto Canyon and Ingram Canyon

The San Joaquin River begins in the high Sierra Nevada and flows northerly into the Sacramento-San Joaquin River Delta. Beneficial uses for the San Joaquin River include municipal and domestic supply, irrigation, stock watering, industrial process water, contact and non-contact recreation, warmwater habitat, warmwater and coldwater fish migration, warmwater fish spawning and wildlife habitat.

The DMC is a Central Valley Project (CVP) facility operated and maintained by the San Luis & Delta-Mendota Water Authority under contract with Reclamation. The concrete lined canal is 117 miles long, starting at the C.W. Bill Jones Pumping Plant, and pumps water from the Sacramento-San Joaquin River Delta to the Mendota Pool. Beneficial uses of the DMC include warm freshwater habitat, irrigation, wildlife habitat, stock watering, recreation, municipal/industrial use, and noncontact use.

The San Luis Reservoir is a 2 million-AF artificial lake connected to the DMC via the O'Neill Forebay midway along the length of the DMC. San Luis Reservoir is operated jointly by Reclamation and the California Department of Water Resources (DWR).

There are Federal Emergency Management Agency (FEMA) Flood Hazard Areas located along Del Puerto Creek downstream of Alternatives 2, 3 and 4, between the California Aqueduct and the San Joaquin River (**Figure 3.10-2**). There are no flood hazard areas along Ingram Creek downstream of Alternative 5.

Hydrologic Unit Maps. Hydrologic Unit Codes (HUCs) are a standardized system developed by the USGS to classify and organize watersheds in the United States. HUCs provide a hierarchical framework that divides the United States into progressively smaller hydrologic units, ranging from large regions to small sub-watersheds. Each unit is identified by a unique code, which helps in managing and reporting hydrologic information. The boundaries of these units are determined based on topographic and hydrologic features, ensuring that they accurately represent natural watershed divisions. Because Ingram Creek has no stream gage data, watershed area is the primary basis for estimating flows. For purposes of estimating flows, HUC 10 and 12 regions were used, which divide the larger sub-region into watersheds (see **Figure 3.10-3** and **Figure 3.10-4**). Relative watershed sizes were combined with flow data from the Del Puerto Creek watershed to estimate flows in Ingram Creek.

Based on the HUC data, it is estimated that the total Del Puerto Creek watershed area is 47,842 acres, of which 46,499 acres are upstream of the proposed site for Alternatives 2, 3 and 4. The total Ingram Creek watershed is estimated at 29,677 acres, of which 11,160 acres are upstream of the proposed site for Alternative 5.

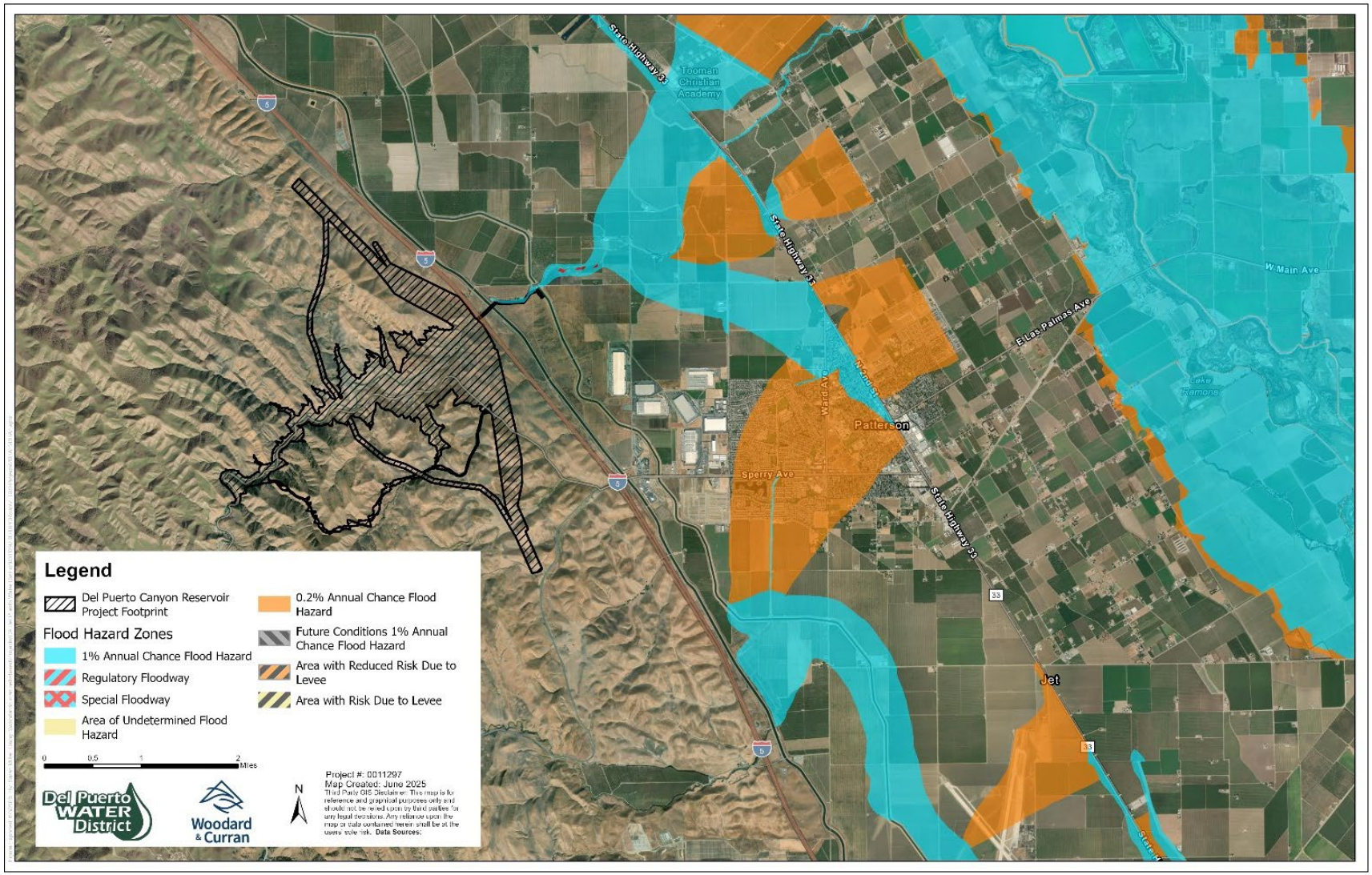

Figure 3.10-2: Del Puerto Creek Flood Hazard Areas

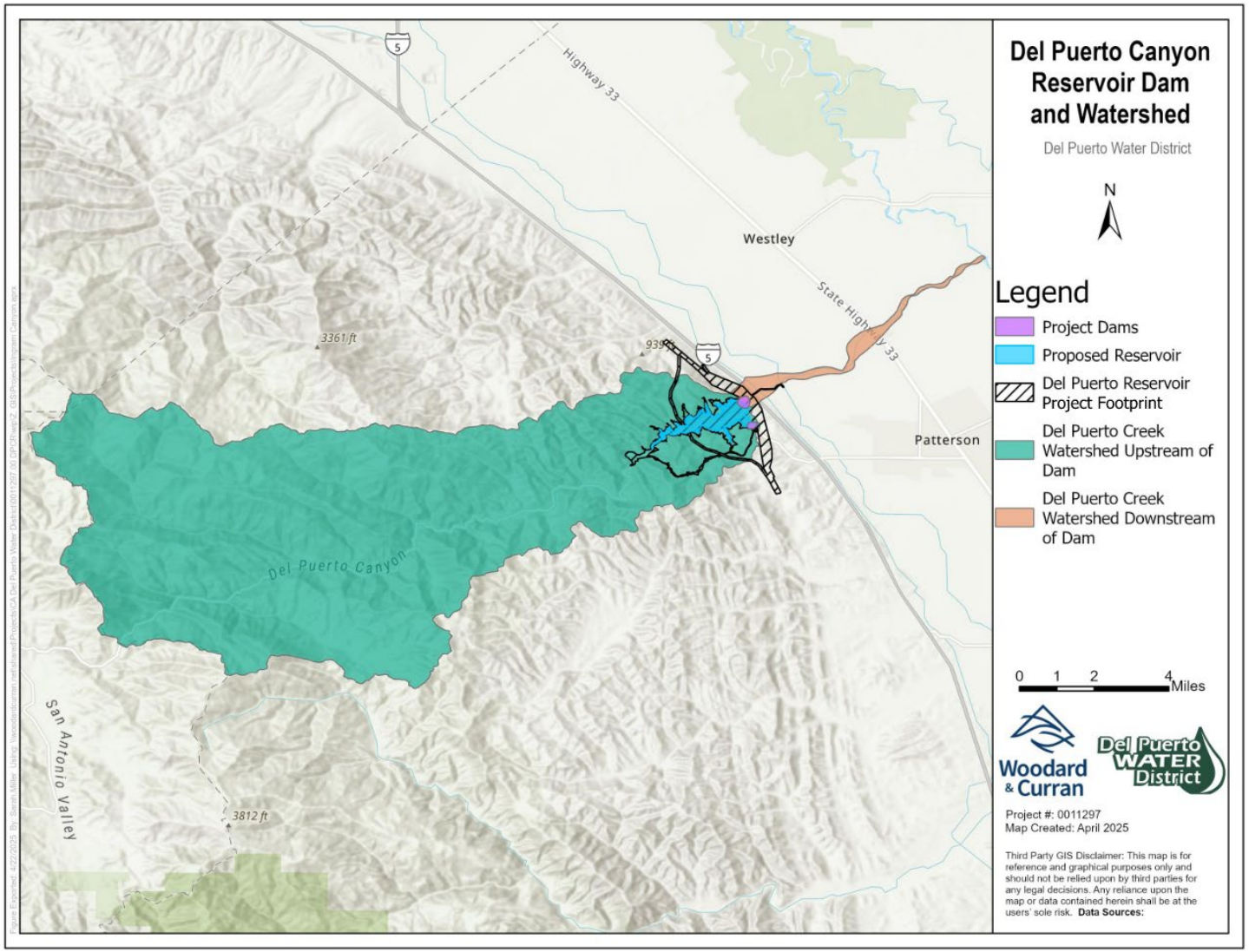

Figure 3.10-3: Del Puerto Creek Watershed

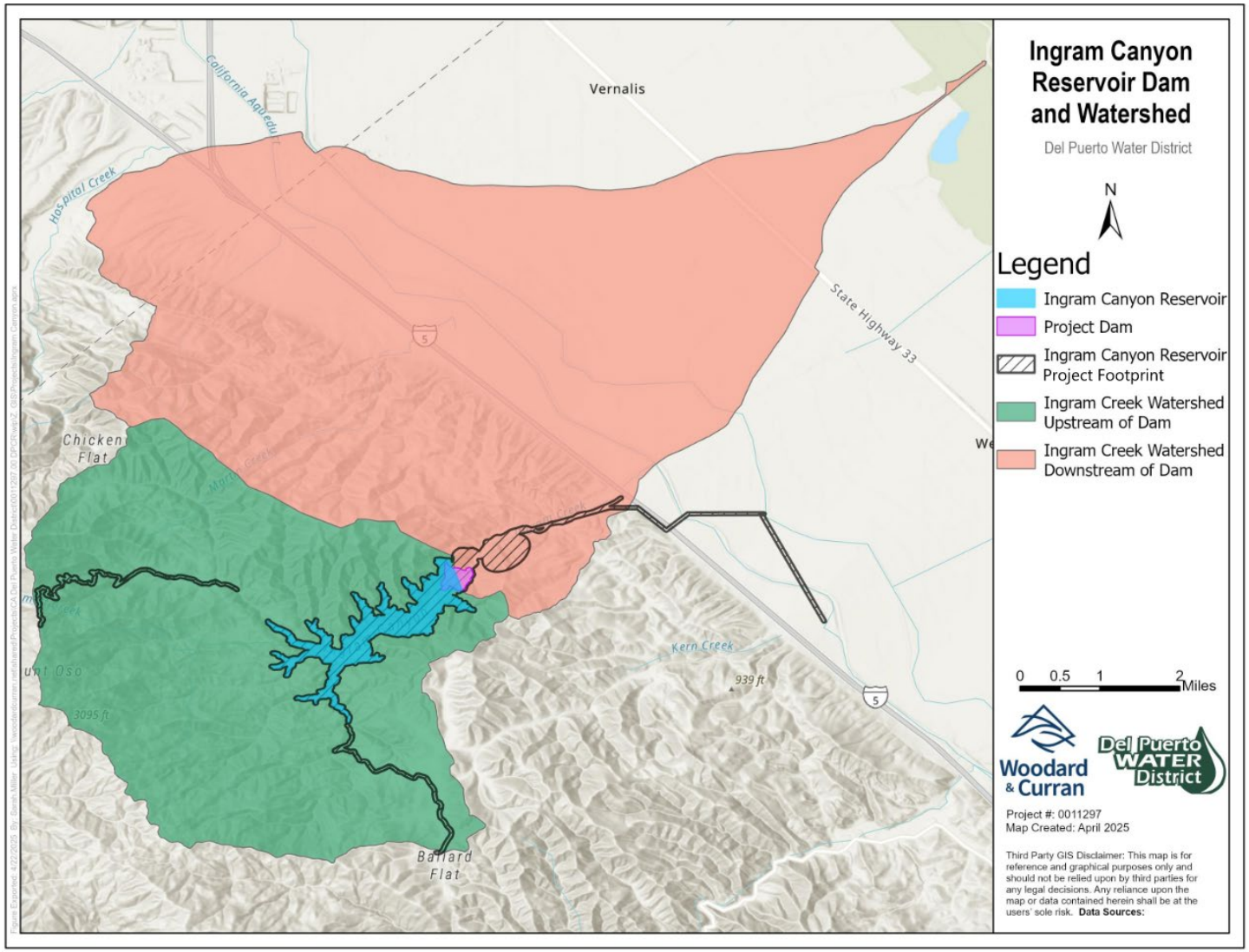

Figure 3.10-4: Ingram Creek Watershed

Groundwater Conditions. Portions of the proposed Project alternative sites east of I-5, including the pump stations and pipelines for all Action Alternatives, overlie the Delta-Mendota Subbasin located within the Northwestern Delta-Mendota Groundwater Sustainability Area jurisdiction. The Project reservoir sites are located outside of the Delta-Mendota Subbasin. Groundwater quality in the subbasin varies, with most being suitable for urban and agricultural uses, while some water in the upper aquifer has high levels of total dissolved solids (TDS) and nitrate, making the water unsuitable for potable use. Localized areas with other contaminants such as high chloride, boron, iron, manganese, and naturally occurring arsenic also exist (EKI Environment & Water 2024).

Surface Water Quality. Water quality data are available for the lower reaches of Del Puerto Creek (east of I-5) through the California Environmental Data Exchange Network (CEDEN). Water quality data for Del Puerto Creek is collected from multiple stations, including Vineyard Avenue and Highway 33. Across these stations, several contaminants were detected exceeding their method detection limits or reporting limits. Notably, *Escherichia coli* (E.coli) was detected multiple times at significantly elevated levels, including a peak concentration of 2,419.6 MPN/100 ml, well above the reporting limit of 1 MPN/100 ml. This high concentration suggests potential microbial contamination and suggests the presence of fecal pollution from sources such as livestock and wildlife. Additionally, the 2024 California Integrated Report lists several impairments for Del Puerto Creek, including pesticides such as pyrethroids and chlorpyrifos, metals, and other pollutants (SWRCB 2024). No data are available for the upper watershed of Del Puerto Creek west of I-5, but upper reaches are assumed to be of relatively high quality because agricultural activity is limited to grazing and the upper reaches are not affected by agricultural return flows.

Ingram Creek has been included on the U.S. Environmental Protection Agency's Clean Water Act 303(d) list of exceedances of water quality objectives for sediment toxicity associated with pyrethroids (SWRCB 2019). The Central Valley Water Board implemented the Pyrethroids Control Program, an amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, to address pyrethroids and other pyrethroid-related impairments. The Pyrethroid Control Program established Total Maximum Daily Loads (TMDLs) and a conditional prohibition of pyrethroid discharges into all waterbodies. Water quality data for Ingram Creek is collected from two stations at River Road and at Highway 33. Water quality data collected from the two monitoring stations revealed multiple instances where contaminant concentrations exceeded their respective reporting limits. Notably, E. coli levels were reported at elevated levels with a peak concentration of 2,419.6 MPN/100 ml. DWR also has a permanent monitoring station on Ingram Creek near its confluence with the San Joaquin River that monitors stage, salinity, and temperature.

Water Quality in the San Joaquin River is generally acceptable for its established beneficial uses. However, the river is affected by salts and nutrients from wastewater discharges and adjacent agricultural practices. The Central Valley Regional Water Quality Control Board implements the San Joaquin River Salt and Boron TMDL Real-Time Management Program, which is a collaborative effort aimed at improving water quality in the Lower San Joaquin River by regulating salt and boron concentrations. The program uses real-time monitoring and predictive modeling to manage discharges from agricultural and municipal sources. Additionally, non-project (i.e. non-CVP) water in the DMC must meet the Delta-Mendota Canal Non-Project Water Pump-In Program Monitoring Plan (Reclamation 2018) water quality standards prior to pumping into the DMC.

Harmful Algal Blooms (HABs). HABs occur when toxic cyanobacteria grow rapidly. These bacteria release cyanotoxins that can be dangerous to humans, pets, fish, and other wildlife. In California, HABs are most common from May to October. Reservoirs can exhibit conditions conducive to HABs, depending on the reservoir depth, currents, prevailing winds, drought conditions, and drawdown level (Bakker and Hilt 2016). These blooms are influenced by various environmental factors, including water temperature (at least 66°F), sunlight, low turbidity, calm and stratified water columns, long water residence times, and the availability of nutrients like nitrogen and phosphorus. Cyanobacteria, which are photosynthetic, thrive in high light conditions near the water's surface and accumulate in the photic zone (USEPA 2016a; Lehman et al. 2013; Berg and Sutula 2015). Elevated water temperatures, particularly between 77°F and 95°F, are crucial for bloom formation and maintenance, as they enhance cyanobacteria growth rates and water column stratification (Berg and Sutula 2015). Nutrient availability directly affects the duration, intensity, and distribution of blooms. Additionally, there is an increasing concern with benthic cyanobacteria blooms. Benthic cyanobacterial blooms are overgrowths of cyanobacteria that occur on the bottom of surfaces of water bodies such as rivers, lakes, and reservoirs.

Specific locations such as the Sacramento-San Joaquin Delta and various lakes and reservoirs in the Central Valley, such as Lake Oroville, San Luis Reservoir, and O'Neill Forebay have recorded algal blooms (Van Wichelen et al. 2016; Mioni et al. 2012; USEPA 2016b and 2019a; Central Valley Regional Water Quality Control Board and California State Parks 2016). Low reservoir levels can exacerbate HAB formation by increasing water temperatures and stabilizing the water column. While the Delta is not listed as impaired for microcystin or cyanotoxins, the USEPA has recommended additions to the 303(d) list for water temperature impairments (USEPA 2018). Nutrients in the Delta originate from municipal wastewater, stormwater, and agricultural drainage, contributing to the persistence of HABs. Both of the Project sites are on grazing land so nutrient inputs would be similar for both sites.

3.10.2 Regulatory Setting

Laws and regulations at the Federal, state, and local level that may apply to the Project are presented in Appendix E.

3.10.3 Environmental Consequences

3.10.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) for hydrology and water quality are listed below. Measures HYD-1a and HYD 1b apply to all Action Alternatives, but Measure HYD-2 only applies to Alternatives 2, 3 and 4, which would intercept flows from Del Puerto Creek.

47 **HYD-1a: Comply with General Order for Dewatering or Other Appropriate NPDES Permit**

To minimize the impacts to water quality from dewatering activities, the Project Sponsors shall implement measures contained in the General Order for Dewatering or other appropriate NPDES permit or Waste Discharge Requirement.

48 **HYD-1b: Comply with Reclamation Monitoring Plan for Non-Project Water Pump-in**

To minimize impacts to water quality for downstream users of the CVP, the Project Sponsors shall develop and implement a monitoring plan based on the Delta Mendota Canal Non-Project Water Pump-in Program Monitoring Plan (USBR 2018) to ensure compliance with Reclamation water quality standards. The monitoring plan will include sampling and testing of water quality prior to water entering the DMC. Contingency plans shall be implemented if water quality does not meet Reclamation standards.

49 **HYD-2: Develop Operational Requirements to Deliver Recharge Water to Lower Del Puerto Creek**

The Project Sponsors shall develop an operations manual (see Appendix J) that describes water delivery to the lower reach of Del Puerto Creek below the proposed dam to make up for a net 300 AFY of lost natural seepage due to the proposed Project. The manual shall provide releases, for the City of Patterson's benefit depending on water year type and Del Puerto Creek inflows, of up to 1,700 AFY. Such releases will augment existing/no-project in-stream recharge conditions. This EPM applies to Alternatives 2, 3 and 4.

3.10.3.2 Alternative 1 (No Action)

Under Alternative 1, there would be no potential for HABs, as no reservoir would be built, and no anticipated impacts to existing water quality due to construction. Alternative 1 would also not reduce the flood risk from Del Puerto Creek and would not result in additional surface water supply. With no reservoir there would be no potential for inundation from dam failure. Without additional surface water supply, Project benefits to effectively manage use of groundwater would not be realized. The Sustainable Groundwater Management Act (SGMA) imposes strict limitations on groundwater pumping, which constrains the ability of the Project Sponsors to rely on groundwater to meet demand. In the absence of new surface water storage, the Project Sponsors would have to pursue obtaining additional surface water resources, or portions of their service areas would need to be fallowed due to a lack of water supply. Under Alternative 1 CVP and SWP operations would be unchanged.

3.10.3.3 Alternative 2 (DPCR 82 TAF)

Water Quality Construction Impacts. Construction of Alternative 2 would have the potential to impact hydrology and water quality. Construction would include ground-disturbing activities that could result in increased erosion and sedimentation, potentially contaminating stormwater runoff and degrading water quality. A Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented to limit impacts to water quality from construction. During construction, dewatering would be conducted to remove excess groundwater from excavations developed for building the dam, installing pipelines, and installing the pumping plant. Per **HYD-1a,** dewatering operations would be conducted in accordance with the General Order for Dewatering or other appropriate NPDES permits. As part of the Project SWPPP discharge from dewatering would be tested before being discharged to ensure that construction-period impacts on water quality are minimized.

After construction of the pipelines, hydrostatic testing would need to be conducted and water from the testing would need to be discharged. Water from testing would be discharged in accordance with the General Order for Dewatering or other appropriate NPDES permits.

The Construction General Permit and the General Order for Dewatering are well established regulatory processes that, when complied with, effectively limit threats to water quality from construction activities such as those that would be conducted as part of the Project. Compliance with the permits (implementation of **Measures HYD-1a** and **HYD-1b**), would ensure potential impacts to the beneficial uses and water quality objectives of the downstream receiving waters, including Del Puerto Creek, the DMC and the San Joaquin River are minimal.

Water Quality Operational Impacts.
*DMC Discharge Standards***.** The water in the reservoir is projected to be comprised of 95 percent pumped water from the DMC and 5 percent from Del Puerto Creek flows. Because almost all of the water in the reservoir would come from the DMC, water quality within the reservoir is expected to meet DMC non-project discharge water quality standards. Implementation of Measure HYD-1b would ensure water entering the DMC meets the established Reclamation water quality standards.

HABs. Nutrient concentrations in the DPCR are not expected to limit HABs, as both Delta water via the DMC and flows from Del Puerto Creek would provide ample nutrients to support HAB formation within the proposed reservoir. Increases in reservoir storage from September through February are expected to increase water detention time and water temperature, creating conditions favorable for HAB formation and maintenance. Modeling performed for Alternative 2 indicates that water elevations would typically reach their lowest levels each year in August (Appendix J). The reduced storage volumes during the spring and summer months could result in higher concentrations of cyanotoxins if HABs form, due to less water being available for dilution compared to other times of the year. If HABs occur in the reservoir, cyanobacteria or cyanotoxins would not enter the water supply because the Reservoir Management Plan would require the Project Sponsors to monitor cyanobacterial cell density and discontinue export of water from the reservoir until the potential for drawing cyanobacteria into the outlet is no longer a concern or until cyanobacteria cell density has dropped below the established threshold(s) (see Project Description, Section 2.4.2.2, Reservoir Management Plan).

Therefore, cyanobacteria and cyanotoxins are not expected to substantially degrade surface water quality. Any HABs that develop in the reservoir would be temporary, generally occurring from May to October and usually dying off at the end of the bloom season. If present, cyanotoxins are also anticipated to be seasonal and degrade over time. All alternatives include development of a Reservoir Management Plan to ensure cyanobacteria and cyanotoxins are not exported from the reservoir. Consequently, the water quality impacts from HABs would be minimal, and no EPMs are required.

Groundwater Construction Impacts. The pump stations and pipelines for Alternative 2 overlie the Delta-Mendota Subbasin. Construction activities would not use groundwater, and therefore, would not interfere with recharge. However, as mentioned above, Alternative 2 includes ground-disturbing activities that may result in increased erosion and sedimentation, potentially contaminating stormwater runoff and degrading groundwater water quality. To limit groundwater

quality impacts, a SWPPP would be developed. Dewatering and hydrostatic testing would be conducted in compliance with established permits, such as the Construction General Permit and the General Order for Dewatering. Implementation of these EPMs (**Measures HYD-1a** and **HYD-1b**) ensures that impacts to groundwater quality remain minimal.

Groundwater Operation Impacts. The Project Sponsors would submit an application to the State Water Resources Control Board to divert Del Puerto Creek flows to storage within the reservoir. Under Alternative 1, about 2,400 AFY of runoff in Del Puerto Creek currently percolates into the groundwater basin between approximately the DMC and the San Joaquin River and is therefore a source of supply to groundwater pumpers, including agricultural pumpers and the City of Patterson. An analysis of reservoir and groundwater operations shows capturing natural flow in the reservoir could decrease the average volume of water that percolates from the creek into the groundwater basin from 2,400 AFY to 1,300 AFY (Appendix J). Storing water in the reservoir would contribute approximately 800 AFY to groundwater recharge through seepage (Appendix J), so the net change in recharge between Alternative 1 and Alternative 2 would be a reduction of 300 AFY.

The City of Patterson's Water Master Plan includes a proposed project to capture additional stormwater from Del Puerto Creek for groundwater recharge. This project, as described in the City's Water Master Plan, would produce a yield of up to 1,700 AFY from pumping recharged water under wet, above normal, and below normal water year conditions. The yield would be up to 1,275 AFY in dry and critically dry water year conditions and would be assumed to be zero in a dry or critically dry year if the previous year were also dry or critically dry. Operation of Alternative 2 would reduce flows in Del Puerto Creek and thus result in a reduction of flows available for the City of Patterson's stormwater capture and recharge project.

Operation impacts would permanently decrease Del Puerto Creek groundwater recharge flows from Del Puerto Creek from 2,400 AFY to 1,300 AFY, but would also augment recharge because the reservoir would contribute about 800 AFY of recharge. Implementation of **HYD-2** would require the Project Sponsors to develop an operations manual that describes water delivery to the lower reach of Del Puerto Creek below the proposed dam to make up for the 300 AFY of lost natural seepage due to Alternative 2 and augment flows in dry years when there would be very little flow in the creek. The procedures shall provide for releases of up to 1,700 AFY under Del Puerto Creek water rights to benefit the City of Patterson depending on water year type and Del Puerto Creek inflows. These releases will maintain stream flows and augment flows in dry years and allow continued in-stream recharge. With implementation of **HYD-2**, the Project Sponsors would deliver water to ensure that the groundwater supply available to groundwater pumpers is improved as compared to Alternative 1 due to the construction and operation of Alternative 2, which includes reserving and releasing flows to meet the City of Patterson's proposed future project needs.

100-Year Floodplain. Operation of the reservoir would prevent the 100-year flow events of Del Puerto Creek from occurring as these flows would be captured and stored in the reservoir.

Dam Inundation. Construction of the reservoir would introduce a dam breach/inundation risk scenario for downstream facilities and the City of Patterson. The evaluation indicates that the probability of such an event is very low because the dam structure would be designed to meet stringent safety requirements required by the California Department of Water Resources Division of

Safety of Dams (DSOD). DSOD sets comprehensive safety requirements to ensure structural integrity and operational safety of dams. All new dams, enlargements, repairs, alterations, and removals must be reviewed and approved by DSOD and designs must meet minimum structural, hydrologic, hydraulic, and geotechnical standards to ensure safety (DSOD 2018). The dams would be designed to withstand a maximum credible earthquake on nearby controlling seismic sources. The maximum credible earthquake on the Great Valley 07/Orestimba (San Joaquin) fault, located about 0.2 miles to the east of the main dam is estimated to be a moment magnitude of 7.1. The dam breach scenario considers the Probable Maximum Flood, consistent with the modeling assumptions required under California Code of Regulations, Title 23, Section 335.6, which mandates that breach scenarios assume the reservoir is at its maximum storage elevation.

In the event of a main dam breach the outflow would flow eastward and potentially overtop I-5, the California Aqueduct, and the DMC (see **Figure 3.10-5**). The outflow would reach the San Joaquin River, inundating agricultural lands and parts of the City of Patterson, primarily north of Las Palmas Avenue. The peak outflow of the main dam is estimated at 800,000 cfs, and the flood wave would flow east following Del Puerto Creek and would fan out in the flat terrain, east of I-5. The flow velocity at the City of Patterson is estimated at 2-8 feet per second and the maximum depth would be approximately 6 feet. The flood wave would continue east to the San Joaquin River, where it would raise the level of the river by up to 14 feet. Depths reflect the maximum height of the flood wave and do not reflect the depth of a ponded inundation area.

The breach at the saddle dam would be wider compared to the main dam breach due to the shape of the valley walls and the open area location. In the event of a saddle dam breach, outflow would flow south and then east, potentially overtopping I-5, the California Aqueduct, and the DMC, inundating agricultural lands and portions of the City of Patterson (see **Figure 3.10-6**). The peak outflow, if the reservoir were completely full, is estimated at 500,000 cfs. The peak outflow would travel down multiple small canyons to I-5. The estimated flow velocity at the City of Patterson would be 2-9 feet per second and the maximum depth would be approximately 10 feet. The flood wave would continue east to San Joaquin River, where it would raise the level of the river by up to 12-13 feet.

The Alternative 2 dams would be designed and constructed pursuant to conservative guidelines and criteria designed to prevent failure. Design and construction would incorporate multiple levels of design redundancy as required to meet design standards of the DSOD (mentioned above) and applicable current Federal dam safety guidelines for a new dam, including FEMA's risk-informed design principles, hazard classification, inflow design flood criteria, seismic considerations, and emergency action planning (FEMA 2023). As noted above, the dams would be designed to withstand the largest and strongest expected earthquake (Maximum Credible Earthquake) – the most severe earthquake considered possible at the site - and the inundation scenario considers the greatest possible expected flood (Probable Maximum Flood) – the largest flood expected from the most extreme weather conditions (FEMA 2005; FEMA 2013). The Ground Motion Study prepared for the Project (Terra/GeoPentech 2025) has indicated a 7.1 maximum credible earthquake magnitude event on this fault. This information will continue to be refined as the development of the Project design progresses and the maximum credible earthquake to be used for design of the dam will be based on a detailed analysis prepared by the design engineer. The DSOD design standards would protect the dams from seismic or other catastrophic failure.

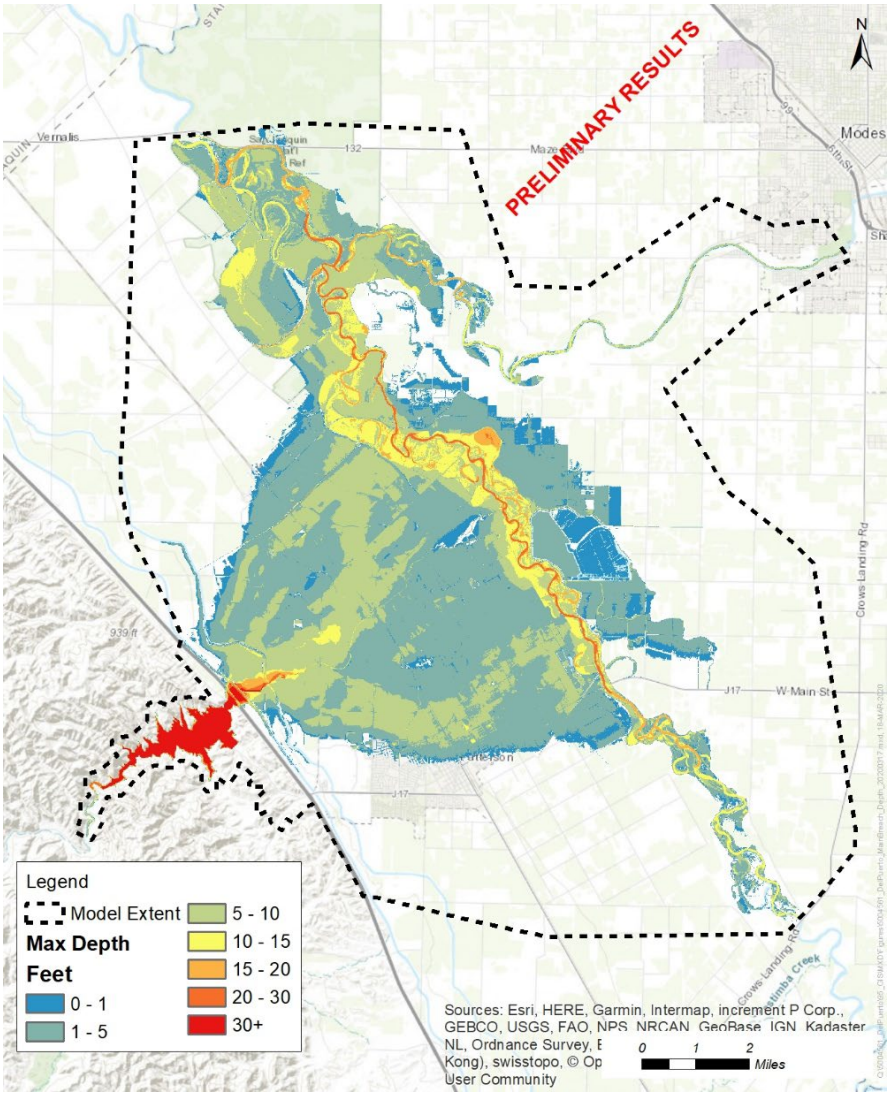

Figure 3.10-5: Preliminary Inundation Extent from Hypothetical Failure of Alternative 2 Main Dam

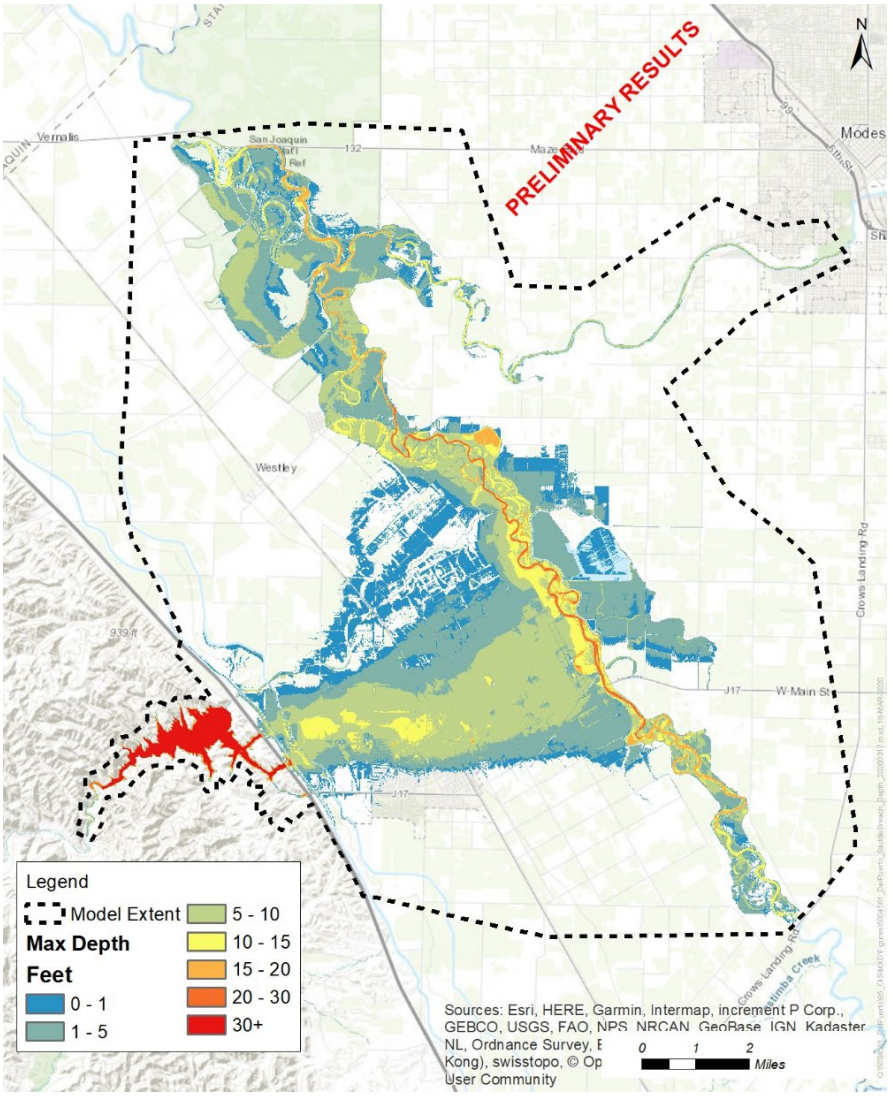

Figure 3.10-6: Preliminary Inundation Extent from Hypothetical Failure of Alternative 2 Saddle Dam

Additionally, the Project Sponsors would closely monitor dam operations to control seepage, prevent uplift pressures, and avoid erosion and a seismic monitoring system would be implemented as part of an ongoing dam safety program. An Emergency Action Plan, compliant with California Water Code Section 6160 et seq., would be developed, including emergency notification procedures, inundation maps, and response protocols for downstream notifications in case of an emergency release.

Alternative 2 would include an emergency spillway designed to handle the probable maximum flood water level, as per DSOD guidelines. Because Alternative 2 is an offstream reservoir it would be filled primarily by diversions from the DMC, with minimal inflow from Del Puerto Creek. During heavy rainfall, the Project Sponsors would actively manage the reservoir to accommodate inflows from Del Puerto Creek by implementing environmental bypasses, stormwater releases, and storage – adjusting operations based on wet or drought year conditions (see Appendix J).

Facilities for rapid emergency drawdown would be designed to meet DSOD standards, allowing the reservoir level to be lowered by 10 percent of the hydraulic head in 10 days and fully evacuated in 120 days. However, the risk of needing an emergency drawdown is minimal due to the small upstream watershed and controlled inflows from the DMC. As described above, Alternative 2 would be designed with multiple safety factors and conservative modeling practices that would result in an extremely low probability of dam breach. These include adherence to state and federal guidelines, use of conservative breach parameters, and sensitivity testing that showed minimal variation in flood extents (see Appendix L). Because inflows and outflows to the reservoir would be managed through pumping, the risk of an event requiring emergency release of water is also very low. The reservoir would be designed and constructed based on requirements of the DSOD and applicable Federal dam safety guidelines, which ensure that the reservoir would be designed to withstand seismic activity. These design standards would protect the dams from catastrophic failure.

CVP and SWP Operations. Operation of Alternative 2 would divert CVP water at the turnout from the DMC to the reservoir, store the diverted water and any additional inflows from Del Puerto Creek, and then release the water back to the DMC for delivery to the Project Sponsors and refuges. Water diverted from the DMC to storage would be limited to water that has been previously stored in and released from CVP reservoirs, consistent with Reclamation's existing water rights. An analysis performed by MBK Engineers (Appendix J) indicates that there could be a small reduction in CVP and SWP diversions from the Delta (less than 0.2 cfs average monthly change over the course of the 100-year simulation period) due to the reduction in San Joaquin River flows described below. Therefore, operation of Alternative 2 would have a minimal effect on the operation of the DMC and the California Aqueduct. No new infrastructure or modifications of existing facilities or operations at the C.W. Bill Jones Pumping Plant would be required. There would be no increase in diversions from the Delta by Reclamation or DWR, because water is made available by Project partners through conservation measures. Alternative 2 would not interfere with Reclamation's obligations to deliver water to other contractors, wetland habitats, or for environmental purposes. Operations would be consistent with the Agreement Between the United States of America and the Department of Water Resources of the State of California for Coordinated Operation of the Central Valley Project and the State Water Project.

Alternative 2 would have negligible impacts on the San Joaquin River flows below the confluence with Del Puerto Creek. Based on the operations analysis using CalSIM model data (Appendix J) from the FEIR, Del Puerto Creek contributes about 0.072% of San Joaquin River flows. With Alternative 2, average annual Del Puerto Creek flows into the river would decrease from about 1,900 AFY to about 700 AFY.

A stream gage upstream of I-5 measures average annual (**Table 3.10-1**) and monthly (**Table 3.10-2**) flows from Del Puerto Creek to the San Joaquin River. Most flows downstream of I-5 percolate into the groundwater and do not reach the San Joaquin River (Woodard & Curran 2020). Upper Del Puerto Creek stream flows into the San Joaquin River occur only during wet weather events, when flows in the San Joaquin River are already high, making the small reduction during these periods imperceptible. During the dry season, creek flows are due to operational spillage from the West Stanislaus Irrigation District, which is estimated at about 2 cfs discharged to Del Puerto Creek from March through November and to agricultural return flows, which would not be reduced by Alternative 2 and might increase with a more reliable supply of irrigation water. Thus, reductions in

creek flows (estimated at 1,200 AF per year) are not expected to materially change flows in the San Joaquin River.

Table 3.10-1: Del Puerto Creek and San Joaquin River Average Annual Flow (AFY)

	Current	Proposed Project
Del Puerto Creek Flow into San Joaquin River	1,900	700
San Joaquin River Flow[1]	2,640,400	2,639,200
Percentage of Del Puerto Creek Flow in SJR	0.072%	0.027%

[1]CalSim Modeling Results for San Joaquin River at Vernalis

Table 3.10-2: Del Puerto Creek Monthly Average Flows without and with Project (AF)

Flow to SJR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
No Action	-	-	40	390	870	490	130	10	10	-	-	-
With Alternatives 2-4	-	-	10	180	230	210	60	-	10	-	-	-
Reduction	-	-	30	210	640	280	70	10	-	-	-	-

Water Storage and Supply. With a reservoir capacity of 82 TAF, Alternative 2 would provide additional water storage, which could be allocated as follows:

Allocation of 82 TAF storage:

- DPWD - 20 TAF
- Exchange Contractors – 40 TAF
- Flexible Storage Capacity – 11 TAF (Remaining storage that could be allocated to other partners or beneficiaries)
- Refuge Water Capacity – 11 TAF

Alternative 2 would provide 82 TAF of storage south of the Delta and would enable the Project Sponsors to store CVP water to the extent permitted by law. The current lack of sufficient south of Delta storage for CVP supplies means that Project Sponsors are not always able to utilize their CVP water supplies when they are available. Locally controlled water storage would allow the Project Sponsors to better manage water supplies when available during wet periods and arrange for delivery of water for later irrigation use. The 82 TAF of storage would provide benefits to agricultural water supply, municipal water supply, and refuge water supply. Agricultural water supply quantities are shown in **Table 3.10-3.**

Table 3.10-3: Agricultural Water Supply (AFY) Alternative 2

Water Year Type	Agricultural Supply
Wet	54,200
Above Normal	55,400
Below Normal	52,600
Dry	43,300
Critical	41,000
Annual Average	49,600

Alternative 2 would also provide municipal water supply with releases of natural Del Puerto Creek flows of up to 1,700 AFY in wet years compared to the No Action. Releases are assumed to be diverted by the City of Patterson into a recharge facility, which would convert 100 percent of the releases shown in **Table 3.10-4** into groundwater recharge. **Table 3.10-4** shows the municipal supply that would be provided under Alternative 2 (which would be the same under Alternative 3 and proportionally the same under Alternative 4). These benefits exceed the reduction in groundwater recharge of 300 AFY, which is described above.

Table 3.10-4: Municipal Water Supply (AFY) Alternative 2, 3 and 4

Water Year Type	City of Patterson Flow Releases	Net Benefit
Wet	1,700	1,400
Above Normal	1,400	1,100
Below Normal	800	500
Dry	600	300
Critical	200	-100
Annual Average	1,000	700

The upper reaches of the DMC experienced reduced capacity due to subsidence. Increased storage capacity would help alleviate some of the DMC capacity constraint through use of reservoir facilities. Alterative 2 could provide a benefit in helping mitigate this DMC capacity constraint by diverting water when DMC flows are capacity constrained and releasing them back to the DMC when there is DMC capacity available. **Table 3.10-5** shows capacity constraint mitigation supply.

Table 3.10-5: DMC Capacity Constraint Mitigation Supply (AFY) Alternative 2

Water Year Type	DMC Capacity Water Supply
Wet	23,500
Above Normal	15,300
Below Normal	16,000
Dry	10,100
Critical	600
Annual Average	14,600

Alternative 2 would enable increased deliveries of water supplies to CVPIA-designated refuges in the San Joaquin Valley by dedicating up to 11 TAF of storage to refuge supplies. In addition, a portion of the Exchange Contractor transfer water made available through increased conservation[1] will be dedicated to refuge supplies, variable by year type. Total estimated deliveries for Alternative 2 by water year type are shown in **Table 3.10-6**. All of the refuge water supply is allocated to Incremental Level 4 refuge supplies.

Table 3.10-6: Refuge Water Supply Benefits (AFY) Alternative 2

Water Year Type	Dedicated Storage and Excess Water	Water Transfer Supply	TOTAL
Wet	11,900	14,000	25,900
Above Normal	11,400	10,000	21,400
Below Normal	11,300	10,000	21,300
Dry	10,700	9,500	20,200
Critical	10,700	900	11,600
Annual Average	11,300	9,800	21,100

3.10.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be similar to those described above for Alternative 2. Alternative 3 would provide agricultural, municipal and capacity constraint supply, but does not include refuge water supply (see Project Description Section 1.4.2.5).

3.10.3.5 Alternative 4 (DPCR 40 TAF).

Water Quality Impacts. Construction of Alternative 4 would involve ground disturbing and dewatering activities that could impact water quality. Dewatering discharge may contain common constituents such as total suspended solids, oil and grease, and heavy metals. Dewatering would be conducted in accordance with the General Order for Dewatering or other NPDES permits and discharge from dewatering operations would be evaluated and included in the SWPPP. Implementation of **Measure HYD-1b** would ensure that discharges from the reservoir to the DMC would meet Reclamation water quality standards as defined in the Delta-Mendota Canal Non-Project Water Pump-In Program Monitoring Plan (Reclamation 2018).

Impacts from Alternative 4 would be similar to those described for Alternative 2, but due to its smaller storage volume and shallower depth, Alternative 4 is more susceptible to HABs, as shallow water bodies tend to warm more rapidly and retain higher temperatures, creating favorable conditions for cyanobacterial growth (Smith et al. 2025). However, as with Alternative 2, the Reservoir Management Plan would ensure that if cyanobacteria occur in the reservoir, water would not be released to the DMC.

[1]The Exchange Contractors would use up to 40,000 AFY of conserved water to offset demand, thus making CVP water available for storage in DPCR. The conserved water would be generated through the conservation program described in "Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority, 2014-2038 EIS/EIR" approved by Reclamation on July 30, 2013

Groundwater Impacts. Construction activities would not use groundwater nor would they interfere with groundwater recharge. Alternative 4 would have the same impacts to groundwater recharge as Alternative 2with a net reduction of 300 AFY, but these would be mitigated and flows augmented with the implementation of **Measure HYD-2**. The Project Sponsors would develop an operations manual that describes water delivery to the lower reach of Del Puerto Creek below the proposed dam to make up for lost natural seepage and augment flows in dry years.

100-Year Floodplain. Operation of the reservoir would prevent the 100-year flow events of Del Puerto Creek from occurring as these flows would be captured and stored in the reservoir.

Dam Inundation. A dam breach/inundation analysis was developed for Alternative 4 (NHC 2024a). The probability of such an event is very low because the dam would meet DSOD safety requirements and would be designed to withstand a maximum credible earthquake on nearby controlling seismic sources. If a breach in the main dam were to occur, outflow from the breach would flow east, overtopping I-5, the California Aqueduct, and the DMC, reaching east to the San Joaquin River, inundating agricultural lands and portions of the City of Patterson, primarily north of Las Palmas Avenue (see **Figure 3.10-7**). The peak outflow from the breach is estimated to be approximately 350,000 cfs. The estimated flow velocity at Patterson would be 1-7 feet per second and the maximum depth would be approximately 6 feet. The flood wave would continue east to the San Joaquin River, where it would raise the river by up to 10 feet relative to baseline water levels, before dissipating upstream and downstream within the river.

Similar to Alternative 2, the breach at the Saddle Dam would be wider compared to the Main Dam breach due to the shape of the valley walls and the open area location. If a breach were to occur, the outflow would travel south and east, reaching the California Aqueduct, the DMC, and eventually the San Joaquin River. The peak outflow from a breach of the saddle dam is estimated to be approximately 50,000 cfs. The peak outflow would travel down multiple small canyons to I-5. The estimated flow velocity at the City of Patterson is estimated to be 1-2 feet per second and the maximum depth would be approximately 2 feet, continuing east to San Joaquin River where it would raise the river by 1.5 feet before dissipating upstream and downstream within the river.

The dams would be designed and constructed according to the Division of Safety of Dams requirements and Federal guidelines, ensuring the dams can withstand seismic activity and prevent catastrophic failures.

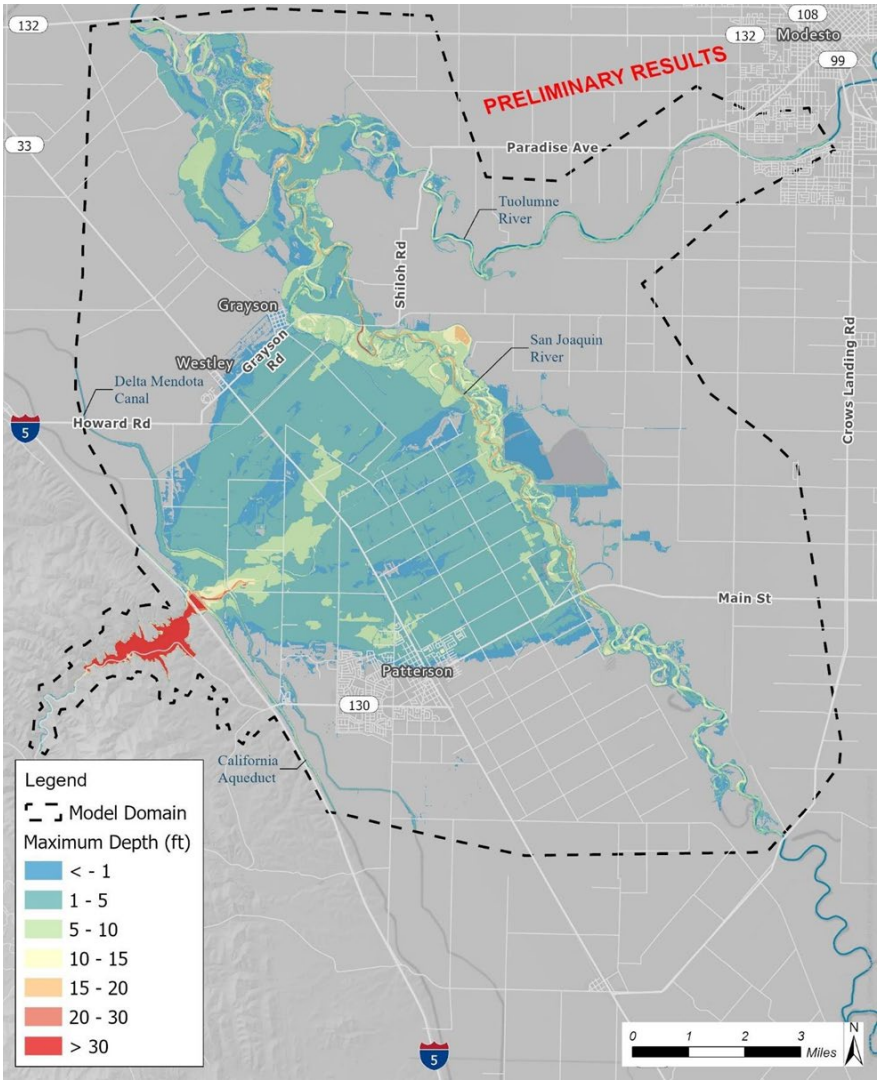

Figure 3.10-7: Preliminary Inundation Extent from Hypothetical Failure of Alternative 4 Dam

CVP and SWP Operations. Alternative 4 would also involve storing water from the DMC and Del Puerto Creek and subsequently releasing it back to the DMC for delivery to the Project Sponsors. However, the quantity of CVP and non-CVP water stored in the reservoir, and the corresponding impact on San Joaquin River flows, would be less with Alternative 4 than with Alternatives 2 and 3 because of the smaller size of the proposed reservoir. The operation of Alternative 4 would have a minimal effect on the DMC or California Aqueduct operations due to minimal reductions in San Joaquin River flow. Alternative 4 includes a turnout to the DMC but would not require any other new CVP infrastructure or modifications to existing CVP facilities beyond the components already proposed as part of Alternative 2. Additionally, the impacts on the San Joaquin River flows would be negligible, with reductions in Del Puerto Creek flows occurring primarily during wet weather events. Therefore, Alternative 4 would maintain consistency with Reclamation's obligations and would only minimally impact existing CVP and SWP operations. The impacts of Alternative 4 on CVP and SWP operations would be similar to, but smaller than those of Alternatives 2 and 3.

Water Storage and Supply. With a reservoir capacity of 40 TAF, Alternative 4 would provide water storage capacity, which could be allocated as follows:

Allocation of 40 TAF storage:

- DPWD - 10 TAF
- Exchange Contractors – 20 TAF
- Flexible Storage Capacity – 5 TAF
- Refuge Water Supplies – 5 TAF

Alternative 4 would provide 40 TAF of storage south of the Delta, and would provide agricultural water supply, municipal water supply, and refuge water supply.

Agricultural water supply quantities are shown in **Table 3.10-7.**

Table 3.10-7: Agricultural Water Supply (AFY) Alternatives 4 and 5

Water Year Type	Agricultural Supply
Wet	27,100
Above Normal	27,700
Below Normal	26,300
Dry	21,650
Critical	20,500
Annual Average	24,800

Alternative 4 would also provide municipal water supply with releases of natural Del Puerto Creek flows of up to 1,700 AFY. Table 3.10-4 shows the municipal supply that would be provided under Alternative 4.

Alterative 4 could mitigate the DMC capacity constraint by diverting water when DMC flows are capacity constrained and releasing them back to the DMC when there is DMC capacity available. **Table 3.10-8** shows capacity constraint mitigation supply.

Table 3.10-8: DMC Capacity Constraint Mitigation Supply (AFY) Alternatives 4 and 5

Water Year Type	DMC Capacity Water Supply
Wet	11,750
Above Normal	7,650
Below Normal	8,000
Dry	5,050
Critical	300
Annual Average	7,300

Alternative 4 would enable increased deliveries of water supplies to CVPIA-designated refuges in the San Joaquin Valley by dedicating up to 5.5 TAF of storage to refuge supplies. Total estimated

deliveries for Alternative 4 by water year type are shown in **Table 3.10-9**. All of the refuge water supply is allocated to Incremental Level 4 refuge supplies.

Table 3.10-9: Refuge Water Supply Benefits (AFY) Alternatives 4 and 5

Water Year Type	Dedicated Storage and Excess Water	Water Transfer Supply	TOTAL
Wet	5,950	7,000	12,950
Above Normal	5,700	5,000	12,700
Below Normal	5,650	5,000	10,650
Dry	5,350	4,750	10,100
Critical	5,350	450	5,800
Annual Average	5,650	4,900	10,550

3.10.3.6 Alternative 5 (Ingram Canyon)

Water Quality Impacts. Construction of Alternative 5 would involve ground disturbing and dewatering activities that could impact water quality. Dewatering operations would be conducted in accordance with the General Order for Dewatering or other applicable permits and would be evaluated within the SWPPP. Implementation of **HYD-1b** would ensure that discharges from the reservoir to the DMC would meet Reclamation water quality standards. Similar to Alternative 4, Alternative 5 would be more prone to HABs than Alternative 1 and Alternative 2 as the reservoir has a smaller storage volume, although this is mitigated slightly because the Alternative 5 reservoir is deeper than the reservoir in Alternative 4. However, the reservoir operations plan would ensure that if cyanobacteria occur in the reservoir they would not be released to the DMC.

Groundwater Impacts. Construction activities would not use groundwater and would not interfere with groundwater recharge. Ground-disturbing activities could increase erosion and sedimentation compared to the No Action, potentially impacting groundwater quality through stormwater runoff. A SWPPP would be implemented and dewatering and hydrostatic testing would comply with permits (Construction General Permit and General Order for Dewatering) to minimize impacts. Additionally, with implementation of **Measures HYD-1a** and **HYD-1b**, impacts to groundwater quality would be minimal.

Similar to the alternatives along Del Puerto Creek, it is expected that environmental releases of Ingram Creek flows would be implemented such that operational impacts on groundwater downstream of the reservoir would be minimized.

100-Year Floodplain. Because there is no FEMA flood zone associated with Ingram Creek operation of the reservoir would not have any effect on existing downstream flooding.

Dam Inundation. A dam breach/inundation analysis was developed for Alternative 5 (NHC 2024b). If a breach were to occur, outflow from the breach would flow east, reaching I-5, the California Aqueduct, and the DMC, flowing east to the San Joaquin River, inundating agricultural lands and the communities of Westley and Grayson, north of Howard and Grayson Roads (see **Figure 3.10-8**). The estimated flow velocity at Westley and Grayson would be 3 to 6 feet per

seconds and maximum depth would be approximately 6 feet. The flow would continue east to the San Joaquin River, raising the level of the river up to 10 feet relative to baseline water levels, before dissipating upstream and downstream within the river. Like all other action alternatives, the Alternative 5 dam would be designed and constructed according to the Division of Safety of Dams requirements and Federal guidelines, ensuring the dam can withstand seismic activity and prevent catastrophic failures.

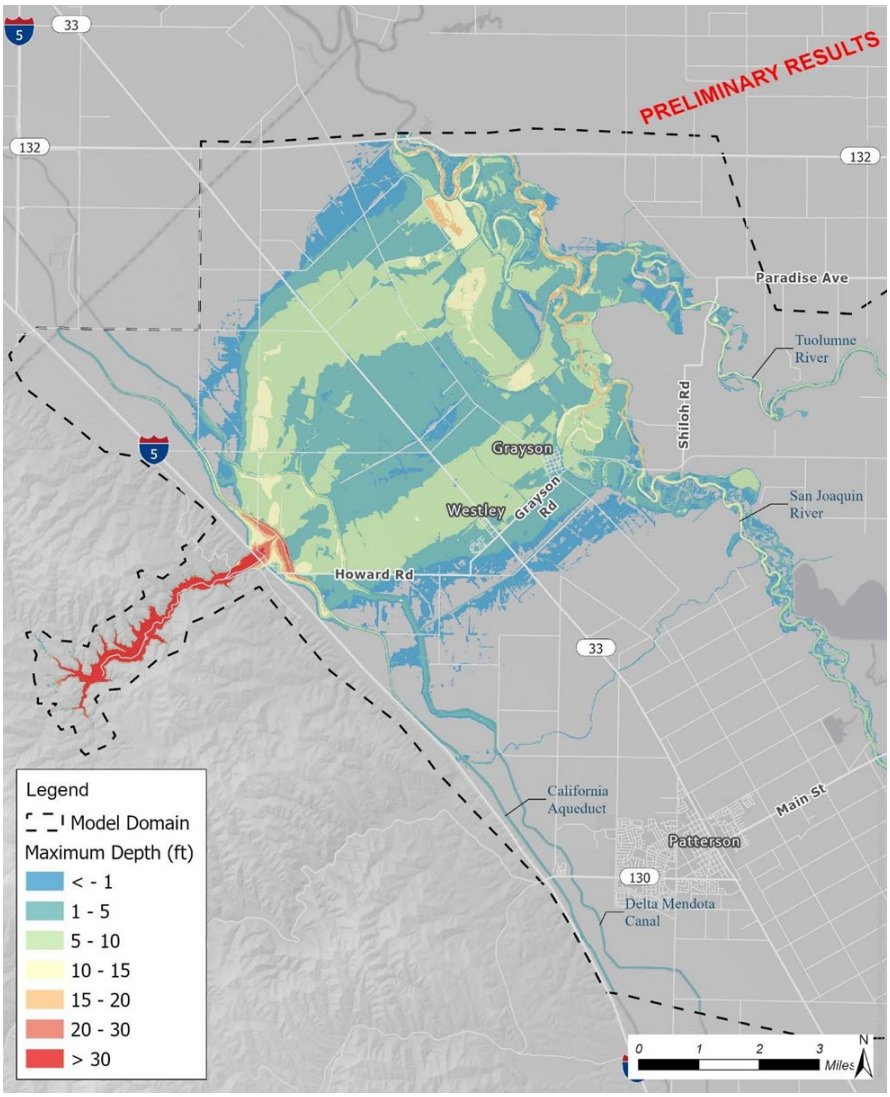

Figure 3.10-8: Preliminary Inundation Extent from Hypothetical Failure of Alternative 5 Dam

CVP and SWP Operations. The impact of Alternative 5 to CVP and SWP operations would be minimal compared to Alterative 1 and would be similar to but smaller than those of Alternatives 2. 3 and 4. Alternative 5 would still involve storing water from the DMC and Ingram Creek and subsequently releasing it back to the DMC for delivery to the Project Sponsors. The Alternative 5 reservoir would capture water from Ingram Creek that would have flowed into the San Joaquin River under Alternative 1. However, the quantity of CVP and non-CVP water stored in the

reservoir, and the corresponding impact on San Joaquin River flows, would be less with Alternative 5 than with other Action Alternatives because of the smaller size of the proposed reservoir and because the watershed upstream of the dam site is smaller (11,160 acres for Alternative 5 versus 46,499 acres for Alternatives 2-4). Operation of the Alternative 5 reservoir would therefore have a minimal effect on the DMC or California Aqueduct operations due to minimal reductions in San Joaquin River flow. Other than the turnout on the DMC that would be constructed as part of Alternative 5, this alternative would not require new CVP infrastructure or modifications to existing CVP facilities. The impacts on San Joaquin River flows would be negligible, with reductions in Ingram Creek flows likely occurring at a smaller magnitude but with similar timing to the other action alternatives (i.e. primarily during wet weather events). Therefore, Alternative 5 would maintain consistency with Reclamation's obligations and would only minimally impact existing CVP and SWP operations compared to Alternative 1.

Water Supply. With a reservoir capacity of 40 TAF, Alternative 5 would provide water storage, allocated as follows:

Allocation of 40 TAF storage:

- DPWD - 10 TAF
- Exchange Contractors – 20 TAF
- Flexible Storage Capacity – 5 TAF
- Refuge Water Supplies – 5 TAF

Alternative 5 would provide 40 TAF of storage south of the Delta, and would provide the same agricultural, refuge and capacity constraint water supply as Alternative 4, but would not provide any municipal supply benefit to the City of Patterson.

Available capacity of reservoir conveyance and storage would help alleviate some of the DMC capacity constraint through use of reservoir facilities. Alternative 5 would enable increased deliveries of water supplies to CVPIA-designated refuges in the San Joaquin Valley by dedicating up to 5.5 TAF of storage to refuge supplies. Total estimated refuge water supply deliveries for Alternative 5 by water year type are shown in **Table 3.10-9**. All of the refuge water supply is allocated to Incremental Level 4 refuge supplies.

3.11 Land Use & Recreation

3.11.1 Affected Environment

This section presents the physical and regulatory setting for land use and recreation surrounding the Project.

3.11.1.1 Study Area

This section describes the environmental setting for current land use and recreation within the study area, which includes the Project sites and adjacent land uses. Direct land use impacts would occur in Stanislaus County, where all Action Alternative's facilities would be located.

The Del Puerto Canyon study area (see **Figure 3.11-1**) applies to the Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF) Project sites. The study area is located at the western edge of the San Joaquin Valley, approximately 15 miles southwest of the City of Modesto and 18 miles west of the City of Turlock.

The Ingram Canyon study area (see **Figure 3.11-2)** applies to the Alternative 5 (Ingram Canyon) Project site and is located approximately 19 miles southwest of the City of Modesto and 23 miles northwest of the City of Turlock. The majority of both study areas lies to the west of Interstate 5 (I-5), with a portion of each study area extending east of I-5. The landscape consists of rolling hills with sparse structural development. Rangelands and agricultural lands dominate the land use pattern across both study areas. Urban land uses are situated to the east of the Del Puerto Canyon study area in the city of Patterson. There is a freeway commercial area east of the proposed Ingram Canyon Reservoir as well as the small rural communities of Westley and Grayson.

The Project would serve water to agricultural users within the Project Sponsors' service areas in San Joaquin, Stanislaus, Merced, Fresno, and Madera counties. More information on agriculture within the region is presented in *Section 3.2, Agriculture*.

3.11.1.2 Issues of Environmental Concern

Issues of environmental concern for land use include the potential to conflict with any existing land use plans or policies. The issue of concern regarding recreation is whether the Project would affect the current use and enjoyment of existing recreational resources or create demand for new recreational opportunities associated with the changes in the land use setting.

3.11.1.3 Characterization

Land Use Direct impacts of Project construction would be confined to Stanislaus County. A majority of the action alternative study areas are located in unincorporated Stanislaus County. All of the study area that falls within unincorporated Stanislaus County is zoned as a *General Agriculture District* (Stanislaus County 2016). The county zoning designations in the study areas for Del Puerto Canyon and Ingram Canyon are shown in **Figure 3.11-1** and **Figure 3.11-2**. Further detail on county zoning is included in *Appendix E, Regulatory Framework, Stanislaus County Zoning Code.*

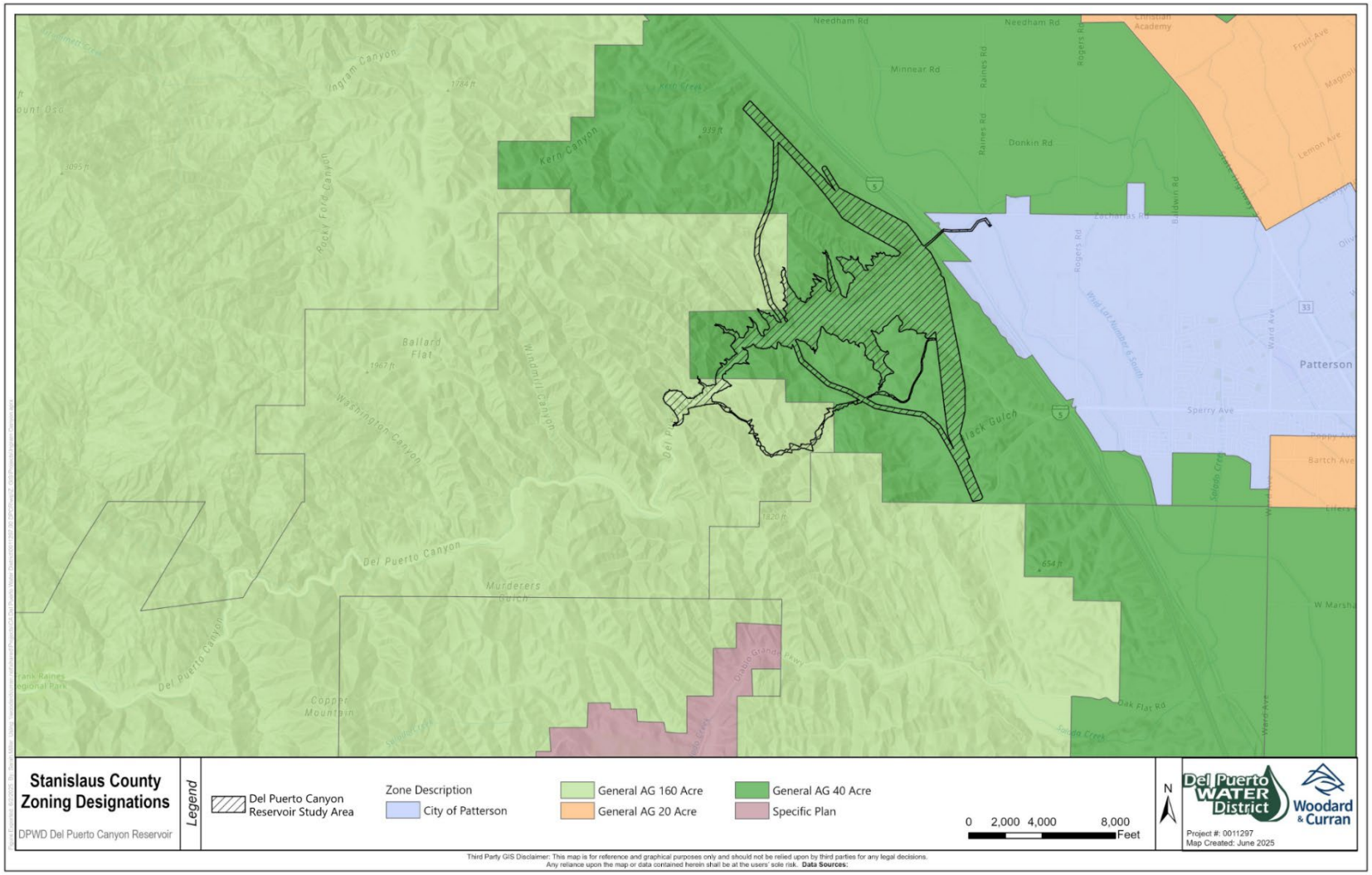

Figure 3.11-1: Stanislaus County Zoning Designations – Alternative 2 (DPCR 82 TAF) Study Area

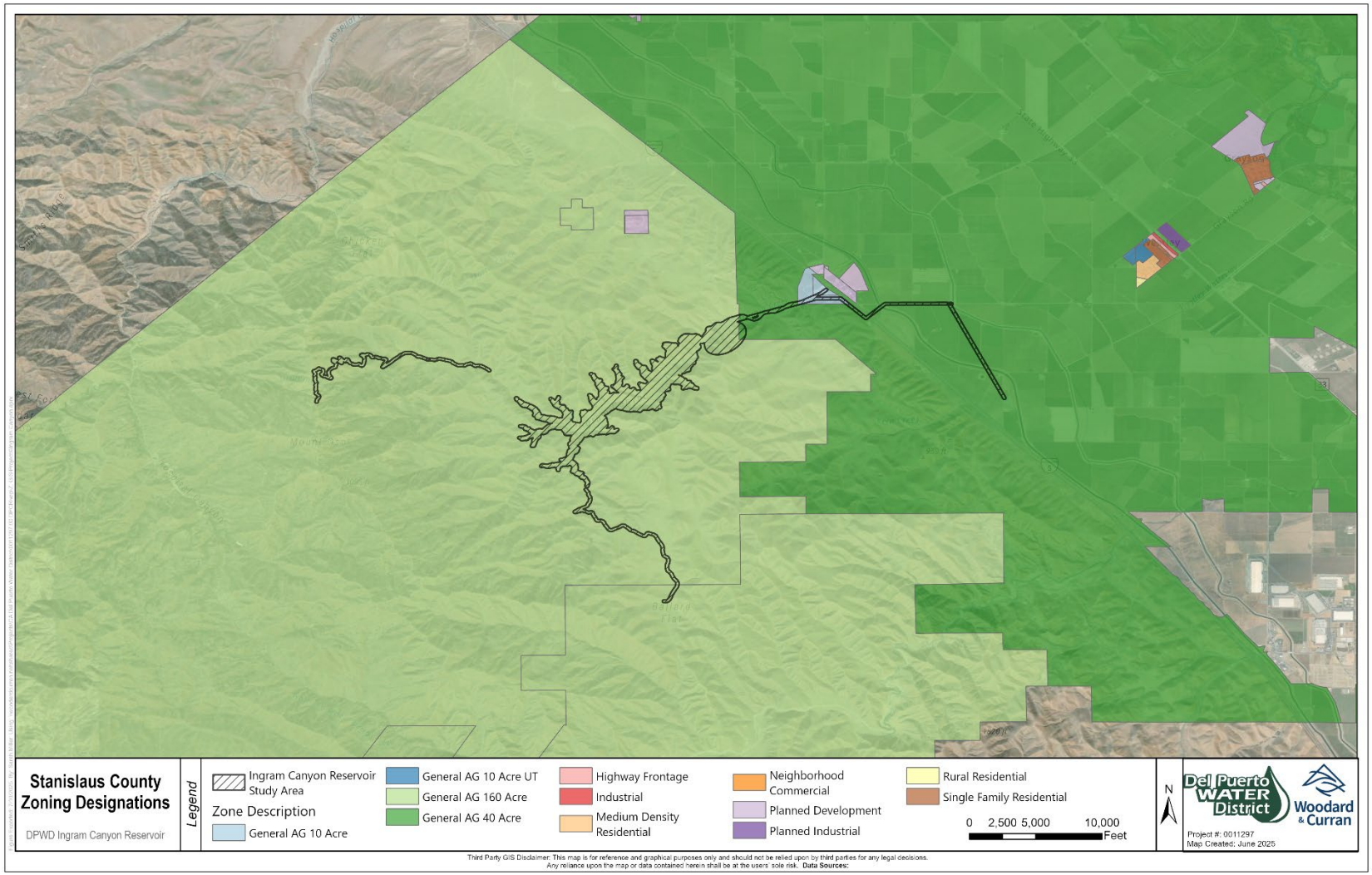

Figure 3.11-2: Stanislaus County Zoning Designations – Alternative 5 (Ingram Canyon) Study Area

A small portion of the proposed conveyance corridor for Alternative 2 (DPCR 82 TAF) lies within the Patterson city limits. This area is designated by the City of Patterson General Plan for light industrial uses (and is zoned West Patterson light industrial). **Figure 3.11-3** shows the city's General Plan designations. The general plan includes designations for land within the city limits, and land within the general plan area adjacent to the city.

Existing Uses West of I-5. The study areas for all Action Alternatives west of I-5 is undeveloped and composed of hilly rangelands currently used for grazing. Del Puerto Canyon Road is a public road that runs east-west through the Del Puerto Canyon study area. Ingram Creek Road is a private road that runs east-west through the Ingram Canyon study area.

Existing Uses East of I-5. East of I-5 lies the California Aqueduct, which runs parallel to the highway. The land between I-5 and the California Aqueduct is flat and consists of agricultural land, however, no crops are currently grown there. The remainder of the study areas lies between the California Aqueduct and the DMC. In the Del Puerto Canyon study area, the terrain in this area is flat and vacant. In the Ingram Canyon study area east of I-5, the terrain is flat and planted with active orchards.

Recreation. Recreational activities in Del Puerto Canyon study area include, but are not limited to, birdwatching, wildlife viewing, photography, bicycling, and motorcycling. The land on either side of Del Puerto Canyon Road is private property, but members of the public still enjoy birdwatching and other activities from the public right-of-way. There are no hiking trails in the Del Puerto Canyon study area, which is entirely private property outside of the public road right-of-way, and opportunities for recreation along the existing road are limited because of the narrow shoulders and limited opportunities for vehicles to safely park along the winding road. Del Puerto Canyon is identified as a birding destination on the Stanislaus Audubon Society website with well over 100 species of birds recorded from the canyon by birders (eBird 2019). Based on comments from the public during the CEQA review conducted for the Proposed Project, Del Puerto Canyon also provides educational opportunities to at least one local science class that visits to learn about native plants, birds, and geology. Public comments stated that Del Puerto Canyon is of local importance to botanists, entomologists, herpetologists, geologists and conservationists. Del Puerto Canyon provides access into the inner coast range and is notable for its rugged landforms and a generally perennial stream with its associated riparian vegetation. Frank Raines Park is a regional park located on Del Puerto Canyon Road about 11 miles west of the upstream end of the canyon area that would be inundated by Alternatives 2 and 3. The park would not be affected. Access to the park is provided by a portion of Del Puerto Canyon Road that would be unaffected by Alternatives 2-4. There is no public access to Ingram Canyon, so no recreational use takes place within the study area.

3.11.2 Regulatory Setting

The regulatory setting for relevant land use policies and regulations is presented in *Appendix E, Regulatory Framework, Stanislaus County Zoning Code*.

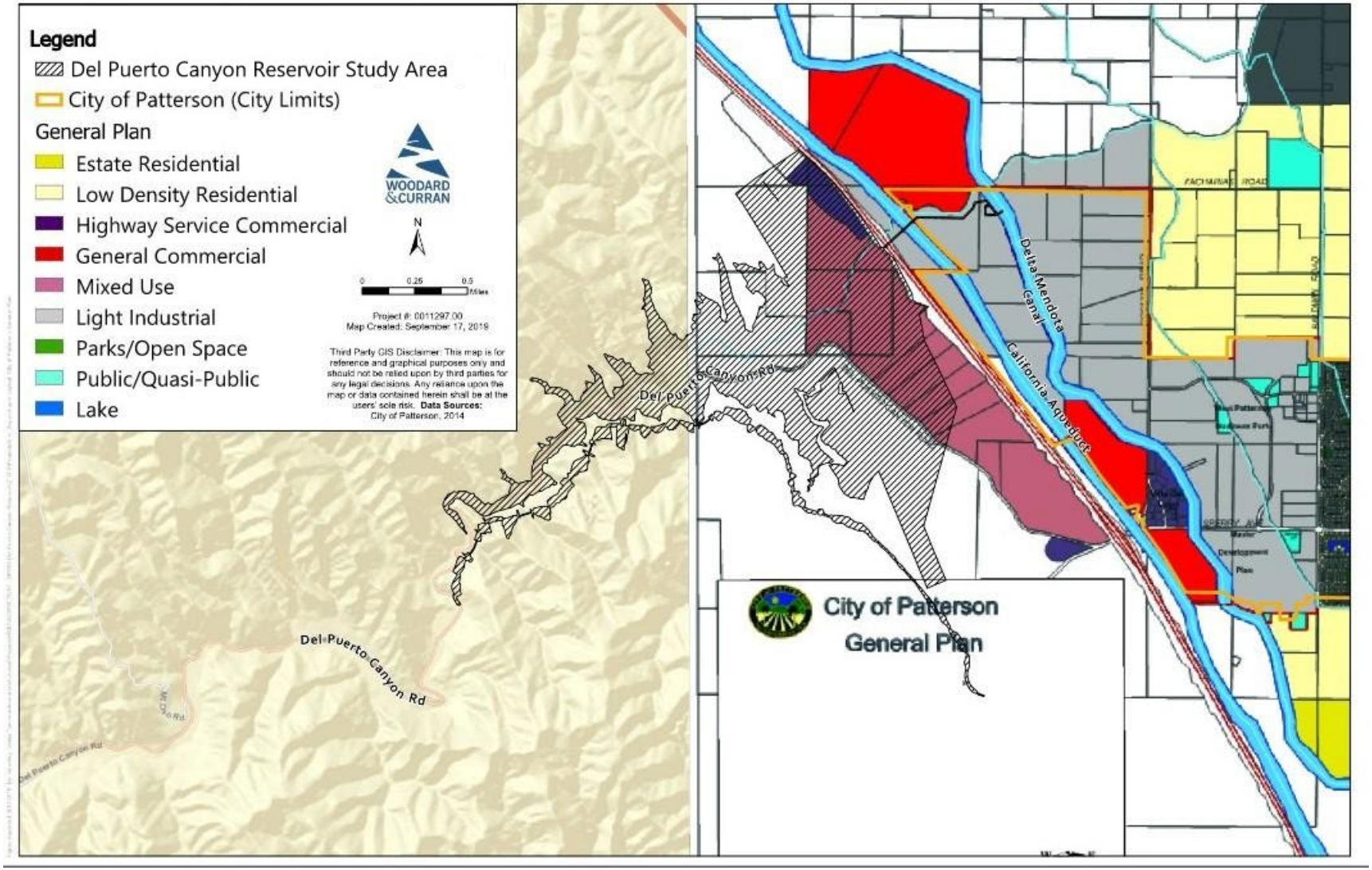

Figure 3.11-3: City of Patterson General Plan Map – Alternative 2 (DPCR 82 TAF)

3.11.3 Environmental Consequences

The impact analysis considers the potential for the Project to physically divide a community or conflict with adopted land use plans or policies. California Government Code Section 53090 et seq. provides that public agencies receive intergovernmental immunity from the zoning and building laws of other cities and counties for construction of facilities for production, generation, storage, treatment or transmission of water. Thus, local regulations may not be applicable to the Project. Although the Project Sponsors receive intergovernmental immunity from local planning and zoning ordinances, efforts will be made to maintain Project consistency with these ordinances as much as possible. This section includes a discussion of the extent to which the Project is or is not consistent with the Stanislaus County General Plan; however, the General Plan does not govern those aspects of the Project involving water storage and transmission. This section also provides an impact analysis of the Project on recreational uses.

3.11.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) for land use and recreation are listed below. EPMs BIO-TERR-2, BIO-TERR-1k, and BIO-TERR-5 are applicable to all Action Alternatives. EPM LU-1 is only applicable to Alternative 2-4 because those are the only alternatives that require relocation of high voltage transmission lines.

26 **BIO-TERR-2: Compensate for Effects on Riparian Habitat or Other Sensitive Natural Community**

Riparian habitat shall be created or acquired and permanently protected to compensate for Project effects to ensure no net loss of riparian habitat functions and values. Land that could be acquired could include acres upstream of the reservoir or elsewhere that satisfied appropriate compensation ratios. Compensation ratios shall be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE, SWRCB). The compensation shall be at a minimum 1:1 ratio (1 acre restored or created for every 1 acre filled) and may be a combination of offsite restoration/creation and mitigation credits. A restoration and monitoring plan shall be developed and implemented concurrently with Project construction. The plan shall describe how riparian habitat will be created and monitored, including funding mechanisms, appropriate long-term management measures, and agency reporting requirements.

18 **BIO-TERR-1k: Avoid and Minimize Impacts on Nesting Birds**

To the maximum extent practicable, the removal of structures and vegetation (trees, shrubs, and ground vegetation) shall take place during the non-breeding season for most migratory birds. This timing is highly preferable because if an active nest is found during preconstruction surveys in a tree (or other vegetation) that would be removed by Project construction, the tree (or other vegetation) would not be allowed to be removed until the end of the nesting season or until the nestlings have fledged, which could delay construction. If vegetation cannot be removed during the non-nesting season, or if ground cover re-establishes in areas where vegetation has been removed, the affected area must be surveyed for nesting birds.

Should structure and vegetation removal activities occur between February 15 and September 30, a qualified biologist shall conduct preconstruction surveys for active nesting birds. If an active nest is found in the survey area, a no-disturbance buffer area will be established around the nest site to avoid disturbance or destruction of the nest until the end of the breeding season or until after a qualified wildlife biologist determines that the young have fledged and moved out of the Project site (this timing varies by species). Buffers shall be developed by the biologist based on the species nesting behavior, their sensitivity to disturbance, the type or work taking place during the nesting season, and considering the surrounding topography and vegetation, which may attenuate noise and block visual disturbances. Buffers will be at a minimum of 50 feet from disturbance for more common ground nesting birds and a minimum of 500 feet for tree nesting raptors. Initial reservoir filling shall begin outside the nesting season.

31 **BIO-TERR-5: Develop a Management Plan for the Protection and Enhancement of Oak Woodlands**

Per Policy 4, 4.1, of the Stanislaus County General Plan, the Project Sponsors shall develop and implement a management plan for the protection and enhancement of oak woodlands to offset the loss of oak woodlands from the Project. This plan will include measures for the protection, management, and enhancement of oak woodlands on lands that are acquired for the development of the reservoir but that are above the high-water line for the reservoir. A minimum of 1 acre of oak woodland shall be preserved, managed, and monitored for every acre of oak woodland lost as a result of Project implementation.

50 **LU-1: Minimize Transmission Structures in Highway Service Commercial Areas**

The relocated transmission towers shall be sited to avoid areas zoned for highway service commercial use.

3.11.3.2 Alternative 1 (No Action)

Alternative 1 would not include the construction of any new facilities and thus would not have any impacts related to land use and recreation. Although the no action alternative would likely result in additional fallowing of agricultural land it is not expected that this would result in a long-term change in land use because this would not be permitted by current zoning of agricultural areas.

3.11.3.3 Alternative 2 (DPCR 82 TAF)

Consistency with Stanislaus County Policies. Construction of Alternative 2 would be consistent with the Land Use Element of the Stanislaus County General Plan. The general plan states that "agriculture, as the primary industry of the County, shall be promoted and protected." Alternative 2 would improve the reliability of water supply for about 45,000 acres of agricultural land within the county, thereby protecting the agricultural industry. The general plan also states that "land designated for agriculture shall be restricted to uses that are compatible with agricultural practices, including natural resources management, open space, outdoor recreation and enjoyment of scenic beauty." Alternative 2 would help manage water supply, maintain open space, and allow for enjoyment of scenery from the realigned Del Puerto Canyon Road (similar to how the current road

is used for recreation). Alternative 2 would not consist of, nor encourage, industrial, commercial, or residential development, so agricultural use of the surrounding area would not be adversely affected. The land use element also states that "riparian habitat along the rivers and natural waterways of Stanislaus County shall, to the extent possible, be protected." The implementation measure for this policy states that "all requests for development which require discretionary approval and include lands adjacent to or within riparian habitat shall include measures for protecting that habitat to the extent that such protection does not pose threats to proposed site uses, such as airports." Alternative 2's impacts on riparian habitat are discussed in *Section 3.4, Biological Resources - Terrestrial* and would be reduced with the implementation of EPM BIO-TERR-2, which requires creation or protection of riparian habitat. Therefore, Alternative 2 would be compatible with the Stanislaus County General Plan Land Use Element.

Land in the Alternative 2 study area is zoned for General Agriculture, indicating that public buildings or other facilities operated by political subdivisions are a Tier Three use. According to the Stanislaus County Zoning Ordinance, a Tier Three use refers to a use that is not directly related to agriculture but may be necessary to serve an A-2 District. Tier Three uses are consistent with the General Agriculture zone if (1) the use will not be substantially detrimental or in conflict with the agricultural use of other property in the vicinity and (2) the parcel on which the use is requested is not located in one of the County's most productive agricultural areas as defined in Stanislaus County's General Plan (Stanislaus County 2017). Per the Agriculture Element of the General Plan, the County does not prescribe a definition for the term *most productive agricultural areas;* rather, use of the term is determined on a case-by-case basis (Stanislaus County 2016). Factors to be considered include the following: soil types and potential for agricultural production; the availability of irrigation water; ownership and parcelization patterns; uniqueness and flexibility of use; the existence of Williamson Act contracts; and existing uses and their contributions to the agricultural sector of the local economy (Stanislaus County 2016). The reservoir itself would convert agricultural land, and further detail on agricultural impacts of Alternative 2 can be found in *Section 3.2, Agriculture*. However, Alternative 2 would provide a benefit of water supply reliability to surrounding agriculture, thereby supporting agriculture throughout the region, and the reservoir is located on grazing land, which is not the most productive type of agricultural in the county.

Alternative 2 would permanently convert 80.2 acres of designated important farmland, specifically prime farmland and unique farmland, as designated by the California Farmland Mapping and Monitoring Program (FMMP) with the remainder being grazing land, nonagricultural and natural vegetation, or vacant or disturbed land within Alternative 2's footprint, as discussed in *Section 3.2, Agriculture*. Construction of Project facilities (primarily the conveyance facilities) could temporarily interfere with some adjacent agricultural uses, but once completed and operational, no disturbance to agriculture would be expected because existing agriculture in the Project construction area is limited to abandoned orchards. Because Alternative 2 would improve water supply reliability for the agricultural community within Stanislaus County, Alternative 2 would be consistent with the general agriculture zone despite the conversion of agricultural land within portions of the study area. As such, Alternative 2 would not conflict with the Stanislaus County General Plan Agricultural Element.

The Conservation/Open Space Element of the Stanislaus County General Plan addresses recreation and reservoirs, stating that the county should "promote the use of water reservoirs for multiple

recreational purposes, where appropriate." The Project Sponsors are open to Stanislaus County developing recreation areas in the future but are not proposing recreational facilities as part of the current Project. The Project Sponsors do not have the resources or expertise to develop and manage recreation areas, so any recreational facilities would need to be developed and managed by the Stanislaus County Department of Parks and Recreation. If developed and managed by the County, the reservoir site could potentially provide upland recreation such as camping, hiking and picnicking. However, the reservoir itself is not expected to be suitable for water-based recreation. The reservoir slopes would be steep and the reservoir would be filled and drained frequently, resulting in extreme changes in water levels. Because of irrigation demands the water level would always drop substantially in the summer, making recreational water activities dangerous as new hazards would appear regularly. Due to these characteristics, the reservoir would not be appropriate for water-based recreation. Therefore, Alternative 2 would not conflict with the Conservation/Open Space Element of the General Plan (Policy Thirteen) which acknowledges that reservoir sites may not always be appropriate for multi-purpose recreational uses.

Consistency with City of Patterson Policies. Under Alternative 2, the pump station and a portion of the conveyance pipeline would be constructed and operated inside the City of Patterson's city limits, with facilities constructed and operated in areas zoned for light industrial uses (West Patterson light industrial). The reservoir, utility relocation, and conveyance corridor (the portion outside the city limits) would pass through land that is part of the city's general plan area, including some areas where the city has made zoning designations. These areas are outside the city limits.

The City of Patterson General Plan goals that are relevant to Alternative 2 are intended to ensure that the City designates adequate land for commercial, industrial, and highway service activities. The City of Patterson Zoning Code includes restrictions on the types of facilities that may be allowed within each land use designation. Per City of Patterson Zoning Code, Section 18.96, all Alternative 2 facilities would be considered "public utility structures" or "electrical substations." The city's definition of public utility structure indicates that "nothing in [the] definition is intended to require a land use permit" (City of Patterson 2017).

Public utility structures are permitted in light industrial areas (including West Patterson light industrial) but are not permitted in general commercial or highway service commercial areas, however electrical substations are allowed with a conditional use permit (City of Patterson 2017). Construction and operation of Alternative 2 facilities in light industrial and mixed-use areas would be consistent with the city's general plan and zoning ordinance. Certain components of Alternative 2 (i.e., relocated utilities and conveyance infrastructure) may be constructed and operated within areas that the City of Patterson has zoned for general commercial or highway service commercial uses. Project components that would be constructed and operated in general commercial or highway service commercial areas are discussed in more detail below and summarized in **Table 3.11-1**.

Table 3.11-1: Summary of City of Patterson zoning designations and potential conflicts

Zoning Designation	Public Utility Structures Permitted?	Proposed Project Components within Zoning Designation	Potential for Conflict with Existing Zoning?
Light Industrial (including West Patterson Light Industrial)	Yes	Conveyance corridor (within city limits and general plan area)	No. Public utility structures are permitted in light industrial areas.
Highway Service Commercial	No	Utility relocation (within general plan area)	No. Construction and operation of the proposed Project would not occur in any highway service commercial areas that are within city limits.
Mixed Use	Unspecified	Utility relocation (within general plan area) Reservoir (within general plan area)	No. No requirements specified for public utility structures. Construction and operation of the proposed Action would not occur in any mixed use areas that are within city limits.

*Utility Relocation***.** Under Alternative 2, utility relocation (of the gas pipeline and electric transmission towers) may occur in the City of Patterson general plan area on land designated as highway service commercial. The relocated gas pipeline would be buried and would not interfere with future commercial activities in the area. Therefore, the pipeline relocation would not conflict with City of Patterson zoning regulations. The existing power lines that currently transect the Del Puerto Canyon study area would be relocated, with three lines in front of the main dam and one power line routed west of the existing corridor, crossing the impoundment. It is possible that one or more support structures (i.e., tubular steel monopoles or lattice steel structures) would be located within the highway service commercial land use type. In this case, EPM LU-1 would be implemented to avoid placing transmission structures in the highway service commercial area.

Conveyance Facilities. Under Alternative 2, the proposed conveyance facilities may be constructed and operated in areas designated by the City of Patterson for highway service commercial or general commercial uses. The conveyance pipeline may pass through both land use designations. Because the pipeline would be buried, it would not prevent use of the area for commercial activities. There are no current commercial or industrial uses in the conveyance corridor, so no existing facilities would be disturbed. Therefore, the conveyance pipeline would not conflict with existing zoning.

The aboveground conveyance facilities would consist of a pumping plant and associated facilities which would be located at a single site adjacent to the DMC, within the DMC right of way. The pumping plant site is within city limits and is zoned as West Patterson light industrial. Thus the pumping plant would not conflict with existing zoning, and the proposed facilities would have no impact on land use plans or policies. Formal authorization from Reclamation would be required for the new turn-out/turn-in off the DMC, the pipeline, and pumping plant.

The presence of transmission towers on highway service commercial land would be eliminated or reduced to the minimum extent that is technically feasible. EPM LU-1 would limit the extent of the

impact on highway service commercial areas and preserve the maximum amount of land possible for commercial use.

Recreation. Under Alternative 2, certain wildlife viewing-based recreation may be altered, though opportunities for wildlife viewing would be provided by the new road alignment. The new road would provide wider shoulders than the existing road and shoulders would be paved bike-friendly shoulders that would facilitate roadside birdwatching or wildlife viewing. Similar to the existing road these opportunities would be limited to the public right-of-way as all of the lands on both sides of the existing and relocated road are private. Potential impacts to terrestrial wildlife, including birds, are addressed in *Section 3.4, Biological Resources – Terrestrial* section. With the realignment of Del Puerto Canyon Road, recreational uses such as bicycling and motorcycling, would be preserved. The new roadway would be completed prior to closure of the existing road, therefore there would be no adverse impacts on the general public's ability to enjoy these activities on the road and character of the road as a rural road would not change. Once completed, the new segment of the road would be maintained by the County as part of their ongoing road maintenance of Del Puerto Canyon Road. Access to the existing Frank Raines Regional Park, which is 11 miles west of the upper end of the reservoir, would be maintained during and after construction activities and would not be adversely affected by Alternative 2.

Because Alternative 2 would cause changes in habitat type and abundance in the reservoir inundation area compared to the no action, Alternative 2 may have impacts on birdwatching, wildlife viewing, and other activities that rely on the existing local flora and fauna. Birdwatching, wildlife viewing, photography, and other activities could still occur from the public right-of-way along the relocated Del Puerto Canyon Road and access to the upper reaches of Del Puerto Canyon would be maintained. However, the specific species that may be observed may change following construction of Alternative 2. Specific impacts to biological communities have been assessed in *Section 3.4, Biological Resources – Terrestrial*. EPMs BIO-TERR-1k and BIO-TERR-5 would ensure that effects on birds and wildlife in the study area would be minimized and that habitat values in the region would be preserved. Nevertheless, the experiences of birdwatching and wildlife viewing in the study area would be altered by Alternative 2.

Alternative 2 would not increase the use of existing recreational facilities resulting in substantial deterioration of a facility, nor would Alternative 2 include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Therefore, Alternative 2 would have no impact on recreational facilities compared to the No Action Alternative. However, Alternative 2 would permanently alter the natural resources of lower Del Puerto Canyon, and thus impact informal recreational uses of this portion of the canyon, including birdwatching and wildlife viewing.

3.11.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be the same as described above for Alternative 2.

3.11.3.5 Alternative 4 (DPCR 40 TAF)

A smaller reservoir would require similar measures to minimize conflict with adopted land use plans or policies and impacts to recreational uses would have constraints similar to Alternative 2. The impacts of conveyance facilities and utility relocation would be identical to Alternative 2. Access to

the existing Frank Raines Regional Park would be maintained during and after construction activities and would not be adversely affected by Alternative 4 compared to the No Action Alternative.

3.11.3.6 Alternative 5 (Ingram Canyon)

Consistency with Stanislaus County Policies. Similar to Alternative 2, Alternative 5 would be consistent with the goals of the Land Use Element of the Stanislaus County General Plan as it relates to advancing the protection of the agricultural industry by improving the reliability of the water supply within the county. This alternative would not consist of industrial, commercial, or residential development, nor is it likely to encourage residential development that would affect continued agricultural use of the surrounding area. Impacts on riparian habitat would be mitigated via compensation with the implementation of EPM BIO-TERR-2. Therefore, Alternative 5 would be compatible with the Stanislaus County General Plan Land Use Element.

Alternative 5 would convert some agricultural land within the Project footprint, as discussed in *Section 3.2, Agriculture*. Construction of the Project conveyance pipeline would occur primarily within existing roads and would not be expected to interfere with adjacent agricultural uses, and once completed and operational, no disturbance to agriculture would be expected. Existing orchards and grazing lands along the pipeline route would continue to operate. Because this alternative would also improve water supply reliability for the agricultural community within Stanislaus County, this alternative would be consistent with the general agriculture zone despite the conversion of agricultural land within the reservoir footprint. As such, Alternative 5 would not conflict with the Stanislaus County General Plan Agricultural Element.

The Project Sponsors are open to Stanislaus County developing recreation areas in the future but are not proposing recreational facilities. In that case, the reservoir site could provide upland recreation such as camping, hiking and picnicking, but the reservoir is not expected to be suitable for water-based recreation. Therefore, this alternative would not conflict with the Conservation/Open Space Element of the General Plan.

Consistency with City of Patterson Policies. Under Alternative 5, there would be no Project facilities constructed and operated near the City of Patterson; therefore, the City of Patterson General Plan goals are not relevant.

Recreation. Recreation such as wildlife viewing would not change with Alternative 5 because there is no existing public access to Ingram Canyon, all of which is currently private property and both the reservoir and access road leading to the reservoir would be private property. Alternative 5 would not increase the use of existing recreational facilities, nor would it include the construction or expansion of recreational facilities that might have an adverse physical effect on the environment because there are no existing recreational facilities. Therefore, Alternative 5 would not affect future recreation opportunities compared to Alternative 1.

3.12 Traffic and Transportation

3.12.1 Affected Environment

This section describes the transportation network and traffic conditions in the proposed study areas and the potential impacts the Project alternatives may have on traffic. Baseline conditions for traffic and transportation were based on the Transportation Impact Assessment prepared for the Del Puerto Canyon Reservoir (Fehr & Peers 2019) and on the Transportation Impact Assessment for Ingram Canyon Reservoir Alternative (CHS 2025).

3.12.1.1 Study Area

Del Puerto Canyon Reservoir study area includes regional and local roads including Interstate 5 (I-5) and the Sperry Avenue (State Route 130) interchange, Diablo Grande Parkway and Del Puerto Canyon Road (**Figure 3.12-1**). Ingram Canyon Reservoir study area includes regional and local roads including I-5, the Howard Road interchange, Howard Road, McCracken Road and Ingram Creek Road (**Figure 3.12-2**).

3.12.1.2 Issues of Environmental Concern

Issues of environmental concern for traffic and transportation are traffic congestion, traffic hazards, increased travel times, and availability of emergency access.

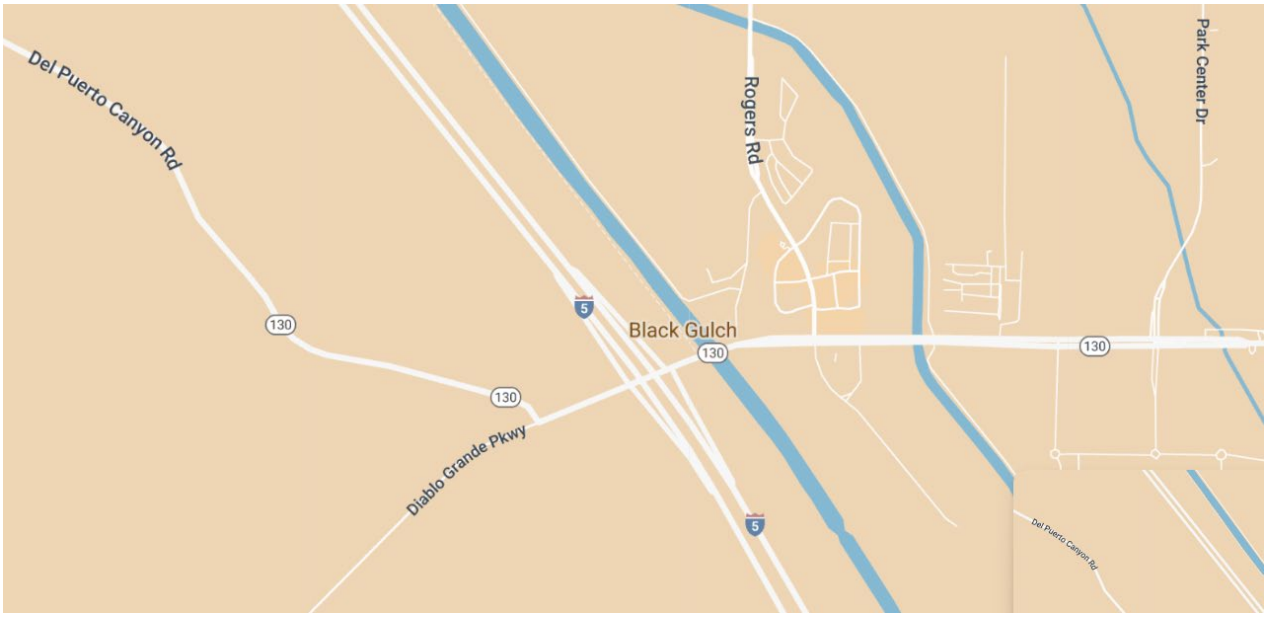

Figure 3.12-1: Road Network Near Del Puerto Canyon

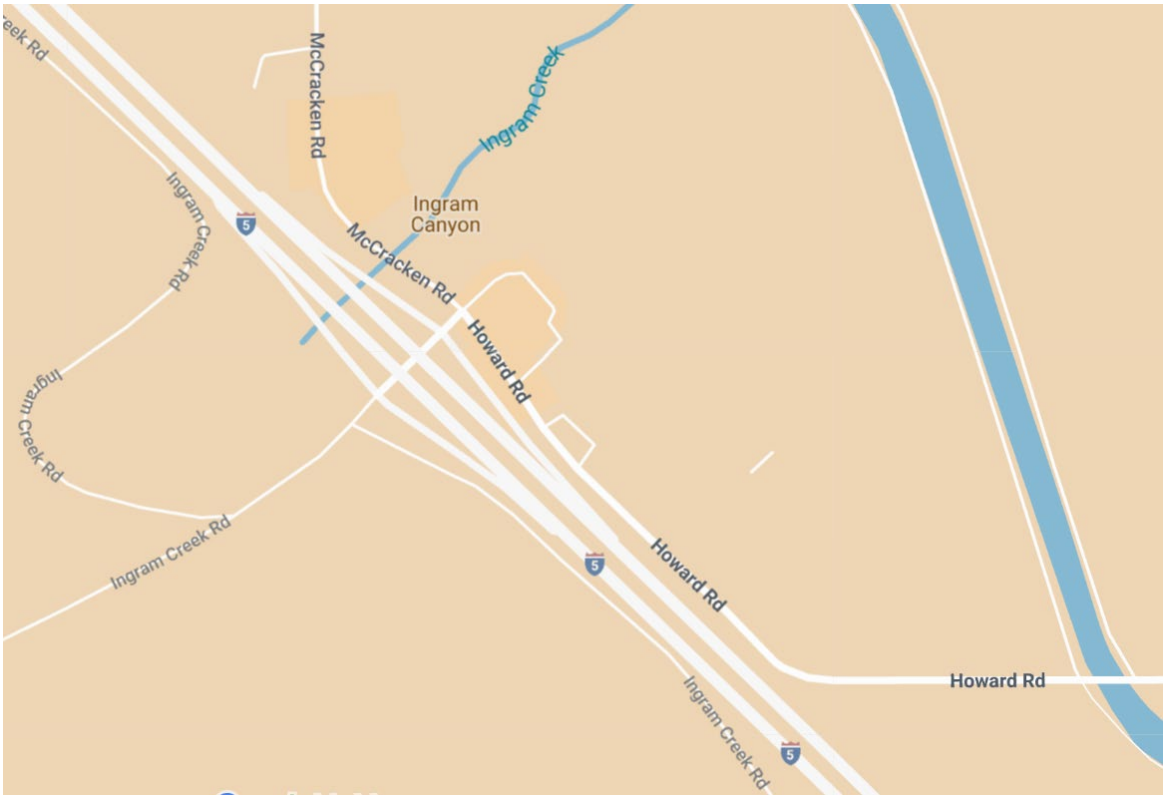

Figure 3.12-2: Road Network Near Ingram Canyon

3.12.1.3 Characterization

Regional Roadway System

Interstate 5 (I-5) is a freeway serving the western US from its southern border with Mexico to its northern border with Canada. In the study areas, I-5 provides two lanes in each direction, and a diamond interchange[1] with Sperry Avenue/Diablo Grande Parkway provides access to the City of Patterson to the east and the Diablo Grande community to the west. A diamond interchange with Howard Road/Ingram Creek Road/McCracken Road provides access to Westley and Grayson to the east. The average daily traffic (ADT) volume in the Project vicinity is approximately 46,210 vehicles (CHS 2025).

Roadway System in Del Puerto Canyon Study Area

Del Puerto Canyon Road is a two-lane rural roadway, which originates 0.1 miles west of the I-5 interchange, connecting Diablo Grande Parkway in the east to Mines Road/San Antonio Valley Road in the west. The roadway has soft shoulders, no bicycle lanes, and no sidewalk facilities. The posted speed on Del Puerto Canyon Road is 35 mph.

[1] A diamond interchange is an interchange involving four ramps that enter and leave the freeway at a small angle and meet the non-freeway at almost right angles. These ramps at the non-freeway can be controlled through stop signs, traffic signals, or turn ramps.

Diablo Grande Parkway is a two-lane rural roadway connecting I-5 in the east to the Diablo Grande community approximately seven miles to the west, which has marked bicycle lanes in the vicinity of the Diablo Grande community (after the community entrance gate). No sidewalks are provided; however, the roadway has paved shoulders. The posted speed limit on this road is 40 mph.

Roadway System in Ingram Canyon Study Area

Ingram Creek Road is a two-lane rural roadway running east-west between Rocky Ford Canyon to the west and Howard Road to the east, near I-5. This roadway is paved between the I-5 southbound ramps and Howard Road but remains unpaved west of the I-5 southbound ramps. There are no bicycle lanes or sidewalks along this roadway.

Howard Road is a two-lane roadway connecting I-5 to Westley. Near the I-5 interchange, it runs north-south, becoming McCracken Road north of Ingram Creek Road and continuing as Howard Road to the south. Approximately 2,000 feet south of the Ingram Creek Road intersection, it transitions to an east-west orientation, extending toward the communities of Westley and Grayson. The roadway has paved shoulders and sidewalks along the northbound (east) side, but there are no paved shoulders or sidewalks on the southbound (west) side.

McCracken Road is a two-lane roadway running north-south between Ingram Creek Road to the south and local retail establishments and rural farmland to the north. This roadway has partial paved shoulders and a discontinuous sidewalk network in the Project vicinity. There is no sidewalk at the intersection of McCracken Road with Ingram Creek Road; the sidewalk begins approximately 630 feet northwest of the intersection.

Bicycle Facilities in Del Puerto Canyon Study Area. Del Puerto Canyon Road is used by cyclists for recreational cycling. The road has "Share the Road" bicycle route signage, but does not have separate designated bike lanes.

Bicycle Facilities in Ingram Canyon Study Area The roadways in the Ingram Canyon study area are primarily rural two-lane roadways with no designated bicycle lanes.

Pedestrian Facilities in Del Puerto Canyon Study Area. Pedestrian facilities normally include sidewalks, pathways, crosswalks, and pedestrian signals. The roadways in the study areas are rural two-lane roadways. No pedestrian facilities or adjacent paths are provided in the Del Puerto Canyon study area.

Pedestrian Facilities in Ingram Canyon Study Area. There are intermittent sidewalks fronting limited developments along McCracken Road and Howard Road in the Ingram Canyon study area, but no sidewalks on Ingram Creek Road.

Transit Service. There is no transit service provided in either the Del Puerto Canyon or Ingram Canyon study area.

Traffic Counts for Del Puerto Canyon Study Area. Weekday morning and afternoon peak period counts of vehicles, bicycles and pedestrians were conducted by Fehr & Peers in May 2019 at the

three existing study intersections (see **Table 3.12-1**). No pedestrian or bicycle activity was observed during the counts.

In addition, traffic counts were collected by Fehr & Peers in mid-May 2019 on Del Puerto Canyon Road north of Diablo Grande Parkway and Diablo Grande Parkway west of Del Puerto Canyon Road. The average daily volumes on these segments were as follows:

- Del Puerto Canyon Road north of Diablo Grande Parkway: 277 vehicles per day
- Diablo Grande Parkway west of Del Puerto Canyon Road: 1,623 vehicles per day

Traffic Counts for Ingram Canyon Study Area. Traffic counts were conducted by CHS Consulting in 2023 on Ingram Creek Road west of I-5. The average daily volumes were as follows:

- Ingram Creek Road west of I-5 and east of southbound on and off-ramps: 6,860 vehicles per day

Intersection Operations. Fehr & Peers and CHS Consulting calculated weekday morning and afternoon peak hour intersection levels of service (LOS) for the Del Puerto and Ingram study areas, respectively (**Table 3.12-1**). LOS is a term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay, and safety. The LOS of a roadway is designated with a letter, A to F, with A representing the best operating conditions and F the worst. During the afternoon peak hour both the Sperry Avenue/Diablo Grande and Ingram Creek Road southbound off-ramps from I-5 currently operate at an unacceptable level of service, with excessive delays for vehicles exiting the freeway and heading east to either Patterson or Westley/Grayson and further east. Both of those intersections meet signal warrant criteria, which means that a traffic signal would be appropriate based on the existing delays at both off-ramps.

Table 3.12-1: Intersection Weekday Level of Service-Existing Conditions

Intersection	Control Type	Existing Delay AM[1]	Existing LOS AM[1]	Existing Delay PM[1]	Existing LOS PM[1]
Del Puerto Canyon Study Area					
Sperry Avenue/Diablo Grande Parkway/I-5 Northbound Ramps	Side-Street Stop	10.2	B	15.0	C
Sperry Avenue/Diablo Grande Parkway/I-5 Southbound Ramps	Side-Street Stop	12.7	B	**40.9**	**E**
Del Puerto Canyon Road/Diablo Grande Pkwy	Side-Street Stop	9.2	A	9.2	A
Ingram Canyon Study Area					
Ingram Creek Road/ I-5 Southbound Ramps	One-way Stop	11.5	B	**42.7**	**E**
Ingram Creek Road/ I-5 Northbound Ramps	One-way-Stop	10.3	B	17.7	C

Source: Fehr & Peers 2019, CHS 2025

Notes: 1. The control delay in seconds, for the worst movement, is reported.

2. Bold text indicates unacceptable LOS conditions (LOS E or F).

3.12.2 Regulatory Setting

A description of each federal, state or local law or regulation is included in Appendix E, Regulatory Framework.

3.12.3 Environmental Consequences

3.12.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) for traffic and transportation (**Appendix G)** are listed below. Measure TR-1a: Sperry Avenue Interchange Improvements Project Contributions is only applicable to Alternatives 2-4, which would affect that interchange. Measure TR-1b: Ingram Creek Road Interchange Improvements Project Contributions is applicable to Alternative 5. Measure TR-2 is applicable to all Action Alternatives.

51 **TR-1a: I-5 Sperry Avenue Interchange Improvements Project Contributions**

The Project Sponsors shall work with Stanislaus County and the City of Patterson to contribute a fair share toward the planned I-5 Sperry Avenue Interchange Improvements project. The signal at the I-5 Southbound Ramps intersection would mitigate the Project impact. The signal at the I-5 Northbound Ramps intersection is recommended to provide efficient operations at both intersections, which are closely spaced and which would not function acceptably with signal control at one intersection and side-street stop-control at the other. The proportional share calculation should take into account the existing deficiency at the Southbound Ramps intersection and the non-Project traffic volume growth between the existing conditions and near-term conditions without the Project, as well as the County and City's plans to secure other state and federal funding for the Interchange Improvements project.

Alternatively, the Project Sponsors may pay a traffic mitigation fee per peak hour trip or another negotiated contribution. Because the planned Interchange Improvements Project is not expected to be fully funded and complete until after the proposed Project's construction period, Stanislaus County and the City of Patterson may choose to use the funding contribution, along with other funding sources if available, to erect temporary traffic signals during dam and roadway realignment construction.

In addition to contributing funding for a traffic signal at the I-5/Sperry Avenue Interchange, the Project Sponsors shall explore development of alternative construction access to the dam site. It may be possible to direct a portion of the construction traffic along Zacharias Road. Although the public road ends at the DMC, there are bridges across the DMC and California Aqueduct and an undercrossing of Interstate 5, which could provide access to the dam site upon receiving permission.

52 **TR-1b: I-5 Ingram Creek Road Interchange Improvements Project Contributions**

The Project Sponsors shall work with Stanislaus County to contribute a fair share toward signal control improvements at the Ingram Creek Road/I-5 Southbound Ramps and Ingram Creek Road/I-5 Northbound Ramps intersections. The

proportional share calculation should account for existing deficiencies at the southbound ramp intersection. For the northbound ramp intersection, since the Alternative's impacts are temporary and do not meet the signal warrant, traffic levels should be monitored, and temporary traffic signals may be installed during construction if necessary.

53 **TR-2: Implementation of Construction Traffic Management Plan**

The Project Sponsors shall prepare a detailed Construction Traffic Management Plan to address traffic conditions throughout the construction period. As part of the plan development, the Project Sponsors and their construction contractors shall meet with appropriate Stanislaus County, City of Patterson, and Caltrans departments to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and safety effects during construction of the proposed Project. The Project Sponsors shall develop the plans for review and approval by the appropriate City, County and Caltrans departments. The plans shall include at least the following items and requirements:

A. A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes.
B. Location of construction staging areas for materials, equipment, and vehicles at approved locations.
C. A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an on-site complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem.
D. Provision for accommodation of pedestrians and bicyclists in the construction area.
E. Provision for parking management and spaces on the Project site for all construction workers to ensure that construction workers do not park on-street where insufficient shoulder space exists.
F. A plan for restoration of pavement to pre-construction conditions after completion of all construction.
G. Other items deemed necessary by the City, County and Caltrans during preparation of the Construction Traffic Management Plan.

3.12.3.2 Alternative 1 (No Action)

Alternative 1 would not include the construction of any new facilities and thus would not have any impacts related to traffic or transportation.

3.12.3.3 Alternative 2 (DPCR 82 TAF)

Unacceptable Level of Service During Construction. During the six-year construction period, substantial additional traffic would be generated, including heavy truck traffic with periods of time

when up to 300 daily round trips could be generated. Construction traffic would result in worsening of already unacceptable levels of services (see existing conditions in **Table 3.12-1**) at the southbound I-5 off-ramp at Del Puerto Canyon Road/Diablo Grande Parkway (see construction LOS in **Table 3.12-2**).

Table 3.12-2: Intersection Weekday Level of Service-during Construction – Alternative 2

Intersection	Control Type	Construction Period Delay AM[1]	Construction Period LOS AM[1]	Construction Period Delay PM[1]	Construction Period LOS PM[1]
Sperry Avenue/Diablo Grande Parkway/I-5 Northbound Ramps	Side-Street Stop	13.4	B	22.5	C
Sperry Avenue/Diablo Grande Parkway/I-5 Southbound Ramps	Side-Street Stop	20.1	C	**202.8**	**F**
Del Puerto Canyon Road/Diablo Grande Pkwy	Side-Street Stop	10.4	B	10.4	B

Source: Fehr & Peers 2019

Notes: 1.The control delay in seconds for the worst movement is reported.

2. Bold text indicates unacceptable LOS conditions (LOS E or F).

Stanislaus County is working with the City of Patterson and Caltrans to construct improvements to the Sperry Avenue interchange. Improvements would widen Sperry Avenue under I-5 to four lanes, widen the off-ramps to provide multiple turn lanes, and signalize both ramp intersections. Project funding would be comprised of 70 percent from the City of Patterson and 30 percent from Stanislaus County, with both agencies pursuing state and federal funds. Environmental review for the project was completed by Caltrans in early 2021, and the Stanislaus County Council of Governments Regional Transportation Plan estimates that the project would be completed in 2030 (StanCOG 2022).

As noted in EPM TR-1a, the Project Sponsors would work with Stanislaus County and the City of Patterson to help fund improvements to the Sperry Avenue interchange. Implementation of this measure would reduce the impact of the proposed Project on the intersection of Sperry Avenue/Diablo Grande Parkway/I-5 Southbound Ramp during construction. With the interchange improvements, the LOS at the Sperry Avenue/Diablo Grande Parkway/I-5 Northbound Ramp is projected to be acceptable with or without the Project during both construction and operation. However, the timing of implementation is outside the control of the Project Sponsors and it is likely that the improvements would not be completed before the start of construction. EPM TR-1a also includes consideration of possible alternative access points for construction vehicles, but it is uncertain whether alternative access from Zacharias Road would be feasible because permission to use alternative routes has not been obtained.

Level of Service During Operation. Maintenance of the Project would require minimal trips and would not affect levels of service at any intersection in the study area. As explained in Section 2.4.3, Maintenance, there would be weekly inspection trips in the first year of operation, reduced in frequency over time with trips every two weeks in years two through five of operation and monthly trips starting in year six.

Vehicle Miles Traveled. Construction would result in additional vehicle travel in the study area with up to 300 additional round trips per day during the peak of construction. Truck trips would

average about 30 miles each way and worker trips would average 15 miles each way. The increase would be typical of a large construction project and would be temporary, ending after the completion of the six-year construction period.

The realignment of Del Puerto Canyon Road would result in a small decrease in the travel distance from the freeway to locations west of the reservoir on Del Puerto Canyon Road. The new road alignment would be 0.17 miles shorter than the existing road. With an estimated 277 vehicles per day using Del Puerto Canyon Road, this would be a reduction of about 47 vehicle miles traveled per day. Thus, there would be no increase in vehicle miles traveled for residents living at the western end of Del Puerto Canyon, or for vehicles traveling to other destinations along the road.

Traffic Hazards. Project construction would introduce a substantial number of large trucks (up to 26 trucks per hour during the AM peak hour) and other heavy vehicles to the study area over the course of the approximately six-year construction schedule. These heavy vehicles may move slowly as they maneuver through the study intersections and cause potential conflicts with regular users of the roadway network, including residents and employees in Patterson and residents in the Diablo Grande community. Therefore, the proposed Project could increase hazards due to design features or incompatible uses.

As noted in EPM TR-2, a construction management plan would be implemented and would include procedures to mitigate the potential for construction traffic to conflict with existing roadway users (e.g., through signage, establishment of construction routes, and appropriate staging areas).

The realigned Del Puerto Canyon Road would be designed in conformance with all applicable codes and standards, such as the roadway standard plans and specifications maintained by Stanislaus County, the Caltrans Highway Design Manual (where applicable), and the California Manual on Uniform Traffic Control Devices. Once complete, the realigned roadway is not expected to serve a different traffic mix (more heavy vehicles, for example) than currently uses the study area roadways.

Emergency Access. Project construction would introduce a substantial number of large trucks (up to 26 trucks per hour during the AM peak hour) and other heavy vehicles to the study area, over the course of the approximately six-year construction schedule, creating periods of delay to area traffic at the Sperry Avenue/Diablo Grande Parkway/I-5 interchange, which may affect emergency response times. The construction traffic management plan described in Mitigation Measure TR-2 would address this impact and ensure that the impact on emergency responders is minimized.

The Project would decrease the travel distance for drivers on Del Puerto Canyon Road between points east of the dam and west of the dam by 0.17 miles due to the roadway realignment. Emergency responders destined for points on Del Puerto Canyon Road within the study area would travel slightly shorter distances to reach their destination. Additionally, the realigned roadway would not impede responders, as it would be designed to conform with applicable design standards and would not have the sharp curves that slow travel times on the existing road. The realigned roadway alternatives would not adversely affect emergency response travel routes or times to the community of Diablo Grande nor Patterson, as emergency responders would virtually all come to/from the east (City of Patterson). Therefore, there would be no impact on emergency response associated with the new roadway alignment.

3.12.3.4 Alternative 3 (Limited Action)

Impacts under Alternative 3 would be the same as described above for Alternative 2.

3.12.3.5 Alternative 4 (DPCR 40 TAF)

Alternative 4 would generate substantial construction traffic and would be expected to have adverse impacts on the Sperry Avenue/Diablo Grande I-5 interchange southbound off-ramp. Impacts would be similar to those described above for Alternative 2 though there may be slightly less construction traffic associated with a smaller dam. The relocated Del Puerto Canyon Road would be 0.17 miles shorter than the existing roadway realignment. Operational impacts would be the same as Alternative 2 because the alignment of the roadway relocation would be the same as with Alternative 2.

3.12.3.6 Alternative 5 (Ingram Canyon)

Unacceptable Level of Service During Construction. During the 4.5-year construction period, substantial additional traffic would be generated with up to 230 round trips per day, including heavy truck traffic, which would result in worsening of already unacceptable levels of service (see existing conditions in **Table 3.12-1**) at the southbound I-5 off-ramp Ingram Creek Road/Howard Road (see construction LOS in **Table 3.12-3**).

Table 3.12-3: Intersection Weekday Level of Service-during Construction – Alternative 5

Intersection	Control Type	Construction Period Delay AM[1]	Construction Period LOS AM[1]	Construction Period Delay PM[1]	Construction Period LOS PM[1]
Ingram Creek Road/ I-5 Southbound Ramps	One-way Stop	12.9	B	**169.9**	**F**
Ingram Creek Road/ I-5 Northbound Ramps	One-way-Stop	12.0	B	**34.1**	**D**

Source: CHS 2025

Notes:1. The control delay in seconds for the worst movement is reported.

2. Bold text indicates unacceptable LOS conditions (LOS E or F).

Stanislaus County currently has no plans to improve the interchange at I-5 and Ingram Creek Road/Howard Avenue, and there are no feasible alternative access points to the Ingram Canyon dam location. However, as noted in EPM TR-1b, the Project Sponsors would work with Stanislaus County to help fund improvements to the Ingram Creek Road/Howard Avenue interchange.

Level of Service During Operation. The number of maintenance vehicle trips would be the same as for Alternative 2. The minimal trips required for maintenance would not affect levels of service at any intersection in the study area.

Vehicle Miles Traveled. Similar to Alternative 1, Alternative 5 would not require relocation of a public road. There are rural residences west of the reservoir for which access from Ingram Creek Road would no longer be possible. Ingram Creek Road is a private unpaved road west of the I-5 southbound off ramps, and provides access to agricultural lands west of I-5. Once Ingram Creek Road is inundated, access to rural residences west of the reservoir would only be available via Mt. Oso Road, a dirt road that heads north from about milepost 8.5 on Del Puerto Canyon Road, extending into the rural parcels west of the reservoir. This would substantially increase travel distance for those rural areas as compared to Alternative 1. For example, a home located a little over

a mile west of the Ingram Canyon Reservoir footprint currently is about 6 miles west of I-5 via Ingram Creek Road. To reach the same residence after the reservoir is inundated would require at least 18 miles of travel along Del Puerto Canyon Road, Mt. Oso Road and other unpaved roads, traversing some areas of fairly steep terrain. Because limited numbers of residents would be affected, total VMT would not increase substantially, though this would be a significant inconvenience for those affected.

Traffic Hazards. Construction would introduce large trucks and other heavy vehicles to the study area that could cause potential conflicts with regular users of the roadway network, including local residents and others who use facilities at the commercial area at the Howard Road Interchange. Although Alternative 5 could substantially increase traffic hazards during construction, EPM TR-2, requires a construction Traffic Management Plan that would implement procedures to mitigate the potential for construction traffic to conflict with existing roadway users (e.g., through signage, establishment of construction routes, and appropriate staging areas).

Emergency Access. Construction would introduce a substantial number of large trucks and other heavy vehicles to the study area, which could affect emergency response times compared to the No Action Alternative. The construction traffic management plan described in Measure TR-2 would address this impact and ensure that the impact on emergency responders during construction is minimized.

Although limited numbers of residences would be affected, any residences located west of the Ingram Creek Reservoir that currently access their homes via Ingram Creek Road would experience substantial increases in emergency response times as police, fire, and other emergency services would have to travel much farther over unpaved roads. Roads accessing the area west of the reservoir would be improved as part of the Project.

3.13 Utilities

This section describes the potential impacts the proposed alternatives may have on specific utilities within the Project study areas. Action Alternatives would store existing available water supplies and would not have any adverse impacts associated with availability of water supplies. Action Alternatives would not generate any wastewater and would not affect local wastewater treatment providers. Because the study areas are primarily undeveloped, construction would generate a minimal amount of solid waste that would require disposal at a landfill, primarily from demolition of structures (small agricultural outbuildings) within the reservoir footprint or relocation of utilities. There is adequate landfill capacity to accommodate the limited construction debris that would be generated. Therefore, the Action Alternatives would not impair attainment of solid waste reduction goals. This analysis focuses on the utilities in the study areas that would have to be relocated, which include a petroleum oil pipeline and electrical services.

The Action Alternatives do not include residential or commercial developments and would not directly induce population growth, and thus would not require new or expanded fire and police protection, schools, parks, or other facilities. Because all of the Action Alternatives would provide water for existing irrigators, they would not result in new demands on public service providers or affect the ability of local providers to maintain acceptable service ratios, response times, or other performance objectives for services.

3.13.1 Affected Environment

3.13.1.1 Study Area

The Del Puerto Canyon study area (see **Figure 3.13-1**) includes the Alternative 2 (DPCR 82 TAF), Alternative 3 (Limited Action), and Alternative 4 (DPCR 40 TAF) Project sites. The Ingram Canyon study area (see **Figure 3.13-2**) includes the Alternative 5 (Ingram Canyon) Project site. The portion of the Del Puerto Canyon study area in the foothills west of Patterson is crossed by five existing PG&E high-voltage transmission lines, a petroleum pipeline and natural gas pipeline. The Ingram Canyon study area is in the foothills west of Westley; there are no transmission lines within the reservoir or dam footprint.

3.13.1.2 Issues of Environmental Concern

Issues of environmental concern for utilities center around the possibility that the Project could necessitate relocation of utilities.

Alternatives 2 through 4 require the relocation of utilities including five existing high-voltage electric transmission lines and a petroleum transmission pipeline. Alternative 5 would entail minimal utility relocation.

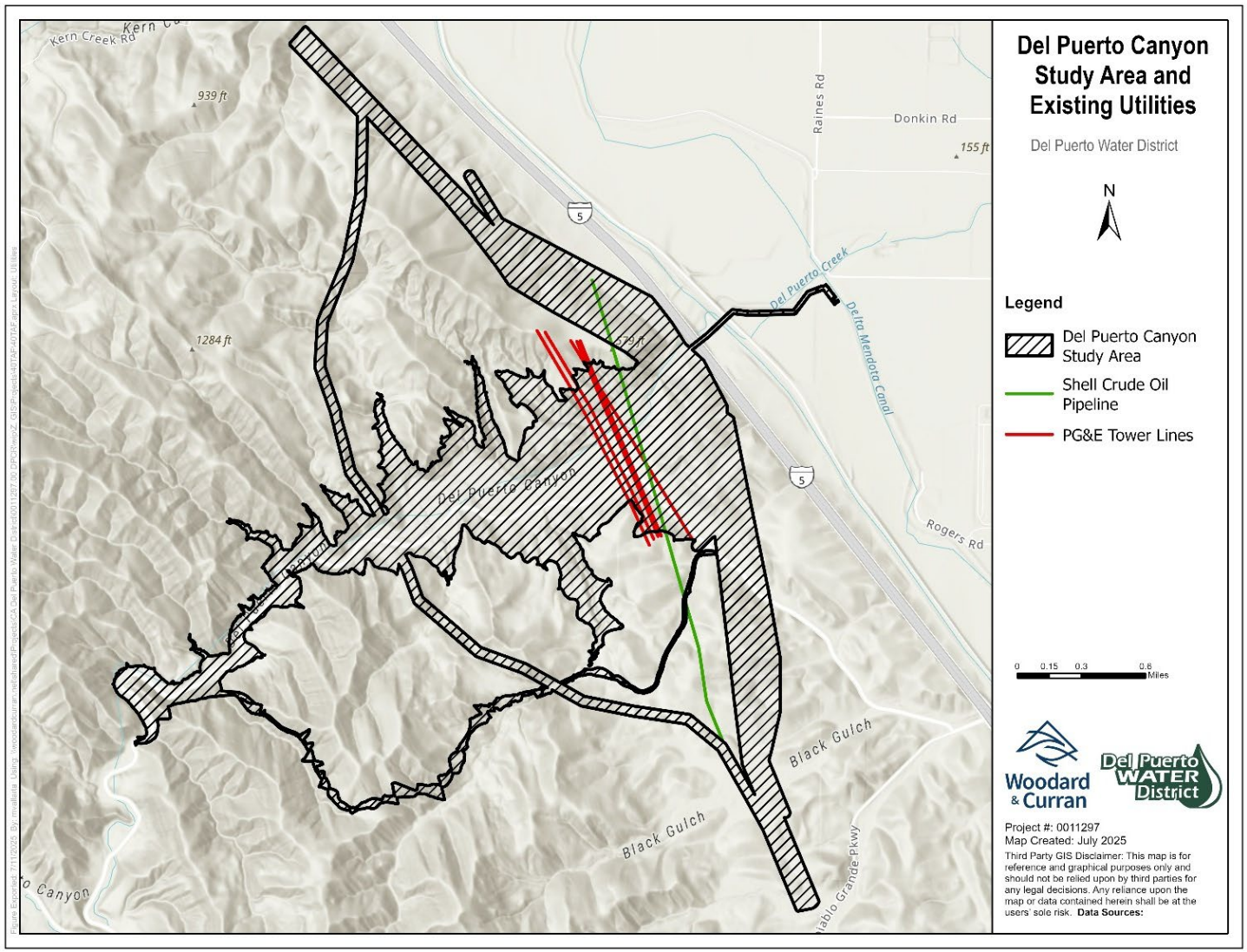

Figure 3.13-1: Del Puerto Canyon Study Area and Existing Utilities

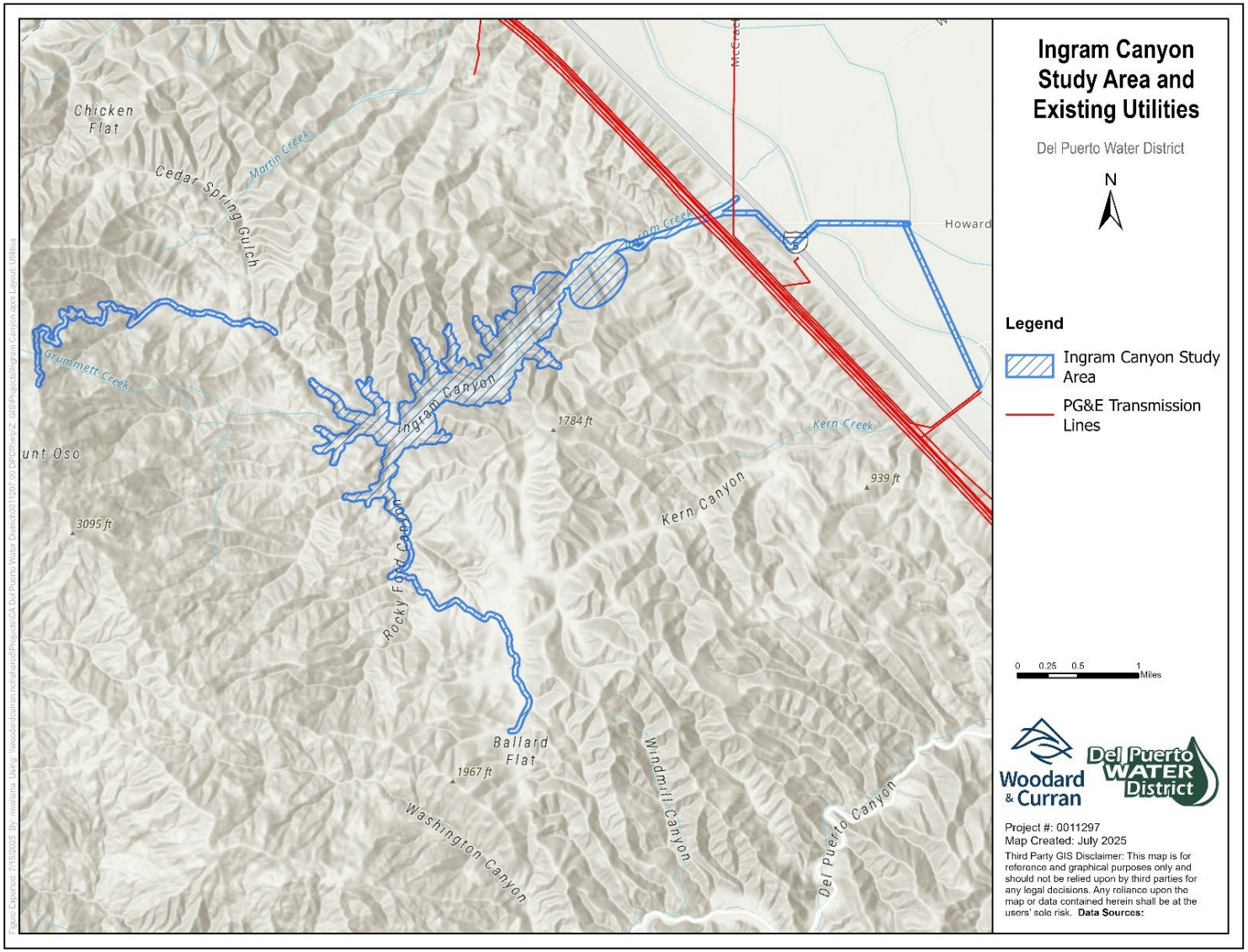

Figure 3.13-2: Ingram Canyon Study Area and Existing Utilities

3.13.1.3 Characterization

Utilities. Two electric utility providers deliver electricity to the area: Pacific Gas and Electric (PG&E), which operates on a regional scale throughout northern and central California, and Turlock Irrigation District (TID). PG&E provides natural gas from high-capacity pipelines to individual customers through small-diameter distribution pipelines (County Office 2019; Stanislaus County 2016). The region is also crossed by both interstate and intrastate pipelines that carry natural gas and petroleum products, as well as large-scale power transmission lines for long-distance electricity transmission. TID does not have utility infrastructure within the area that would be affected by construction activities, though TID does supply electricity to the Del Puerto Canyon study area (TID n.d.). PG&E supplies electricity to the Ingram Canyon Study area.

Both study areas are in the western portion of Stanislaus County. Existing utilities run north-south across the Del Puerto Canyon reservoir site, including five high-voltage electric transmission lines owned by PG&E and a petroleum pipeline owned and operated by Shell Pipeline. The Ingram Canyon study area is north of the Del Puerto area and west of the communities of Westley and Grayson. The Alternative 5 reservoir would be located west of the utility lines that are crossed by the Del Puerto Canyon reservoir.

3.13.2 Regulatory Setting

Laws and regulations at the Federal, state, and local level that may apply to the Project are described in Appendix E.

3.13.3 Environmental Consequences

3.13.3.1 Environmental Protection Measures

Because utility relocation could affect multiple resources, all Environmental Protection Measures (EPMs) identified in Sections 3.1 through 3.4, and Sections 3.6 through 3.12 of this EIS are applicable. No EPMs beyond those identified elsewhere in this EIS are proposed.

3.13.3.2 Alternative 1 (No Action)

Under the No Action Alternative, the Project would not be constructed. There would be no need to relocate existing utilities and thus no impact on utilities.

3.13.3.3 Alternative 2 (DPCR 82 TAF)

Alternative 2 would require the relocation of existing utilities that run north-south through the study area; this relocation is considered part of the proposed Project and is evaluated throughout other sections of the EIS. Existing high voltage transmission lines and petroleum pipelines would be relocated as described in the Alternatives Description. Environmental impacts associated with the utility relocation component of the Project are addressed through EPMs identified in Sections 3.1 through 3.4 and 3.6 through 3.12.

Construction related impacts to utilities would be temporary, occurring only during the 2.5 years during construction when utilities are being relocated and would be minimized through coordination

with utility owners and by following transition procedures such that the service remains largely uninterrupted.

Relocating utilities would result in unavoidable construction-period impacts associated with construction traffic and emissions during construction; relocation of utility lines would contribute to unavoidable loss of agricultural lands and has the potential to impact cultural resources. Explanation of how EPMs would reduce impacts is provided in Sections 3.1, 3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, and 3.12.

Because the existing utilities cross directly through the footprint of the proposed Del Puerto Canyon reservoir site inundation area, their relocation is necessary for construction of Alternative 2.

3.13.3.4 Alternative 3 (Limited Action)

Impacts under the Limited Action Alternative would be the same as those described above for Alternative 2.

3.13.3.5 Alternative 4 (DPCR 40 TAF)

Alternative 4 would inundate the existing utility corridor and would require relocation of high-voltage transmission lines and a petroleum pipeline. Relocating utilities would result in unavoidable construction-period impacts associated with construction traffic and emissions during construction; relocation of utility lines would contribute to unavoidable loss of agricultural lands and has the potential to impact cultural resources. Explanation of how EPMs would reduce impacts is provided in Sections 3.1, 3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, and 3.12.

3.13.3.6 Alternative 5 (Ingram Canyon)

Alternative 5 would avoid the impacts associated with relocating the high voltage transmissions lines that would have to be moved for Alternatives 2 through 4. However, existing utility infrastructure serving ranching operations and residential properties would need to be decommissioned to accommodate Alternative 5. The decommissioning of utility infrastructure would contribute to unavoidable construction impacts associated with traffic and emissions. Explanation of how EPMs would reduce impacts is provided in Sections 3.1 through 3.4, and 3.6 through 3.12.

3.14 Socioeconomics

3.14.1 Affected Environment

This section describes the environmental setting for socioeconomic conditions and evaluates the socioeconomic impacts of the proposed Project. The analysis includes potential effects on population, employment, income, and community services within the Project construction area, and the service areas of the Project Sponsors, which encompass Stanislaus, Merced, San Joaquin, Fresno, and Madera counties.

3.14.1.1 Study Area

The environmental setting for socioeconomic conditions include the proposed sites for construction of Project facilities and adjacent areas likely to experience a social or economic impact from implementing the proposed Project. Because additional water supply reliability would benefit the entire region the study area is the same for all Action Alternatives and includes Stanislaus, Merced, San Joaquin, Fresno, and Madera counties. The region is characterized by its agricultural economy, with significant contributions from farming, livestock, and related industries.

3.14.1.2 Issues of Environmental Concern

Issues of environmental concern for socioeconomic conditions generally include how the proposed Project may affect local and regional economies. An analysis of impacts may consider factors such as how the proposed Project affects job creation or loss, changes in income, and impacts on local businesses. Additionally, issues of socioeconomic concern include how the proposed Project's changes in land use or resource management would affect community well-being including population changes, housing availability, and community services.

3.14.1.3 Characterization

The following sections present socioeconomic data for Stanislaus, Merced, San Joaquin, Fresno, and Madera Counties. Data was obtained from the U.S. Census, and the most current available data are for 2023.

Population and Employment. **Table 3.14-1** shows the population and employment data for the counties in the study area. The estimated total and employed population in Stanislaus, Merced, San Joaquin, Fresno, and Madera Counties, the numbers of individuals employed in various industries in each county, as well as the county's median and per capita income in dollars.

After rising steadily through 2020 and showing slight improvement in 2021 and 2022, overall unemployment rates in the five counties served by the Project Sponsors have increased in the last several years. **Table 3.14-2** shows unemployment rates in Stanislaus, Merced, San Joaquin, Fresno, and Madera Counties from 2018 through early-2025. Information for January 2025 is preliminary monthly unemployment data.

Table 3.14-1: Population and Employment by Industry Sector - 2023

Category	Stanislaus County	Merced County	San Joaquin County	Fresno County	Madera County
Total Population	552,250	285,597	787,416	1,012,152	158,790
Employed Population	240,228	111,532	345,069	425,398	60,454
INDUSTRY					
Agriculture, forestry, fishing, hunting, mining	12,081	11,757	15,102	33,333	7,997
Construction	21,314	9,466	29,267	26,586	4,385
Wholesale trade	29,473	11,758	33,777	27,322	5,687
Retail trade	6,545	3,778	8,625	12,073	1,432
Transportation, warehousing, utilities	27,450	11,914	40,451	42,808	5,936
Information	18,366	8,270	31,198	28,783	3,973
Finance, insurance and real estate	2,171	922	4,969	4,963	873
Professional, scientific, management, administrative, waste management services	8,190	3,310	14,947	18,247	2,683
Education, health care	20,237	7,544	36,028	39,805	4,057
Arts, entertainment, recreation, accommodation, food services	52,650	24,295	71,037	110,056	12,954
Other services (not public)	19,982	8,841	27,152	35,150	4,518
Public administration	11,877	4,937	14,969	19,946	2,646
Median income (dollars)	79,661	65,044	88,531	71,434	75,496
Per capita income (dollars)	33,653	27,711	36,192	31,777	29,698

Source: U.S. Census, 2023 American Community Survey 5-year Estimates

Table 3.14-2: Annual Average Unemployment Rates

Year	Stanislaus County	Merced County	San Joaquin County	Fresno County	Madera County
2018	6.1%	8.2%	6.2%	7.7%	6.7%
2019	6.0%	8.0%	6.0%	7.5%	6.5%
2020	9.9%	10.1%	9.0%	10.5%	9.0%
2021	6.1%	9.5%	6.3%	8.0%	7.0%
2022	5.5%	7.6%	5.5%	7.5%	6.7%
2023	6.6%	8.6%	6.2%	8.2%	7.3%
2024	6.8%	9.5%	6.4%	8.4%	7.7%
2025 (as of January)	7.4%	11%	6.9%	8.6%	8.5%

Source: California EDD 2025

Agricultural Water Use and Production. The Project Sponsors are under contract with Reclamation for delivery of up to 980,210 AF of CVP water annually to over 300,000 acres of highly productive farmland.

As shown in **Table 1.1-1** in the Introduction, Reclamation frequently delivers less than the full contracted water amount to the DPWD. Although the Exchange Contract provides a more reliable supply to their service area, the Exchange Contractors received less than the full contracted water amount in two out of the last twenty-four years. On-going shortages and lack of water supply reliability have created severe hardship on DPWD and their growers. During the 2014 to 2015 severe drought, DPWD irrigators fallowed about 15,000 acres, which is about 30 percent of the irrigated land in the district. This decline has resulted in a substantial loss of both farm income and agricultural related jobs. The effect of these shortages on the agriculturally based economies of the communities on the west side of the San Joaquin Valley has had severe economic repercussions and will exhibit continuing negative economic impacts as these losses ripple through the local and regional economies.

Uncertainties regarding water supply have ongoing effects on the local economy. For example, over the years from 2001 to 2013, growers in the DPWD service area increased acreage planted to higher value permanent crops, such as almonds, but in the face of uncertain water deliveries, growers may defer land conversion investments and leave lands fallow. However, this is not an option for lands already planted in permanent crops. Drought conditions and pumping restrictions have thus had major economic impacts on San Joaquin Valley counties, with an estimated agricultural revenue decline of $368 million in 2009 (Michael and Howitt et al. 2010).

As described in Chapter 3.2, *Agriculture*, Agriculture is the major industry in the Project Sponsors' service area, including Stanislaus, Merced, San Joaquin, Fresno, and Madera Counties, generating billions of dollars annually with $4.2 billion (2022), $4.1 billion (2022), $3.22 billion (2024), $8.59 billion (2024), and $2.3 billion (2023), respectively. According to the California Department of Food and Agriculture (2023), Stanislaus County consistently ranks among the top ten agricultural counties

in the state. Agriculture is also Merced County's number one industry and largest employer (Merced County, 2022).

3.14.2 Regulatory Setting

There are no federal or state regulations regarding socioeconomics that would apply to the Project. Appendix E describes laws and regulations at the local level that may apply to the Project.

3.14.3 Environmental Consequences

3.14.3.1 Environmental Protection Measures

There are no socioeconomic-related Environmental Protection Measures proposed for any of Project alternatives.

3.14.3.2 Alternative 1 (No Action)

Alternative 1 would result in the agricultural economy in the Project Sponsors' service area to continue to be subject to the uncertainties of water supply and there would be no potential for economic benefits. Additional years in which the Project Sponsors do not receive a full allocation of CVP water would result in ongoing adverse effects on the agricultural economy.

3.14.3.3 Alternative 2 (DPCR 82 TAF)

Alternative 2 is expected to have economic benefits by improving water supply reliability for the area's agricultural industry. This alternative would support the local and regional economy by providing a stable water source, which is crucial for agricultural productivity.

Direct Economic Benefits. The direct economic benefits of Alternative 2 would include increased agricultural production due to reliable water supply compared to Alternative 1, and the potential for new job creation in construction and maintenance of the reservoir. The Feasibility Report for the Project estimated an annual economic benefit of almost $18.9 million (in March 2020 dollars) (Woodard & Curran 2020).

Indirect Economic Benefits. The indirect economic benefits of Alternative 2 would include improved economic stability for local communities dependent on agriculture and increased spending in local businesses due to higher agricultural output compared to the No Action.

Long-Term Benefits. Alternative 2 would result in improved agricultural productivity and economic growth due to improved water supply reliability as compared to the No Action. Alternative 2 would provide up to 82 TAF of water storage that would enhance the reliability of supply for the service areas of the Project Sponsors.

Overall, Alternative 2 is expected to provide substantial socioeconomic benefits to the area by enhancing water supply reliability, supporting agricultural productivity, and improving community services (Woodard & Curran 2020).

3.14.3.4 Alternative 3 (Limited Action)

Socioeconomic benefits under Alternative 3 would be similar to those described above for Alternative 2, but the stored water would cost users more due to the elimination of WIIN funding.

3.14.3.5 Alternative 4 (DPCR 40 TAF)

The direct economic benefit of Alternative 4 would include increased agricultural production due to a more reliable water supply compared to Alternative 1 and the potential for new job creation in construction and maintenance of the reservoir. Assuming the 40 TAF of storage would be allocated in the same percentages as identified in the Feasibility Report for Alternative 2, the estimated annual economic benefit would be proportional to the amount of storage and is estimated at $9.2 million (in March 2020 dollars).

3.14.3.6 Alternative 5 (Ingram Canyon)

Socioeconomic benefits under Alternative 5 would be estimated at an annual benefit of $9.2 million compared to the No Action Alternative. Benefits would be similar to those described above for Alternative 4, because both would provide the same amount of water storage. However, the cost of operating Alternative 5 would be greater than Alternatives 2-4 because of greater energy requirements for pumping.

3.15 Unavoidable Adverse Impacts

Unavoidable adverse impacts are those on natural and human resources that would remain after mitigation measures have been applied. They are environmental consequences of an action that could not be avoided, either by changing the nature of the action or through mitigation. After consideration of actions, operations, and features to avoid, mitigate, or compensate for adverse effects, the Action Alternatives would likely result in the unavoidable impacts detailed below.

Substantial damage to Scenic Resources within a State Scenic Highway, and Substantial Degradation of Existing Visual Character or Quality, or a Substantial Adverse Effect on a Scenic Vista. The proposed dam for all three Action Alternatives located in Del Puerto Canyon (Alternatives 2, 3, and 4) would be highly visible and would have unavoidable adverse impacts on views from Interstate-5, which is a scenic highway, and would alter the visual character of the area. Mitigation would be implemented to screen the pumping plant but there is no feasible mitigation that would reduce the visual impacts of the dam. There would be no aesthetic impact associated with Alternative 5 (Ingram Canyon) because the reservoir site is not visible from any public viewpoints.

Substantial Adverse Change in Significance of a Unique Archaeological Resource. The study areas potentially have a high level of sensitivity for cultural resources. There are previously recorded archaeological sites within both the Del Puerto Canyon reservoir site and Ingram Canyon reservoir site and there is a reasonable likelihood that there could be previously undiscovered resources within both the Del Puerto Canyon and Ingram Canyon reservoir site inundation areas that cannot be avoided.

Generate Emissions, Either Directly or Indirectly, That May Have an Adverse Impact on the Environment. Construction and operation of all Action Alternatives would generate emissions that would have the potential to affect the environment. Construction emissions would be greatest for Alternative 2 because it would require the greatest amount of earthmoving. Alternative 1 would not generate construction or operational emissions.

Conflict with a Plan, Ordinance or Policy Addressing the Transportation Circulation System, Including Transit, Roadway, Bicycle and Pedestrian Facilities: Project construction traffic would increase unacceptable delays during the evening peak hour at both the southbound Interstate 5/Sperry Avenue/Diablo Grande Parkway Interchange (for Alternatives 2, 3 and 4) and at the southbound Interstate 5/Ingram Creek Road/Howard Avenue for the Alternative 5.

Require Relocation of Electric Power, Natural Gas, and Telecommunication Facilities, the Construction or Relocation of Which May Cause Substantial Environmental Effects. Relocation of high-voltage power lines and a petroleum pipeline would be required for implementation of Alternatives 2-4. Impacts of these major utility relocations would contribute to the unavoidable adverse impacts identified above. There would be minimal impact regarding utility relocation for Alternative 5.

Loss of Habitats in Inundation Area. All of the Action Alternatives would result in conversion of agricultural land within the inundation area to a reservoir with accompanying loss of habitats. Creeks and associated wetlands within the inundation area would be converted to a reservoir and potential habitats for sensitive terrestrial species would be inundated.

3.16 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments involve the use of nonrenewable resources and the effects of use on future generations. Irreversible effects primarily result from the use or destruction of specific resources that cannot be replaced within a reasonable time frame, such as energy, construction materials and land. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as the disturbance of a cultural resource. The Action Alternatives would result in the irreversible and irretrievable commitment of the following resources during Project construction and operation:

- Construction materials, including resources such as soil and rocks
- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for Project construction and O&M
- Permanent conversion of existing agricultural land for use as a water storage facility

Nonrenewable resources are expected to account for a minimal portion of the region's resources; the Project's use of nonrenewable resources would not affect the availability of these resources for other needs within the region. Construction would not result in inefficient use of energy or natural resources. The selected construction contractors would use best available engineering techniques, construction and design practices, and equipment operating procedures. Although the Project would require commitment of land for use as a water storage facility it would support continued agricultural use of lands by providing a reliable water supply.

4 Consultation and Coordination

4.1 Introduction

This chapter describes the consultation and coordination activities undertaken for the Project.

4.2 Public Collaboration and Outreach

4.2.1 Project Sponsor Public Outreach

The Project Sponsors conducted public outreach while developing the 2020 EIR. A summary of the notification and process conducted under the California Environmental Quality Act (CEQA) is summarized in Section 1.8.1 of the Introduction.

4.2.2 Reclamation Public Outreach

Reclamation published a NOI to prepare an EIS in the Federal Register on April 29, 2020. Reclamation considered previous environmental documents, public comments from Reclamation's scoping period, and comments provided on the Project Sponsors' CEQA documents in development of the DEIS. Additional information about scoping is provided in Section 1.8.3 of the Introduction.

4.3 Consultation and Coordination

This section describes the most recent consultation and coordination activities undertaken Reclamation as the NEPA lead agency.

4.3.1 Cooperating Agencies

Cooperating agencies pursuant to NEPA include the U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS), and U.S. Army Corps of Engineers (USACE)

4.3.2 Native American Tribe Consultation

Reclamation initiated consultation with Indian Tribes and other interested parties in August of 2019 and will continue to consult and coordinate with the Tachi-Yokuts Tribe of the Santa Rosa Rancheria, Northern Valley Yokuts Tribe, Southern Sierra Miwuk Nation, and the Tule River Indian Tribe. Consultation to date has included correspondence by mail, email, phone calls, and a field meeting with Native Americans on December 11, 2019.

4.3.3 State Historic Preservation Office Consultation

The purpose of the National Historic Preservation Act (NHPA) (16 U.S. Code § 470) is to protect, preserve, rehabilitate, or restore significant historical, archeological, and cultural resources. Section 106 of the act requires Federal agencies to take into account effects on historic properties. Once an undertaking has been established, the Section 106 review involves a step-by-step procedure described in detail in the implementing regulations (36 CFR Part 800). As described in *Section 3.6, Cultural Resources*, a historic property survey report for the proposed Project was prepared. This analysis includes a Section 106 evaluation for the proposed Project. Completion of the cultural resources report and concurrence by SHPO would ensure compliance with the NHPA.

To date the Project Sponsors contacted the Native American Heritage Commission (NAHC) requesting a review of its Sacred Lands Files. The NAHC stated that no Sacred Sites had been identified in the study area and provided contact information for three tribes. The Project Sponsors sent outreach letters to the three following contacts provided by the NAHC:

- Katherine Erolinda Perez, Chairperson, North Valley Yokuts Tribe
- William Leonard, Chairperson, Southern Sierra Miwuk Nation
- Neil Peyron, Chairperson, Tule River Indian Tribe

The letters were intended to gather information regarding prehistoric archaeological sites and features, Sacred lands or locations that are important in Native American culture, places that the Native American community continues to use for ongoing cultural practices and activities, or historic-era resources such as structures, residences, or other built-environment features. Follow up phone calls to the three contacts were conducted on August 15, 2019. William Leonard stated that the Project is out of the Southern Sierra Miwuk Nation's tribal territory and he would defer to the Tuolumne or Chicken Ranch tribes. Shana Powers, the Cultural Department Director of the Tachi-Yokuts Tribe of the Santa Rosa Rancheria, and Katherine Perez of the Northern Valley Yokuts Tribe, contacted the Del Puerto Water District on November 11 and 12, 2019 respectively. Both expressed interest in learning more about the proposed Project. A field visit was conducted on December 11, 2019, with representatives of the Santa Rosa Rancheria (Tachi Yokuts) and Nototomne Cultural Preservation (North Valley Yokuts).

4.3.4 U.S. Fish and Wildlife Service and National Marine Fisheries Service Coordination

4.3.4.1 Endangered Species Act

Section 7 (50 cfr 402) of the Endangered Species Act of 1972, as amended (16 U.S.C. § 1531 et seq.) (ESA) requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior and or Commerce, to ensure that any action they authorize, fund or carry out does not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat. Under section 7, if a project may affect, and is likely to adversely affect a listed threatened or endangered species, federal agencies must consult with the United States Fish and Wildlife Service (USFWS) and/or the NOAA's National Marine

Fisheries Service (NMFS) to obtain a Biological Opinion. If the federal agency determines that the project may affect, but is not likely to adversely affect federally threatened or endangered species, the federal agency must consult informally, and if USFWS and NMFS agree with that finding, a letter of concurrence can be issued.

Chapters 3.4, Biological Resources-Terrestrial and 3.5, Biological Resources-Aquatic, describe the sensitive species that have the potential to occur in the area, and potential effects to federal endangered and threatened species. Impacts to species will be avoided, minimized, or offset through the implementation conservation measures established by consultation with the Services. Reclamation will not initiate any action that may affect a federally listed species without first completing the appropriate consultation(s) with USFWS or NMFS. Reclamation plans to initiate consultation under Section 7 of the ESA in early 2026.

4.3.4.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 U.S.C. § 661 et seq.) is intended to promote conservation of fish and wildlife resources by preventing their loss or damage, and to provide for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and State wildlife agencies when any waterbody is impounded, diverted, controlled, or modified for any purpose. Based on surveys and investigations to be conducted by the federal and state agencies charged with administering wildlife resources, a report addressing any potential impacts to fish and wildlife species and appropriate mitigation measures will be provided to Reclamation for the Proposed Project. Compliance with FWCA will be coordinated with Endangered Species Act consultation, as described above.