APPENDIX D

USFWS BIOLOGICAL ASSESSMENT

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

May 25, 2022

Patrick Gower
Field Supervisor, San Diego County
United States Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
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Carlsbad, CA 92008-7385

Re: Request for Concurrence under Endangered Species Act Section 7 Informal Consultation for the United States-Mexico-Canada Agreement (USMCA) Mitigation of Contaminated Transboundary Flows Project (Alternative 1)

Dear Patrick Gower:

The United States Environmental Protection Agency, Region 9 (EPA) would like to request the United States Fish and Wildlife Service (USFWS) review of the enclosed Draft Biological Assessment. EPA is submitting this request to initiate informal consultation pursuant to 50 CFR § 402.13, and requests USFWS written concurrence under Section 7 of the Endangered Species Act (ESA) with EPA's determination that the United States-Mexico-Canada Agreement (USMCA) Mitigation of Contaminated Transboundary Flows Project (Project) "may affect, but is not likely to adversely affect" all listed species and designated critical habitat with the potential to occur within the proposed Project's Action Area.

In January 2020, Congress passed the USMCA Implementation Act, which appropriated funds to EPA for implementation of wastewater infrastructure projects at the U.S.-Mexico border and authorized EPA to plan, design, and construct wastewater treatment projects in the Tijuana River area. These projects aim to reduce transboundary flows that cause adverse public health and environmental impacts in the Tijuana River watershed and adjacent coastal areas. In accordance with the requirements of the National Environmental Policy Act, EPA has developed a draft Programmatic Environmental Impact Statement (PEIS) to support an informed decision-making process that considers and reviews the environmental impacts of reasonable alternatives to meet the purpose and need of the USMCA goals.

EPA has identified two alternatives that it has evaluated in its draft PEIS: a limited funding approach for implementation (Alternative 1) and a more comprehensive solution (Alternative 2) that would warrant additional funding. EPA has not yet identified a preferred alternative; however, EPA has completed a Draft Biological Assessment evaluating potential effects to federally listed threatened and endangered species and designated critical habitat for the activities associated with Alternative 1, which includes four Core Projects. If implemented, and as described in the draft PEIS, most activities under the Core Projects would be located within the U.S. in the Tijuana River Valley in San Diego, California. Though Alternative 1 also includes actions in Mexico, the Draft Biological Assessment does not include analysis for international activities occurring in Mexico except when transboundary flows could be affected.

EPA's evaluation of the species and designated critical habitat with potential to occur in the Action Area and potential effects associated with the construction and operations of Alternative 1 is detailed in the enclosed Draft Biological Assessment. The Draft Biological Assessment includes proposed conservation measures that would be incorporated and implemented with the Project. The analysis in the Biological Assessment supports a determination that the Project "may affect, but is not likely to adversely affect" listed species and designated critical habitat. This determination applies to the following species and designated critical habitat:

Animals:

1. San Diego fairy shrimp *(Branchinecta sandiegonensis)*
2. Quino checkerspot butterfly *(Euphydryas editha quino)*
3. Light-footed Ridgway's rail *(Rallus obsoletus levipes)*
4. Least Bell's vireo *(Vireo bellii pusillus)* and designated critical habitat
5. Coastal California gnatcatcher *(Polioptila californica)*

Plants:

1. San Diego thorn-mint *(Acanthomintha ilicifolia)*
2. San Diego ambrosia *(Ambrosia pumila)*
3. Thread-leaved brodiaea *(Brodiaea filifolia)*
4. Orcutt's spineflower *(Chorizanthe orcuttiana)*
5. Otay tarplant *(Deinandra conjugens)*
6. San Diego button-celery *(Eryngium aristulatum* var. *parishii)*
7. Willowy monardella *(Monardella viminea)*
8. Spreading navarretia *(Navarretia fossalis)*
9. California Orcutt grass *(Orcuttia californica)*
10. San Diego mesa mint *(Pogogyne abramsii)*
11. Otay mesa mint *(Pogogyne nudiuscula)*

We hereby request the USFWS's written concurrence with EPA's determination that the Project "may affect, but is not likely to adversely affect" the listed species and designated critical habitat identified above. If you have questions or need additional information, please contact me (415-947-4187, lee.lily@epa.gov) or Mimi Soo-Hoo of my staff (415-972-3500, soo-hoo.mimi@epa.gov).

Sincerely,

LILY LEE Digitally signed by LILY LEE Date: 2022.05.25 12:41:21 -07'00'

Lily Lee
Manager, Infrastructure Section

Enclosures (1):

1. *Draft Biological Assessment for the USMCA Mitigation of Contaminated Transboundary Flows Project,* prepared by Stillwater Sciences under subcontract to Eastern Research Group, Inc. (May 2022)

cc: (with enclosures)

David Zoutendyk

TECHNICAL REPORT ◦ MAY 2022

Draft Biological Assessment for the USMCA Mitigation of Contaminated Transboundary Flows Project

PREPARED FOR

United States Environmental Protection Agency
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UNDER SUBCONTRACT TO

ERG
Eastern Research Group, Inc.

Stillwater Sciences

Suggested citation:
Stillwater Sciences. 2022. Biological Assessment for the USMCA Mitigation of Contaminated Transboundary Flows Project. Prepared by Stillwater Sciences, Los Angeles, California under subcontract to Eastern Research Group, Inc. (ERG) for U.S. Environmental Protection Agency (EPA), Washington, DC.

Cover photos: The Tijuana River (top left, top right, bottom left) and Smuggler's Gulch (bottom right)

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Appendices

Appendix A. Database Query Results for Federally Listed, Proposed, and Candidate Species

ACRONYMS AND ABBRVIATIONS

Abbreviation	Definition
APTP	Advanced Primary Treatment Plant
BA	Biological Assessment
BMP	best management practices
BOD	biochemical oxygen demand
BWIP	Border Water Infrastructure Program
CBP	United States Customs and Border Protection
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CILA	Comisión International de Limites y Aguas
cm	centimeters
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
DAF	dissolved air flotation
EPA	United States Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ESA	Endangered Species Act
HDPE	high-density polyethylene
IPaC	Information for Planning and Conservation
ITP	South Bay International Wastewater Treatment Plant
m	meters
MGD	million gallons per day
MSCP	Multiple Species Conservation Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
O&M	operations and maintenance
PB1-A	Pump Station 1A
PB1-B	Pump Station 1B
PB-CILA	Pump Station CILA
PEIS	Programmatic Environmental Impact Statement
PVC	polyvinyl chloride
SAB	San Antonio de los Buenos
SBLO	South Bay Land Outfall
SBOO	South Bay Ocean Outfall
SBWRP	South Bay Water Reclamation Plant
SF	square feet
TRNERR	Tijuana River National Estuarine Research Reserve
U.S.	United States of America
USFWS	United States Fish and Wildlife Service
USIBWC	United States Section of the International Boundary and Water Commission
USMCA	United States–Mexico–Canada Agreement
VegCamp	Vegetation Classification and Mapping Program

1 INTRODUCTION

1.1 Purpose of Biological Assessment

The purpose of this Biological Assessment (BA) is to review Alternative 1 of the United States–Mexico–Canada Agreement (USMCA) Mitigation of Contaminated Transboundary Flows Project (proposed Action) in sufficient detail to determine to what extent the proposed Action may affect any federally threatened, endangered, or proposed listed species and/or designated or proposed critical habitats. Alternative 1 consists of Core Projects and is analyzed as one of several alternatives in a review pursuant to the National Environmental Policy Act (NEPA). The following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated or proposed critical habitat by the proposed federal action. This BA has been prepared on behalf of and approved by the proposed Action proponent, the United States (U.S.) Environmental Protection Agency (EPA), in accordance with legal requirements set forth under the Endangered Species Act (ESA) of 1973, as amended, and implementing regulations (19 United States Code 1536 [c], 50 Code of Federal Regulations [CFR] § 402.12 [f] and § 402.14 [c]).

This BA only covers inland listed species under jurisdiction of the U.S. Fish and Wildlife Service (USFWS). A separate BA has been prepared for marine species for consultation with the National Marine Fisheries Service (NMFS), in accordance with the ESA.

1.2 Federally Listed Species and Critical Habitat

A list of threatened and endangered species was obtained from the USFWS from the online Information for Planning and Conservation (IPaC) portal on March 3, 2022 (Consultation code 2022-0014986). This, combined with other desktop queries (Section 3.1.1), identified 34 federally listed or proposed species for listing[1] as potentially occurring within the Action Area (Appendix A). Based on a desktop review and field investigations (Section 3.1), 17 listed species were determined to have moderate to high potential to be present within the Action Area, and 17 listed species were determined not likely to be present in the Action Area as there is no suitable habitat and/or the Action Area is outside of the species' known range.

1.2.1 Species Analyzed for Potential Effects

The following six listed wildlife species were initially considered to have potential to be present within the main Action Area and may be affected by the project. These species are considered and analyzed further in this BA:

- San Diego fairy shrimp (*Branchinecta sandiegonensis*) (Endangered)
- Riverside fairy shrimp[2] (*Streptocephalus woottoni*) (Endangered)

[1] Candidate species and/or species under status review have no Section 7 requirements, though agencies may consider them when making natural resource decisions. Therefore, two species (Monarch butterfly and western spadefoot) are not included in the total counts here, but are included in Appendix A. Database queries were made for these species; however, they are not considered within the scope of this consultation and effects assessments were not completed for these species in this BA.

[2] Riverside fairy shrimp was considered and analyzed in this BA, though final determination following review was that the proposed federal action evaluated in this BA will have "no effect" on the species.

- Quino checkerspot butterfly (*Euphydryas editha quino*) (Endangered)
- Light-footed Ridgway's rail (*Rallus obsoletus levipes*) (Endangered)
- Least Bell's vireo (*Vireo bellii pusillus*) (Endangered)
- Coastal California gnatcatcher (*Polioptila californica*) (Threatened)

The following 11 listed plant species were considered to have potential to be present within the main Action Area and may be affected by the project and are considered and analyzed in this BA:

- San Diego thorn-mint (*Acanthomintha ilicifolia*) (Threatened)
- San Diego ambrosia (*Ambrosia pumila*) (Endangered)
- Thread-leaved brodiaea (*Brodiaea filifolia*) (Endangered)
- Orcutt's spineflower (*Chorizanthe orcuttiana*) (Endangered)
- Otay tarplant (*Deinandra conjugens*) (Threatened)
- San Diego button-celery (*Eryngium aristulatum* var. *parishii)* (Endangered)
- Willowy monardella (*Monardella viminea*) (Endangered)
- Spreading navarretia (*Navarretia fossalis*) (Threatened)
- California Orcutt grass (*Orcuttia californica*) (Endangered)
- San Diego mesa mint (*Pogogyne abramsii*) (Endangered)
- Otay mesa mint (*Pogogyne nudiuscula*) (Endangered)

1.2.2 Critical Habitat Analyzed for Potential Effects

The main Action Area (defined in Section 2.2) does not contain any designated or proposed critical habitat for any listed species. However, designated critical habitat for least Bell's vireo occurs along the Tijuana River, downstream of the main Action Area, and may be indirectly affected by the project. Therefore, the least Bell's vireo critical habitat is considered and analyzed in this BA.

The status of the above species, their habitat associations in the Action Area, and life histories are described in Section 4; potential effects of the proposed Action are analyzed in Section 5.

1.2.3 Species with No Effect Determinations

The project will have no effect[3] on the following 12 federally listed wildlife species:

- Hermes copper butterfly (*Lycaena hermes*) (Proposed Threatened)
- Tidewater goby (*Eucyclogobius newberryi*) (Endangered)
- Unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) (Endangered)
- Arroyo toad (*Bufo californicus*) (Endangered)
- California red-legged frog (*Rana draytonii*) (Threatened)
- Green sea turtle (*Chelonia mydas*) (Threatened)
- California condor (*Gymnogyps californicus*) (Endangered)

[3] Riverside fairy shrimp was considered and analyzed in this BA, though final determination following review was that the proposed federal action evaluated in this BA will have "no effect" on the species (Section 1.2.1).

- Western snowy plover (*Charadrius nivosus nivosus*) (Threatened)
- California least tern (*Sternula antillarum browni*) (Endangered)
- Western yellow-billed cuckoo (*Coccyzus americanus*) (Threatened)
- Southwestern willow flycatcher[4] (*Empidonax traillii extimus*) (Endangered)
- Pacific pocket mouse (*Perognathus longimembris pacificus*) (Endangered)

The project will have no effect on the following five federally listed plant species:

- Del Mar manzanita (*Arctostaphylos glandulosa* subsp. c*rassifolia*) (Endangered)
- Coastal dunes milk-vetch (*Astragalus tener* var. *Titi*) (Endangered)
- Encinitas baccharis (*Baccharis vanessae*) (Threatened)
- Salt marsh bird's-beak (*Chloropyron maritimum* subsp. *maritimum*) (Endangered)
- Mexican flannelbush (*Fremontodendron mexicanum*) (Endangered)

There is little or no suitable habitat in the Action Area and/or the Action Area is outside of the known range of the abovementioned species, as documented in Appendix A. As such, these species are excluded from the detailed effects analysis and not discussed further in this BA.

1.3 Consultation to Date

Early coordination between EPA and USFWS occurred for the project. The following chronology reflects a summary of significant events:

- **December 16, 2020:** USFWS was introduced to the project during a meeting with the EPA and project consultants (Eastern Research Group, Inc. [ERG] and Stillwater Sciences [Stillwater]).
- **March 9, 2021** and **April 2, 2021:** USFWS, EPA, and ERG participated in two Natural Resources Workshops.
- **July 1, 2021:** USFWS, EPA, ERG, and Stillwater participated in a meeting that included an updated overview of the project, the status of alternatives development, and a proposed approach to ESA Section 7 consultation.
- **January 5, 2022:** USFWS, EPA, ERG, and Stillwater participated in a meeting that included project updates and a summary of listed species with the potential for project-related effects.
- **February 9, 2022:** USFWS and Stillwater participated in a site visit to evaluate site conditions in the proposed Action Area and discuss potential impacts on federally listed species.
- **March 2, 2022:** Stillwater procured an official species list from the USFWS online IPaC portal (USFWS 2022) (Consultation code 2022-0014986).

[4] Southwestern willow flycatcher was observed north of Dairy Mart Road (downstream) along the Tijuana River during Stillwater Sciences' 2021 site reconnaissance visit; however, because this species is a non-breeding migrant (i.e., foraging only) in California, there will be no impacts to the species' vulnerable life-stage (i.e., breeding) by the project.

2 DESCRIPTION OF THE PROPOSED ACTION

2.1 Project Background and Purpose

Transboundary flows crossing into the U.S. from Mexico have raised water quality and human health concerns since the 1930s. These transboundary flows negatively impact public health, the environment, and have been linked to numerous beach closures along the San Diego County coast. Currently the Tijuana River and Estuary are listed by the State of California as "impaired" under Section 303(d) of the Clean Water Act due to pollutants including bacteria, sediment, and trash, among others. In January 2020, Congress passed the USMCA Implementation Act, which appropriated $300 million to EPA under Title IX of the Act for architectural, engineering, planning, design, construction, and related activities in connection with the construction of high-priority wastewater facilities in the area of the U.S.-Mexico border. Subtitle B, Section 821 of the Act authorized EPA to plan, design, and construct wastewater (including stormwater) treatment projects in the Tijuana River area.

Existing treatment facilities and infrastructure associated with the project (in the U.S.) include the South Bay International Wastewater Treatment Plant (ITP), the South Bay Water Reclamation Plant (SBWRP), the South Bay Land Outfall (SBLO), the South Bay Ocean Outfall (SBOO), and the canyon collector systems (Figure 2-1). The ITP is located approximately 1.3 miles west of the Tijuana River entrance to the U.S., and about one-half mile south of where Dairy Mart Road crosses over the Tijuana River. The existing plant is a primary and secondary treatment system designed to treat an average daily flow of 25 million gallons per day (MGD) of wastewater from the International Collector in Mexico (including diverted Tijuana River flows), as well as dry-weather flows from the canyon collector system. The SBWRP is a primary, secondary, tertiary, and disinfecting treatment plant that is adjacent to the ITP. The SBWRP treats wastewater collected from only U.S. communities, with the treated water discharging through the SBLO and SBOO. The SBLO is a tunnel that extends from the effluent distribution vault near the ITP and SBWRP to the coast and discharges to the SBOO. The SBOO is a pipe, designed to handle an average flow of 174 MGD, with a wye diffuser system at the end that extends 3.5 miles offshore to discharge treated effluent from both the ITP and the SBWRP into the Pacific Ocean. The canyon collector system consists of canyon flow diversion structures designed to capture transboundary dry-weather flows from Mexico and convey them through canyon collector pipelines to the ITP for treatment and discharge to the Pacific Ocean through the SBOO. This system collects diverted transboundary flows in Goat Canyon, Smuggler's Gulch, Cañón del Sol, Silva Drain, and Stewart's Drain in the U.S.

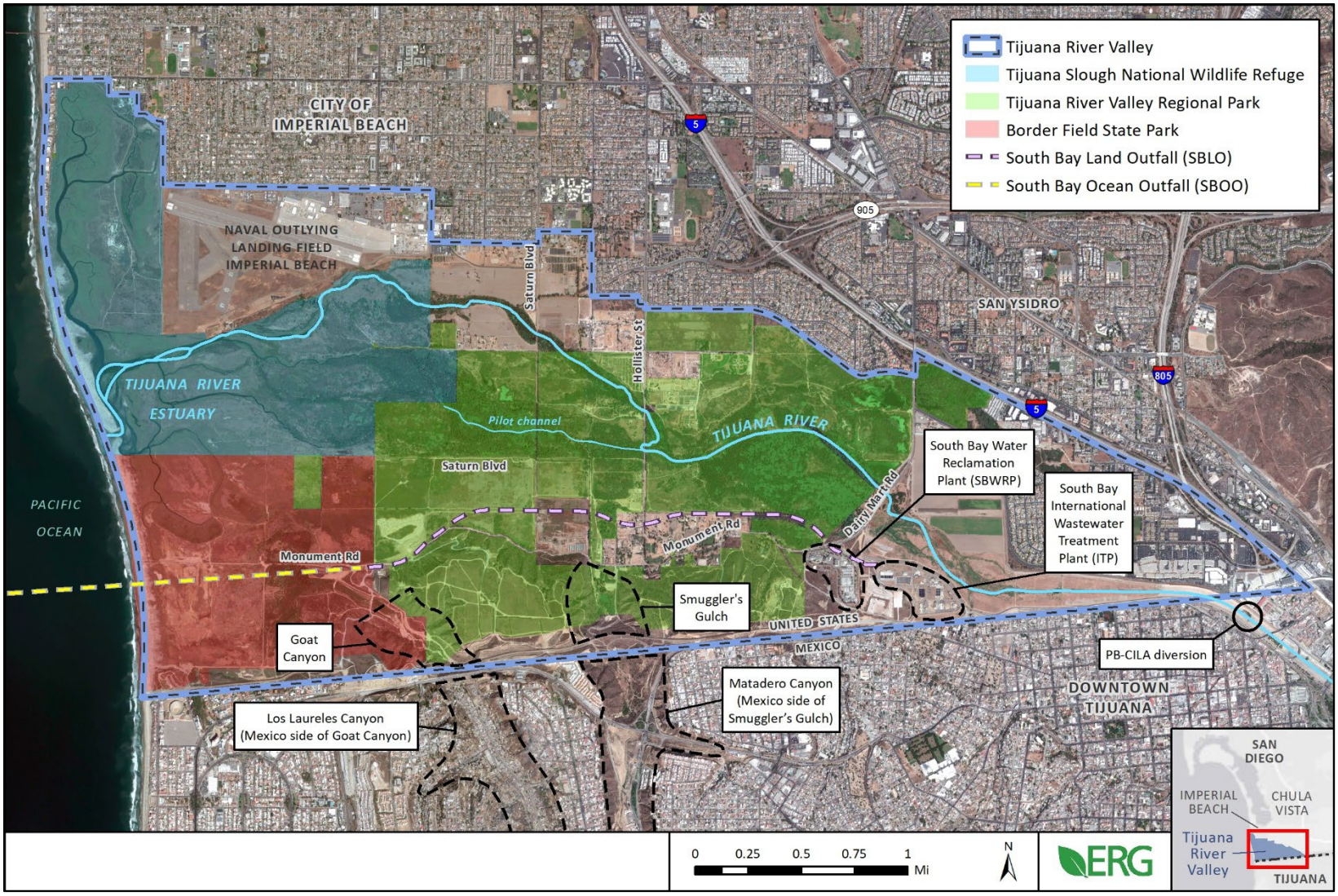


Figure 2-1. Existing Treatment Facilities and Associated Infrastructure in the Tijuana River Valley.

The project analyzed in this BA involves the planning, design, construction, and operation and maintenance of high-priority treatment works to reduce transboundary flows from Tijuana that convey pollutants, sewage, and/or trash into the U.S. from Mexico via the Tijuana River, its tributaries, and across the maritime boundary along the San Diego County coast. The project aims to improve the collection and/or treatment of contaminated flows in the Tijuana region before they reach the U.S.-Mexico border and improve the collection and/or treatment of contaminated transboundary flows in the U.S.

2.2 Project Location and Action Area

The project analyzed for this BA includes the activities associated with Alternative 1 (Core Projects) within the U.S. in the Tijuana River Valley in San Diego, California, as described in the Draft Programmatic Environmental Impact Statement (PEIS) (currently in preparation) and Section 2.3. This BA does not include any analysis for international activities occurring in Mexico except when transboundary flows could be affected. The Action Area is defined in 50 CFR § 402.02 as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the purposes of this BA, the Action Area includes: the existing treatment facility (ITP) and immediate surroundings, Monument Road (from Smuggler's Gulch to the ITP [via Monument Road, Dairy Mart Road, Clearwater Way, and West Tia Juana Street]), and Smuggler's Gulch (Figure 2-2). The SBOO is part of the Action Area for the NMFS consultation.

Riparian habitat along the Tijuana River downstream of Dairy Mart Road bridge is also considered part of the Action Area for the indirect effects analysis in this BA, because implementation of Projects C and D (described in Section 2.4.1 and 2.4.2, respectively) would result in a decrease in dry-weather transboundary flows and pollutant loadings in the Tijuana River (described in Section 5.1). The cumulative volume of transboundary river flows would be reduced by up to approximately 6 percent, resulting in potential long-term effects from changes to associated riparian habitat (Section 5.1). Such historical or predicted long-term future changes in riparian habitat have not been quantified. Implementation of the Core Projects would not affect wet-weather transboundary river flow events that saturate the wider floodplain, fill ponds and other depressions, and gradually recharge the aquifer, other than through the 5-MGD reduction of untreated wastewater in the river under Project C (Section 2.4.1). A discussion regarding the potential indirect effects of the proposed Action on riparian habitat is included in Section 5.1.

Figure 2-2. Action Area and Least Bell's Vireo Designated Critical Habitat.

2.3 Project Description (Alternative 1: Core Projects)

For consideration in the environmental review, EPA has developed a solution to address transboundary flows that consists of four Core Projects identified as Projects A, B, C, and D, as described in Table 2-1. These four projects, in total, constitute Alternative 1.

Some components of Alternative 1 would take place in Mexico. Binational negotiations are underway regarding the scope, funding, and implementation of projects in Mexico being contemplated as part of the proposed Action. EPA and the U.S. Section of the International Boundary and Water Commission (USIBWC) would move forward with funding and/or implementing projects in Mexico only if such projects have support and funding contributions from appropriate Mexican authorities. Components of Alternative 1 that would take place in Mexico are not considered in this BA except when transboundary flows would be affected.

Table 2-1. Projects Constituting Alternative 1.

Alternative	Project Title	Project Location
Alternative 1: Core Projects	A. Expanded ITP Option A1: Expand to 40 MGD Option A2: Expand to 50 MGD Option A3: Expand to 60 MGD	U.S. only
	B. Tijuana Canyon Flows to ITP Option B1: Trenching via Smuggler's Gulch and Monument Road Option B2: Trenchless via Smuggler's Gulch and Under Mesa Option B3: Connect to Existing Canyon Collector System	U.S. and Mexico
	C. Tijuana Sewer Repairs	Mexico only
	D. Advanced Primary Treatment Plan (APTP) Phase 1	U.S. and Mexico

2.3.1 Projects A, B, and C: Improve Collection and Treatment of Wastewater

Alternative 1 includes three Core Projects (Projects A, B, and C) that are intended to improve collection and treatment of wastewater from Tijuana. Project A involves expanding wastewater treatment capacity at an existing facility in the U.S. (the ITP). Projects B and C are focused on modifying and improving wastewater collection systems to ensure that more wastewater is conveyed to treatment, rather than released directly to the Tijuana River or the Pacific Ocean without treatment.

2.1.1.1 Project A: Expanded ITP

Project A includes the expansion of the 25-MGD ITP for secondary treatment of wastewater at one of three different average daily flow capacity options, 40 MGD (Option A1), 50 MGD (Option A2), or 60 MGD (Option A3); construction of a new solids processing facility; installation of other new supporting facilities; and associated site modifications. The primary purpose of expanding the ITP is to reduce impacts to the U.S. coast by treating wastewater from the International Collector that otherwise would be discharged to the Pacific Ocean via San Antonio de los Buenos (SAB) Creek without adequate treatment, or any treatment at all. The expanded ITP may also reduce untreated wastewater overflows from the sanitary sewer to the Tijuana River caused by mechanical failures at Pump Station 1B (PB1-B). Depending on the proposed capacity of the plant, the expanded ITP may also provide treatment for sewage collected

in the canyons (Project B), as well as for additional sewage flows produced by the future population of Tijuana. Project A construction is estimated to be completed no later than 2027.

The proposed new and expanded facilities and processes for Project A are described below. Additionally, USIBWC is in the process of initiating a plant-wide condition assessment of existing ITP components, the results of which could identify additional upgrades necessary to support expanded operations (e.g., rehabilitation of valves, junction boxes, and piping).

- **Preliminary treatment.** Upgrades would include replacing and/or installing new raw wastewater pumps to increase capacity, replacing influent screens at the ITP headworks, and renovating the existing grit chamber. Renovations to the grit chamber, depending on final design, could include installation of a more advanced automatic pump sequencing system, upgrading the grit pumps, and expanding the grit basin itself.
- **Primary treatment.** Upgrades would include installing new primary clarifiers, contiguous with and west of the existing primary clarifiers. The new clarifiers would be built to the same dimensions as the existing ones.
- **Secondary treatment.** Upgrades would include adding new biological reactors south of the seven existing reactors; constructing a new, centrally located blower building with new centrifugal blowers and decommissioning equipment in the existing blower building; installing new sludge storage tanks immediately west of the two existing sludge storage tanks; and installing new rectangular secondary sedimentation tanks south of the existing secondary settling tanks, with new pumps to support operations.
- **Discharge.** The capacity of the effluent metering pipe would increase, and treated effluent would continue to be discharged through the SBLO, which then discharges into the SBOO and then into the Pacific Ocean. Modifications to the wye diffuser array on the SBOO could be necessary to promote dispersal of the increased loadings (e.g., opening ports on existing capped risers and/or installing new diffuser heads and ports to existing closed, blind flanged risers).
- **Solids processing.** Upgrades would include new equipment to process the increased amount of solids produced by primary and secondary wastewater treatment. This would include new dissolved air flotation (DAF) units to thicken sludge from secondary treatment, new belt filter presses for additional dewatering of waste solids, expansion of the existing dewatering building to accommodate new equipment, and expansion or replacement of solids handling facilities. Project A would also incorporate anaerobic digestion of primary and secondary sludge to substantially reduce the amount of waste solids produced per gallon of wastewater treated at the ITP. Reducing solids is necessary due to anticipated logistical challenges with securing enough trucks and drivers to transport sludge offsite for disposal; however, incorporating anaerobic digestion increases the complexity of plant operations and necessitates the installation of air pollution control equipment. This could include, among other controls, installation of an electric generator to combust biogas emissions and produce electricity to offset a portion of the ITP's energy demand.
- **Other improvements.** The ITP expansion would include auxiliary facilities to provide support functions such as office space, a control room, and restrooms. This would involve constructing at least one new building and/or renovating the existing office building used by operations staff. Other improvements would include additional roads and parking within the ITP parcel; new utility connections, such as electrical (including a backup electrical generator) and communications; and expanded security fencing and lighting around the ITP.

Site modifications would be necessary to accommodate the new and expanded facilities. This would include providing fill material to create a level foundation for the proposed secondary reactors and clarifiers (the areas southwest of Dairy Mart Road are approximately 10 feet lower in elevation than the rest of the ITP parcel); relocating the portion of Dairy Mart Road that crosses through the ITP parcel by demolishing it and paving a replacement road along the western boundary of the ITP parcel; and enclosing or relocating the stormwater swale that runs alongside this portion of Dairy Mart Road. Fill material would be sourced from elsewhere within the Tijuana River Valley, such as the transboundary sediment deposits in Goat Canyon or Smuggler's Gulch. Construction activities would also potentially involve temporary work (e.g., material/equipment staging and stormwater management) throughout the undeveloped 25-acre southwest quadrant of the ITP parcel and in portions of the 4-acre parcel northwest of the ITP.

The infrastructure at the expanded ITP would require regular and ongoing operations and maintenance (O&M) activities to ensure operational reliability and efficiency. Additional staff members would also be required to accommodate the anticipated increase in O&M needs. Long-term recurring operations would include hauling of sludge produced by the treatment process to Mexico for disposal. The pumps and equipment supporting the ITP would also require regular and ongoing O&M activities such as rehabilitation and replacement at varying time intervals.

Figure 2-3 provides a schematic of the proposed treatment train at the expanded ITP. Figure 2-4 depicts the anticipated general locations of project elements and construction activities for Project A. Figure 2-5 provides an example conceptual site plan of the individual facilities that would be constructed for Project A.

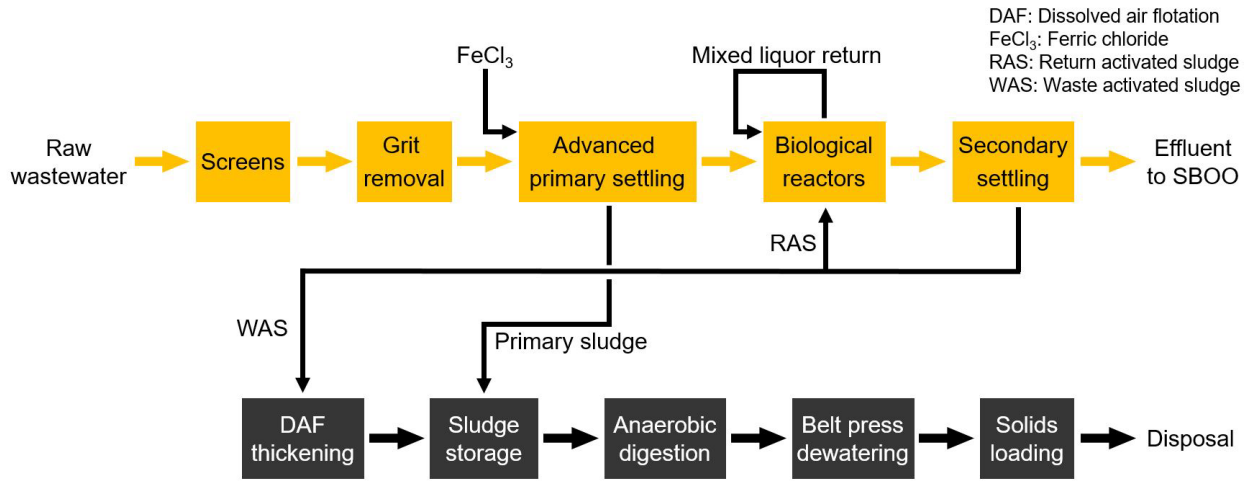


Figure 2-3. Project A – Schematic of Expanded ITP Treatment Train.

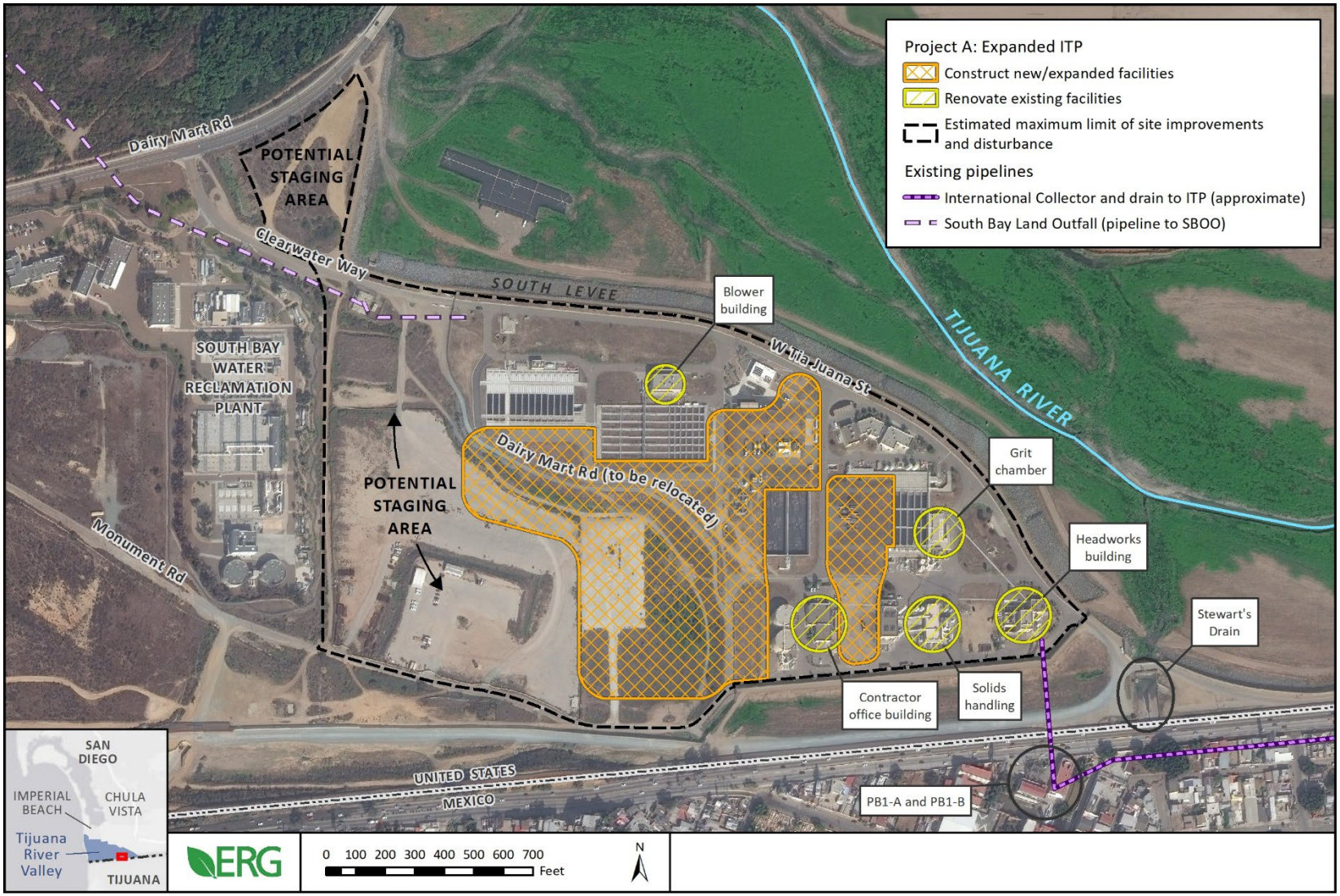


Figure 2-4. Project A (Expanded ITP) – Locations of Project Components.

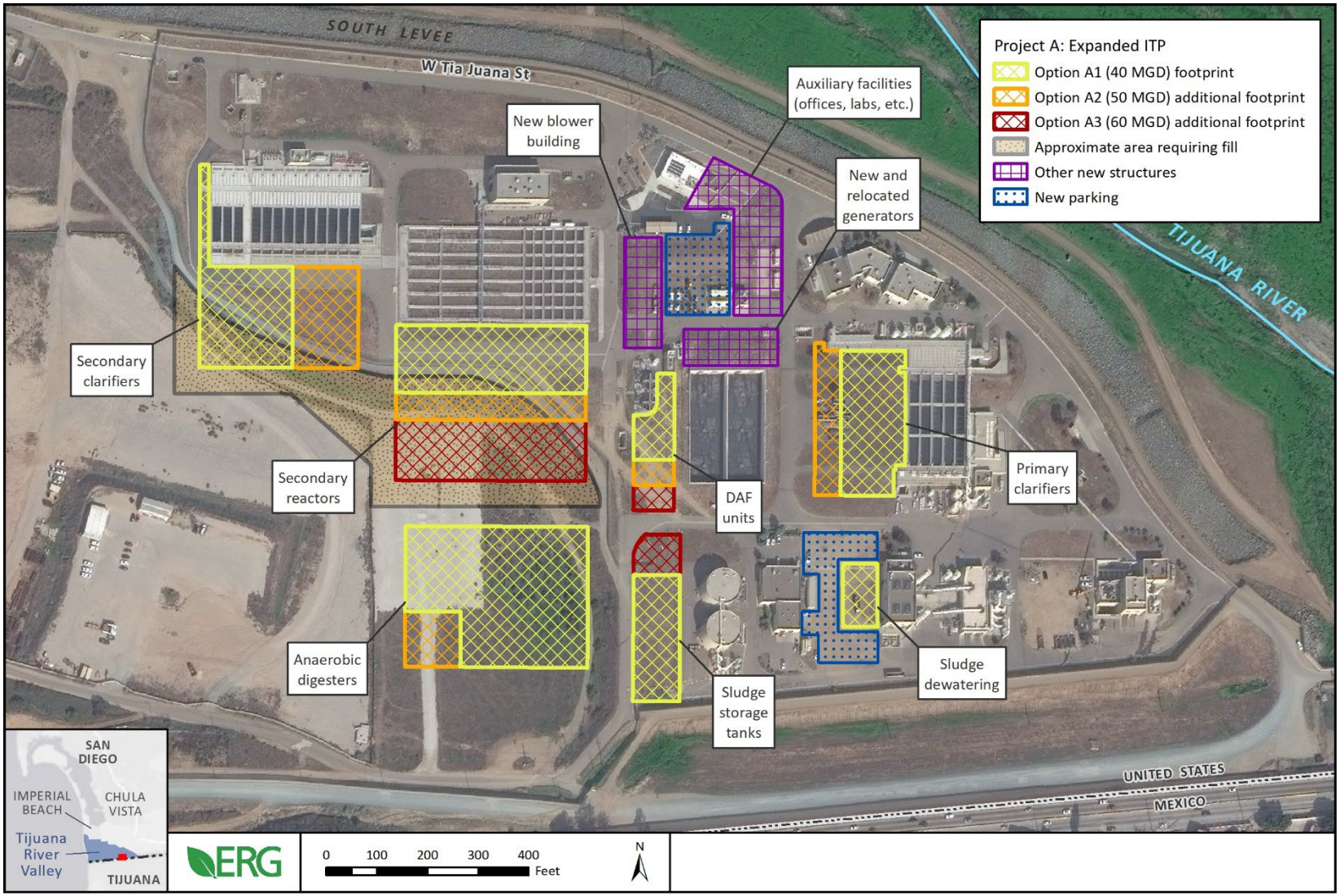


Figure 2-5. Project A (Expanded ITP) – Conceptual Site Plan of Proposed Facilities.

Project A includes three proposed average daily flow capacity options for the proposed ITP expansion from the current 25-MGD capacity: Options A1, A2, and A3. The differences between the three options are summarized below and in Table 2-2.

- **Option A1: Expand to 40 MGD.** Expanding the ITP to a design treatment capacity of 40 MGD (average daily flow) would enable the plant to treat all wastewater in the International Collector and wastewater that would be collected by the rehabilitated sewer collectors in Tijuana (see Project C). However, the 40-MGD option would have minimal, if any, reserve capacity for future population growth.
- **Option A2: Expand to 50 MGD.** Expanding the ITP to a design treatment capacity of 50 MGD (average daily flow) would provide the same treatment capabilities as the 40-MGD option (see Option A1) while also accommodating wastewater collected in the canyons in Mexico (see Project B) and providing capacity for current and projected wastewater flows through 2030.
- **Option A3: Expand to 60 MGD.** Expanding the ITP to a design treatment capacity of 60 MGD (average daily flow) would provide the same treatment capabilities as the 50-MGD option (see Option A2) while providing capacity for current and projected wastewater flows through 2050.

Table 2-2. Comparison of Project A options.

Component [a]	Option A1		Option A2	Option A3
ITP treatment capacity (average daily flow)	40 MGD		50 MGD	60 MGD
ITP treatment capacity (peak daily flow)	100 MGD	100 MGD	100 MGD	
New primary clarifiers (#)	5	8	8	
New secondary reactors (#)	5	7	10	
New centrifugal blowers (#)	5	5	6	
New secondary clarifiers (#)	7	12	12	
New DAF units (#)	4	5	6	
New anaerobic digestors (#)	5	6	6	
New sludge storage tanks (#)	2	2	3	
New facility footprint, total (approximate)	400,000 square feet (SF)	475,000 SF	530,000 SF	
New ITP employees (#)	30	40	50	
Estimated capital cost for construction [b, c]	$227 million	$299 million	$372 million	

[a] All scope estimates presented are based on feasibility-level engineering and are subject to refinement during the design process.
[b] Cost estimates do not include renovations to the existing grit chambers and solids handling facilities.
[c] All cost estimates were developed with an estimated accuracy of +50%/-25% for U.S.-side projects and +100%/-50% for Mexico-side projects.

2.1.1.2 Project B: Tijuana Canyon Flows to ITP

Project B includes the installation of a wastewater conveyance system from Matadero Canyon and Los Laureles Canyon in Mexico to the expanded ITP for treatment (see Project A for details on the ITP expansion); decommissioning of three pump stations in the canyons; and associated temporary construction activities. Following treatment, these flows would be discharged to the

Pacific Ocean through the SBLO/SBOO as described for Project A. Three configurations and/or installation methods of the conveyance line are being considered: trenching through Smuggler's Gulch and Monument Road (Project B1), trenchless installation in Smuggler's Gulch and under the mesa (Project B2), and connection to the existing canyon collector system (Project B3). The primary purpose of the proposed conveyance system is to reduce the amount of dry-weather wastewater flows that are currently discharged with little to no treatment to the Pacific Ocean via SAB Creek. As a secondary benefit, Project B would potentially reduce the volume and frequency of dry-weather transboundary flows in Goat Canyon and Smuggler's Gulch by eliminating the reliance on pump stations whose mechanical issues may cause occasional wastewater overflows into the canyons in Mexico.

Up to 12.7 MGD (peak daily) of wastewater from the canyons would be collected by the new conveyances and transported to the ITP for treatment. The current wastewater flow from the canyons is 6.3 MGD, so the new conveyances would have available capacity to accommodate flow increases over time.

The new wastewater conveyance system would include new pipelines (Reaches 1–4) in Mexico that use gravity to convey wastewater to the U.S., which would allow the existing pump stations in the canyons to be decommissioned—specifically, the Matadero pump station in Matadero Canyon and the Los Laureles 1 and Los Laureles 2 pump stations in Los Laureles Canyon. The new Reach 5 pipeline in the U.S. is described later in this section. The new conveyance lines in Mexico would consist of the following:

- **Reach 1:** A 15-inch nominal diameter gravity sewer that would flow directly east from the Los Laureles 2 pump station and connect to Reach 2. Reach 1 would be approximately 2,000 feet long, would pass underneath the high ground between the two canyons, and would be installed using directional drilling.
- **Reach 2:** A 15-inch nominal diameter gravity sewer that would flow generally north from the eastern end of Reach 1 to the Matadero pump station. Reach 2 would be approximately 1,700 feet long and would be installed using conventional open-cut trenching methods.
- **Reach 3:** A 21-inch nominal diameter gravity sewer that would flow generally north along Matadero Canyon from the Matadero pump station until it intersects Reach 4 approximately 150 feet south of the border. Reach 3 would be about 3,500 feet long and would be installed using conventional open-cut trenching methods (except for approximately 700 feet passing beneath the International Highway, which would be installed using micro-tunneling).
- **Reach 4:** A 15-inch nominal diameter gravity sewer that would flow generally east from the Los Laureles 1 pump station until it intersects with Reach 3. Reach 4 would be approximately 4,000 feet long, would pass beneath the high ground between the canyons, and would be installed using directional drilling.

The sections of the proposed conveyance line that would be installed using open-cut trenching (Reach 2 and a part of Reach 3) would occur in undeveloped areas in Matadero Canyon and would require temporary land disturbance and lighting along the proposed route during construction, as well as for staging areas. The sections of the proposed conveyance line that would be installed using micro-tunnelling or directional drilling (Reach 1, 4, and part of Reach 3) would require temporary pits at each end of the micro-tunnel or drilling location with construction staging areas to feed the pipe sections underground. The construction areas on each side of the micro-tunnel or drilling operation would require temporary fencing, lighting, a truck-

mounted generator to run equipment, and other construction equipment. The pipes would have shallow installation, so dirt would be backfilled following installation.

In the U.S., Project B includes three proposed configurations of Reach 5 to convey flows from the end of Reach 4 to the expanded ITP: Options B1, B2, and B3. The differences between the three options are summarized below.

- **Reach 5, Option B1: Trenching via Smuggler's Gulch and Monument Road.** Option B1 includes installing Reach 5 using open-cut trenching methods through Smuggler's Gulch and along Monument Road. Reach 5 would consist of a 24-inch nominal diameter force main that would run from 150 feet south of the border in Matadero Canyon to the headworks of the ITP. This sewer would run north beneath the border for approximately 1,000 feet; north under the Smuggler's Gulch access road for approximately 1,300 feet; east under Monument Road for approximately 6,100 feet; and east/southeast adjacent to Clearwater Way and West Tia Juana Street for approximately 3,600 feet before reaching the headworks of the ITP.

  Reach 5 would be installed using conventional open-cut trenching methods except for the section beneath the U.S.-Mexico border, which would be installed using micro-tunneling. Temporary pits would be required at each end of the micro-tunnel section and may require additional security during construction due to their proximity to the border. Depending on the results of utility surveys, open-cut trenching would be confined to the existing roadway in Smuggler's Gulch and along Monument Road and would be confined to the undeveloped strip of land adjacent to Clearwater Way and West Tia Juana Street. Unvegetated areas would be used for construction staging activities, as necessary.
- **Reach 5, Option B2: Trenchless installation via Smuggler's Gulch and under mesa**. Option B2 includes installing Reach 5 using a combination of open-cut trenching and trenchless methods to avoid or minimize disturbances within Smuggler's Gulch and along Monument Road. Reach 5 would be a 24-inch nominal diameter polyvinyl chloride (PVC) force main that starts 150 feet south of the border and runs approximately 1,000 feet north into Smuggler's Gulch; east underneath the mesa for approximately 5,000 feet; and east/southeast along Dairy Mart Road, Clearwater Way, and West Tia Juana Street for approximately 4,500 feet before reaching the headworks of the ITP.

  The sections of Reach 5 underneath the border, Smuggler's Gulch, and the mesa between Smuggler's Gulch and the ITP would be installed using directional drilling. These sections would require three temporary pits: one located 150 feet south of border in Smuggler's Gulch, one located approximately 900 feet north of the border in Smuggler's Gulch (adjacent to the canyon flow diversion structure), and one located near the intersection of Dairy Mart Road and Monument Road. The temporary construction pits in Smuggler's Gulch may require additional security during construction due to their proximity to the border. Open-cut trenching would be used for the final section to the ITP headworks (identical to that for Option B1).
- **Reach 5, Option B3: Connect to existing canyon collector system**. Option B3 includes installation of Reach 5 beneath the border to connect to the existing canyon collector pipeline in Smuggler's Gulch (part of the existing canyon collector system) for conveyance to the ITP. This option would minimize disturbances and leverage existing infrastructure. Reach 5 would be a 24-inch nominal diameter high-density polyethylene (HDPE) gravity pipe that runs north beneath the border for approximately 1,000 feet and connects to the existing 30-inch gravity sewer ("canyon collector") that currently conveys flows from the Smuggler's Gulch canyon flow diversion structure to the Hollister Street pump station. The

existing equipment at the pump station would be used to pump these combined flows (from Reach 5 and the U.S.-side canyon flow diversion structures) to the ITP using the existing 16-inch and 30-inch force mains.[5]

Reach 5 would be installed using micro-tunnelling underneath the border. The U.S.-side micro-tunnelling pit would also be used to connect Reach 5 to the existing canyon collector. Temporary pits would be required at each end of the micro-tunnel section and may require additional security during construction due to their proximity to the border.

Project B construction activities, including components in Mexico, are projected to take approximately two years to complete following mobilization but the specific schedule for starting and completing construction is not known at this time.

The infrastructure proposed for Project B would be expected to require regular and ongoing O&M activities to ensure operational reliability and efficiency, potentially requiring up to approximately two additional staff members. Maintenance on the U.S. side would generally consist of inspecting the ground along the sections of pipe installed using open-cut trenching to look for potential leaks. The new conveyance pipelines would use gravity to transport wastewater; therefore, minimal mechanics would be involved, reducing the overall maintenance requirements, and decommissioning the Matadero, Los Laureles 1, and Los Laureles 2 pump stations would reduce maintenance requirements as only access points would remain. Maintenance of the new gravity pipelines in Mexico would generally consist of routine closed-circuit television inspections, cleaning, and leak repairs.

Figure 2-6 through 2-8 depict the anticipated general locations of project elements and construction activities for Options B1, B2, and B3, respectively, of Project B.

[5] Depending on the results of the USIBWC condition assessment of existing ITP components, the scope of Option B3 could also include rehabilitation of the Hollister Street pump station and associated force mains.

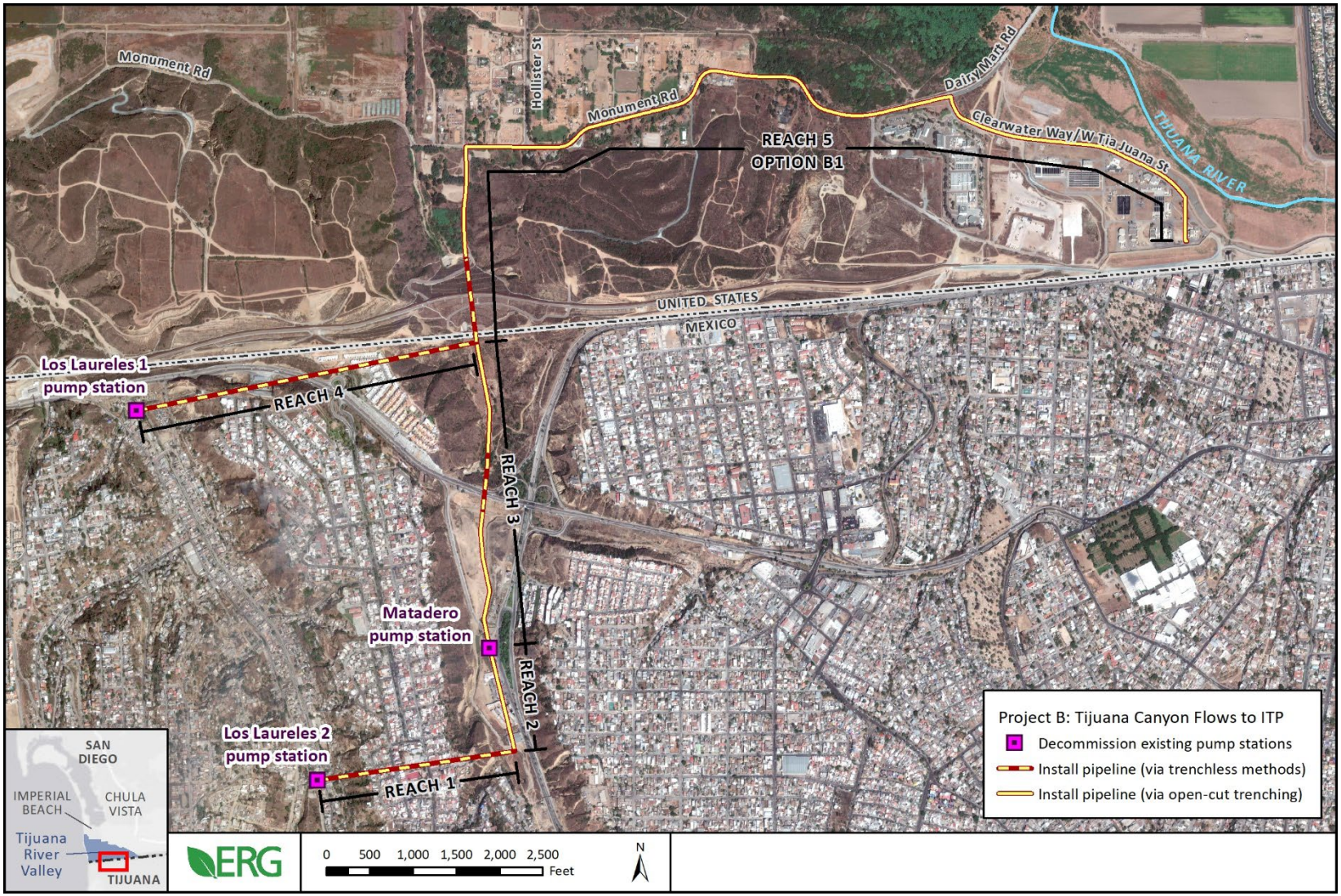


Figure 2-6. Project B (Tijuana Canyon Flows to ITP), Option B1 – Locations of Project Components.

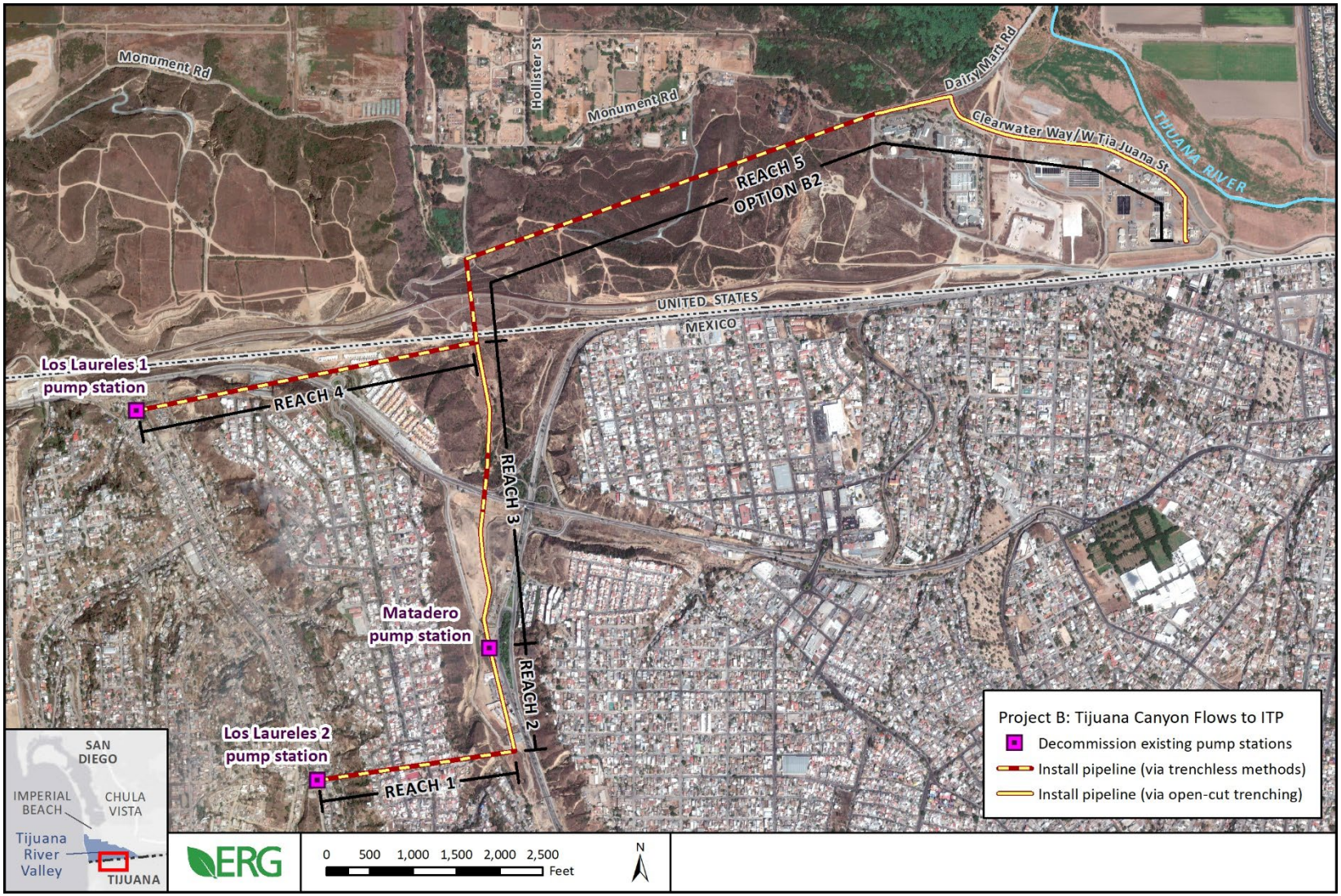


Figure 2-7. Project B (Tijuana Canyon Flows to ITP), Option B2 – Locations of Project Components.

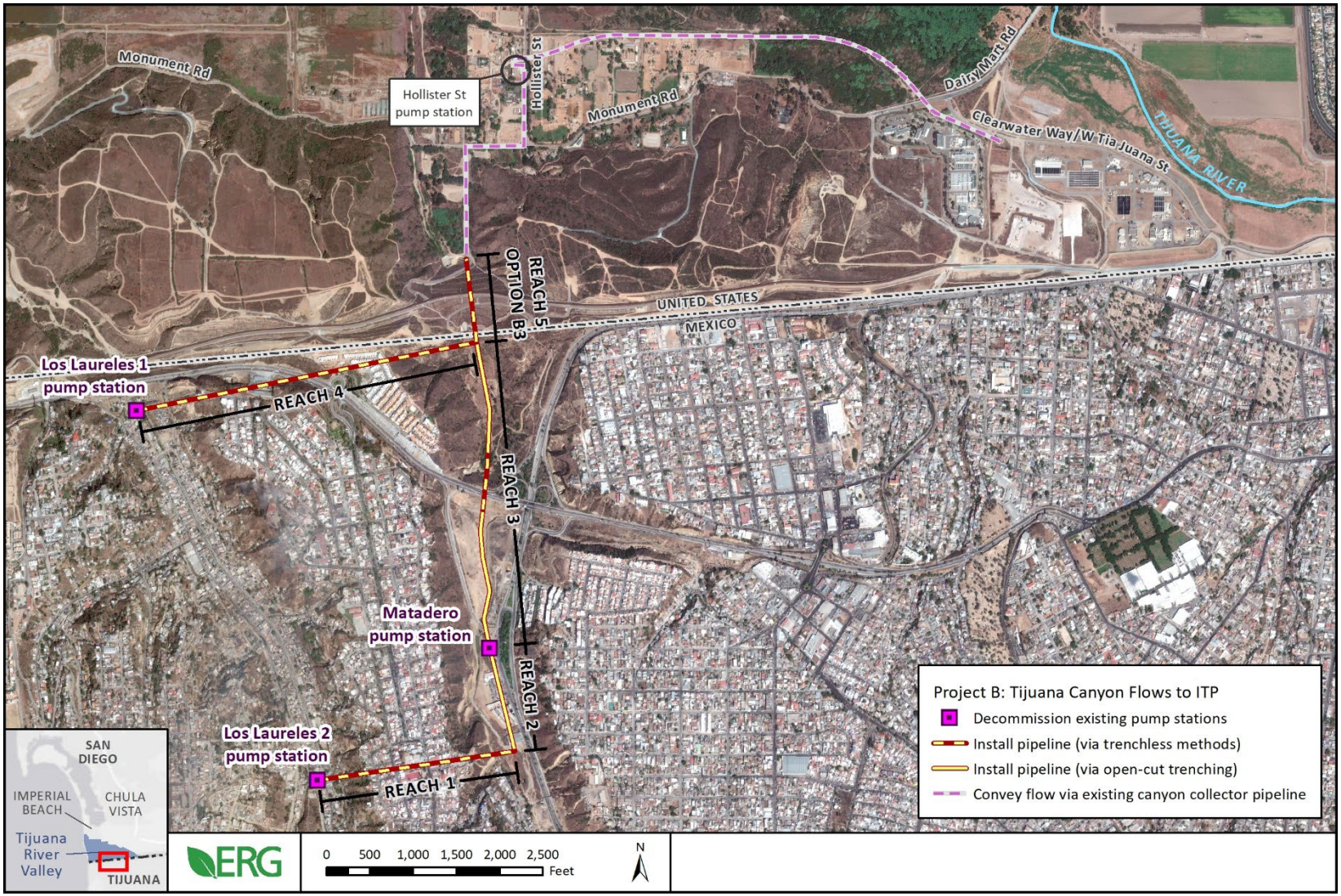


Figure 2-8. Project B (Tijuana Canyon Flows to ITP), Option B3 – Locations of Project Components.

2.3.1.1 Project C: Tijuana Sewer Repairs

Project C includes rehabilitating or replacing targeted sewer collectors in the Tijuana metropolitan area in order to reduce the amount of untreated wastewater that currently leaks from the sanitary sewer system in Tijuana and enters the Tijuana River. By reducing wastewater leaks to the river in Tijuana, Project C would improve downstream water quality in the Tijuana River Valley and Estuary by both 1) reducing overall river flow volumes, and thus reducing the frequency of dry-weather transboundary flows caused by river flow rates that exceed the Comisión International de Limites y Aguas (CILA) pump station (PB-CILA) diversion capacity, and 2) ensuring that more wastewater in the Tijuana sewer system is successfully conveyed to the expanded ITP for treatment (see Project A) rather than entering the U.S. as a transboundary flow. As indicated above, improvements in Mexico are not considered as part of this BA except when transboundary flows could be affected.

The Comisión Estatal de Servicios Públicos de Tijuana (State Public Service Commission of Tijuana) and the Comisión Nacional del Agua, with concurrence from EPA and USIBWC, have identified seven sewer collectors to be rehabilitated or replaced using USMCA appropriations, EPA's Border Water Infrastructure Program (BWIP), and/or Mexico funds as a Core Project. Most of the improvements would include replacement of old concrete pipes with new pipes made from more durable material (e.g., PVC or HDPE) to prevent the risk of leaks and collapses. Most of these collector rehabilitation and replacement projects, listed in Table 2-3, were selected with the goal of reducing transboundary wastewater leaks to the Tijuana River down to 5 MGD.[6] One project (Force Main Antiguo, project #7) was selected with the goal of reducing transboundary wastewater leaks that reach the U.S. and the Tijuana River via Los Laureles Canyon and Matadero Canyon. Figure 2-9 depicts a schematic of the wastewater collection system in Tijuana, and the project locations.

Construction activities for rehabilitation or replacement of these sewer collectors would include the use of heavy construction equipment and open-cut trenching in most locations. In some cases (e.g., when sections of pipelines are particularly deep or would cross busy roadways), trenchless methods would be used. The targeted sewers are located in urban, developed areas predominantly within existing streets.

Project C construction activities are projected to take approximately one to three years to complete (per individual project) following mobilization but the specific schedule for starting and completing construction for all collector repairs is not known at this time. Binational negotiations regarding O&M responsibilities and funding for Project C are ongoing.

[6] In addition to the projects identified in Table 2-3, EPA is planning to provide BWIP funding for separate efforts (pursuant to separate NEPA reviews) that also would perform priority repairs to sewer infrastructure in Tijuana.

Table 2-3. Tijuana Sewer Collectors Included in Project C for Rehabilitation or Replacement.

ID Number	Name	Description	Length to Be Rehabilitated (Feet)	Existing pipe	Proposed pipe
Projects to Reduce Wastewater Leaks to Tijuana River in Mexico					
1	International Collector (Phase 2) [a]	Rehabilitate International Collector piping using trenchless methods due to location along a major highway.	8,200	72-inch concrete	72-inch PVC SPR (PVC spiral inside concrete pipe)
2	Rehabilitation of Insurgentes Collector	Replace Insurgentes Collector piping.	18,400	36-inch concrete	36-inch PVC
3	Rehabilitation of Poniente Collector (missing sections in col. 20 de Noviembre)	Rehabilitate Poniente Interceptor pipeline, which is old, at risk of collapse, and causes major spills and wastewater discharges to the Tijuana River.	2,300	42-inch concrete	42-inch and 48-inch PVC
4	Rehabilitation of Collector Carranza	Replace Carranza Collector piping in Colonia Carranza.	9,200	36-inch concrete	36-inch PVC
5	Rehabilitation of Interceptor Oriente	Replace the Oriente Collector in the eastern section of the Tijuana River.	22,800	42- and 48-inch concrete	42-inch and 48-inch PVC
6	Tijuana River Gates	Replace piping along the Alamar and Tijuana River wastewater collection system to reduce untreated wastewater discharges to the Tijuana River.	23,300	8- to 60-inch concrete	8-inch to 60-inch PVC
Project to Reduce Wastewater Leaks to Los Laureles Canyon and Matadero Canyon in Mexico					
7	Force Main Antiguo	Rehabilitate the force main section of the old conveyance from PB1 to San Antonio de los Buenos Wastewater Treatment Plant.	14,400	42-inch steel core concrete	42-inch steel or PVC pipe

[a] Phase 1 of the International Collector repairs, which includes construction of new alternative piping through the streets of Tijuana using 60-inch PVC, is being funded through BWIP and received a Categorical Exclusion in March 2022 to complete its NEPA review.

Figure 2-9. Project C – Schematic of Tijuana Sewer Collectors for Rehabilitation or Replacement.

2.3.2 Project D: APTP Phase 1

Project D includes the construction and operation of a 35-MGD Advanced Primary Treatment Plant (APTP) for advanced primary treatment of diverted water from the existing PB-CILA diversion in Mexico, rehabilitation and extension of the existing force main from PB-CILA to the new APTP, installation of other new supporting facilities, and associated site modifications. The primary purpose of Phase 1 of the proposed APTP is to reduce impacts to the U.S. coast by treating diverted river water that otherwise would be discharged to the Pacific Ocean via SAB Creek without adequate treatment, or any treatment at all. This project would also reduce the frequency of transboundary river flows by eliminating the use of Pump Station 1A (PB1-A), whose mechanical issues indirectly cause occasional shutdowns of the PB-CILA diversion.

The APTP would operate independently of the existing ITP and would consist of the following treatment processes: screening, aerated grit removal, grit dewatering, a ballasted flocculation process, and sludge handling. Figure 2-10 provides a schematic of the treatment train at the proposed APTP.

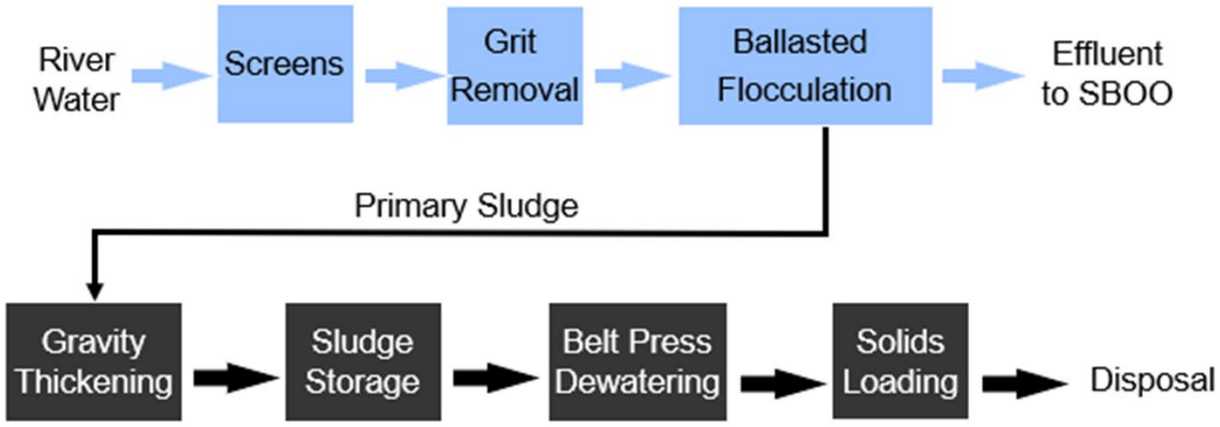


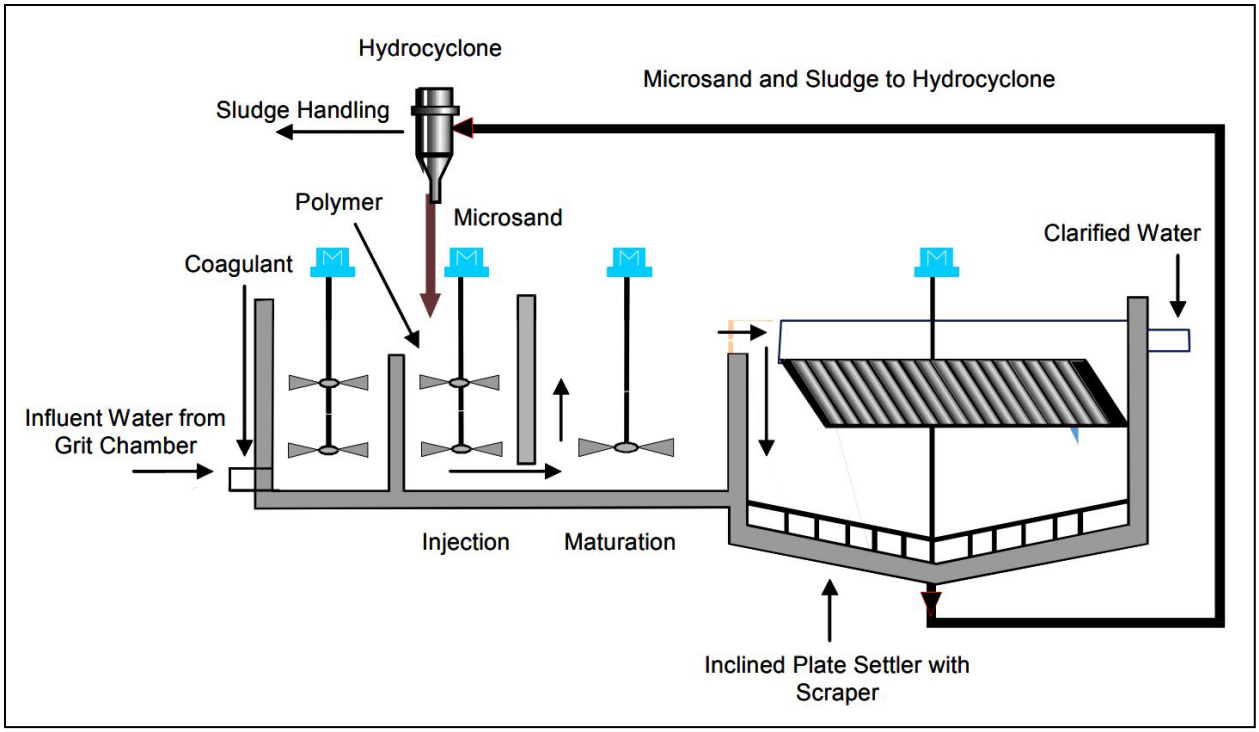
Figure 2-10. Project D – Schematic of APTP Treatment Train.

The proposed 35-MGD APTP for Project D, which represents Phase 1, would be designed and constructed to allow for potential expansion under Phase 2. For example, concrete pads constructed under Phase 1 for ballasted flocculation, sludge storage, and other process units would be large enough to accommodate the potential installation of additional process units under Phase 2, and piping and stub-outs to convey flows between the units would be sized to accommodate the flow rates of a 60-MGD plant. While these expanded pads would not specifically support operation of the 35-MGD plant, this approach is necessary to ensure soil and foundation stability for the overall plant and to ensure that the siting of Phase 1 infrastructure does not inadvertently prevent potential future expansion under Phase 2 (which is not part of the project analyzed in this BA and would undergo Section 7 consultation in the future if necessary).

The proposed new facilities and processes for Project D are described below.

- **Preliminary treatment.** The preliminary treatment process would include conveying influent from the headworks through self-cleaning bar screens and an aerated grit removal tank. The screening process would protect the advanced primary treatment process from large solid waste, and the grit chambers would remove approximately 25 percent of the suspended solids from river water.

- **Primary treatment.** The APTP would include a ballasted flocculation treatment process. Ballasted flocculation is a physical chemical treatment process that uses recycled media, coagulants, and polymers to improve the settling properties of suspended solids. The ballasted flocculation process is estimated to achieve total suspended solids and biochemical oxygen demand (BOD_5) removals of 85 percent and 50 percent, respectively. Two ballasted flocculation treatment trains would be constructed, each with a 25-MGD design capacity. A flow schematic of the ballasted flocculation process is shown in Figure 2-11.
- **Discharge.** Treated effluent from the ballasted flocculation process would be conveyed through a new 300-foot pipeline located within the ITP parcel to tie into the existing ITP effluent structure and then discharged through the SBLO, which then discharges into the SBOO and then into the Pacific Ocean. Modifications to the wye diffuser array on the SBOO could be necessary to promote dispersal of the increased loadings (e.g., opening ports on existing capped risers and/or installing new diffuser heads and ports to existing closed, blind flanged risers).
- **Solids processing.** The APTP would include solids handling facilities to process the grit and sludge removed from the river water. The sludge handling process would include gravity thickening, sludge storage, and dewatering units. The sludge loading facilities would include conveyors and hoppers to load the sludge onto trucks to be hauled offsite for disposal.
- **Other improvements.** The new APTP would include facilities for offices, a control room, and restrooms to support operations. These facilities would potentially be co-located with similar proposed support facilities at the expanded ITP (Project A). The existing blower building at the ITP would be repurposed to house the controls for the APTP process. Electrical upgrades to the current system, including additional backup power, would support the pumps and equipment for the proposed APTP. The APTP site is enclosed by the existing ITP fence, but additional or upgraded lighting would potentially be required.



Source: EPA 2003.

Figure 2-11. Ballasted Flocculation Process Flow Schematic.

Site modifications for the proposed APTP would be necessary and would include grading and land disturbance for siting of the proposed APTP (shown in Figure 2-12) on the northern edge of the ITP property and for construction staging areas within the ITP site. The proposed APTP would be constructed in the north area of the ITP parcel, immediately north of the ITP secondary treatment units and south of West Tia Juana Street. Construction activities would also potentially involve temporary work (e.g., material/equipment staging and stormwater management) throughout the undeveloped 25-acre southwest quadrant of the ITP parcel.

In order to convey river water to the new APTP, the existing PB-CILA diversion in Mexico (which would operate when the instantaneous river flow rate is 35 MGD or less) would convey diverted river flows through an existing force main across the border to the APTP headworks. Project D would include the rehabilitation and extension of this existing force main from PB-CILA in Mexico to the new APTP in the U.S. PB-CILA currently conveys diverted river water to PB1-A through a 42-inch force main. This line would be rehabilitated and extended to direct flows from PB-CILA to the headworks of the new APTP, thus bypassing PB1-A and allowing it to be decommissioned. The section of the line proposed for rehabilitation runs from PB-CILA to Avenue M in Tijuana and is approximately 7,200 feet long. Rehabilitation of this section of existing pipe would involve installing mechanical joint restraints and applying corrosion protection. A new section of 42-inch HDPE force main, approximately 800 feet in total length, would be installed (using micro-tunneling) under the border from the PB1-A site in Mexico to a location west of Stewart's Drain on ITP property in the U.S. Finally, open-cut trenching in the U.S. would be used to construct an approximately 1,800-foot section of new 42-inch HDPE force main north to West Tia Juana Street and then to the headworks of the new APTP.

Rehabilitating and extending the existing force main line would involve temporary land disturbance during construction in both Tijuana and in the U.S. within the ITP parcel. In Tijuana,

temporary pumps would re-route flow between PB-CILA and PB1-A while this portion of the force main is rehabilitated, and temporary fencing and lighting would be constructed to increase security and support operations. Micro-tunneling under the U.S.-Mexico border would require temporary pits at both ends, and open-cut trenching would involve land disturbance and additional lighting. A temporary shutdown of PB-CILA or bypass of the force main (e.g., by sending diverted river flows to the International Collector) would be necessary to allow for connection of the rehabilitated and new force main sections.

The proposed APTP would require regular and ongoing O&M activities to ensure operational reliability and efficiency. Approximately 30 additional staff members would be required to accommodate the anticipated increase in O&M needs. Long-term recurring operations would include hauling of solids produced by the treatment process to a local solid waste disposal site. The pumps and equipment supporting the APTP would also require regular and ongoing O&M activities such as rehabilitation and replacement at varying time intervals.

Figure 2-12 through 2-13 depict the anticipated general locations of project elements and construction activities for Project D. Figure 2-14 provides an example conceptual site plan of the individual facilities that would be constructed for Project D.

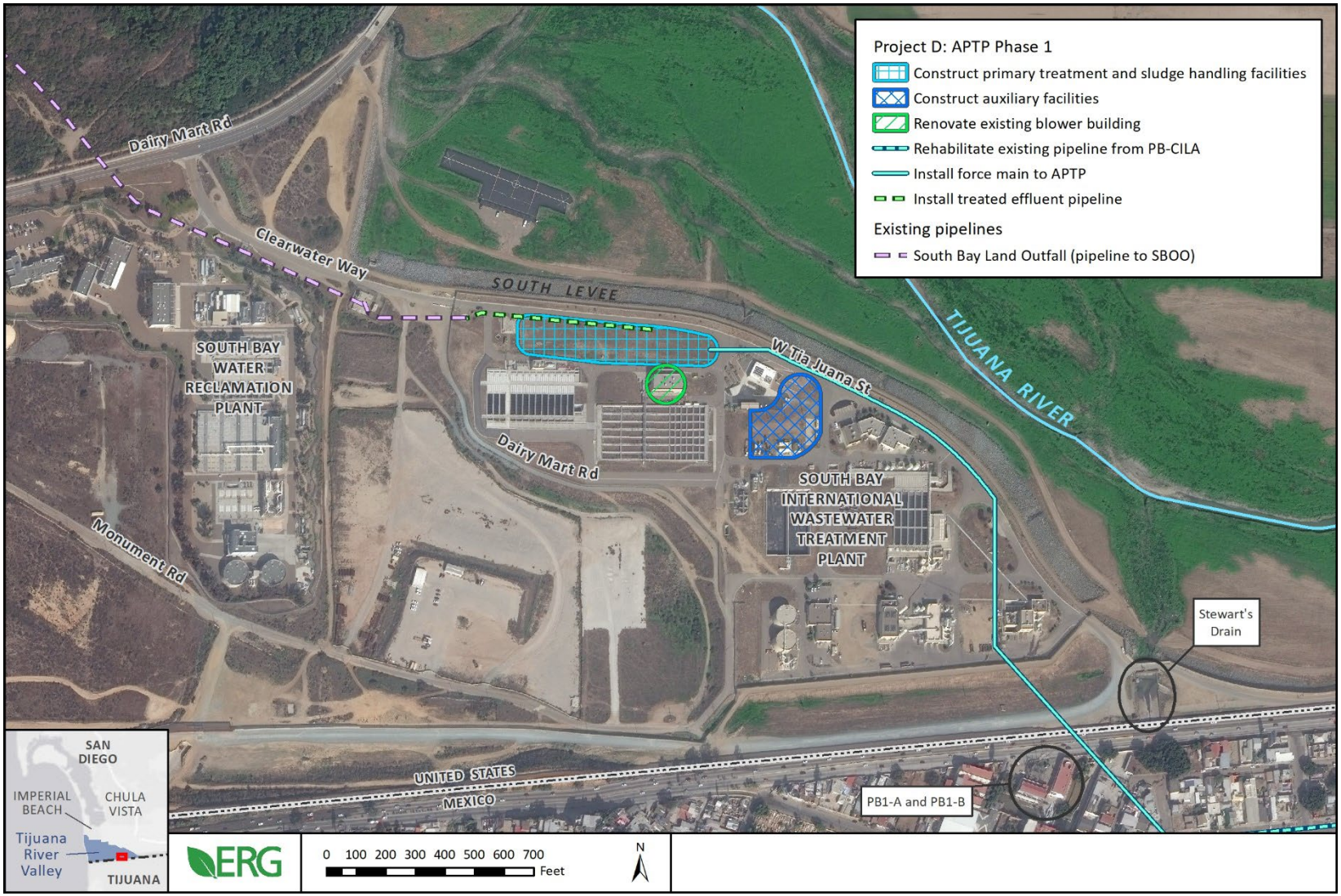


Figure 2-12. Project D (APTP Phase 1) – Locations of Project Components (1 of 2).

Figure 2-13. Project D (APTP Phase 1) – Locations of Project Components (2 of 2).

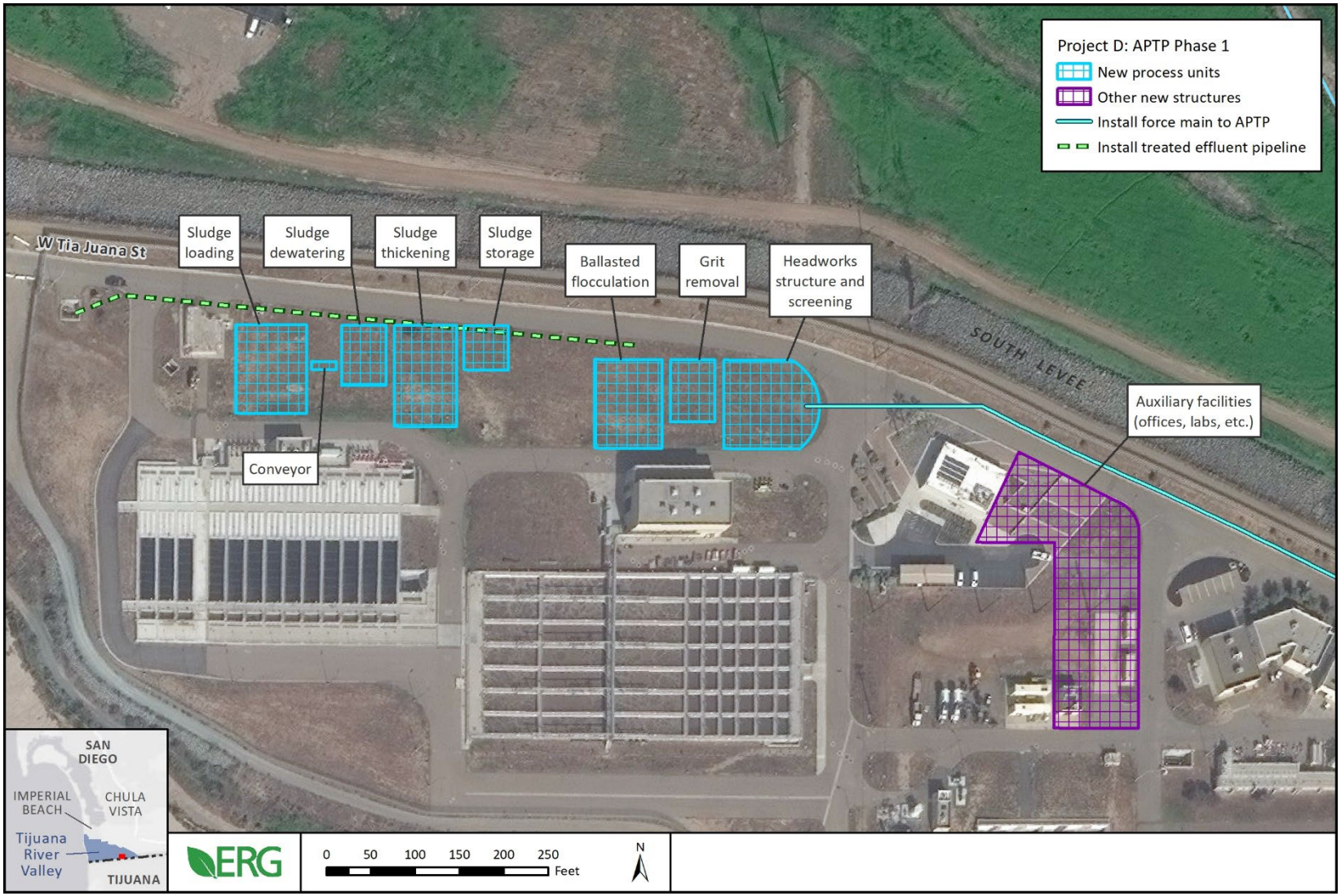


Figure 2-14. Project D (APTP Phase 1) – Conceptual Site Plan of Proposed Facilities.

2.4 Conservation Measures

2.4.1 General Conservation Measures and Best Management Practices

The conservation measures described below will be implemented as part of the project and are based on standard practices to avoid, minimize, or reduce potential impacts on environmental resources and comply with existing regulations and/or requirements:

1. Confine all heavy equipment, vehicles, and construction activities to existing access roads, road shoulders, and disturbed/developed or designated work areas. Limit work areas to what is necessary for construction.
2. All materials imported into the Action Area (e.g., straw wattles, gravel, and mulch) will be obtained from certified sources that are free of noxious weeds.
3. Wash stations will be set up at all vehicle entrances into the Action Area to remove mud and dirt from vehicles before entering the Action Area. Sediment accumulated from the washing will be removed daily and placed in a sealed container for disposal in an approved landfill. Project workers will use boot brushes, a metal scraper, soap, water and scrub brushes to remove mud, debris, and plant materials found on their clothing and personal equipment.
4. Best management practices (BMPs) for erosion control, stormwater runoff, hazardous material handling, and stock-pile management will be implemented to prevent pollution caused by construction operations and to reduce contaminated stormwater runoff.
5. All construction equipment will be inspected for leaks prior to being brought onsite. All equipment shall be well maintained and inspected daily while onsite to prevent leaks of fuels, lubricants or other fluids into wetlands and waterways.
6. Service and refueling procedures will be conducted in a designated area where there is no potential for fuel spills to seep or wash into waterways.
7. No pets, hunting, open fires (such as barbecues), or firearms will be permitted at the project site.
8. Project lighting will be of the lowest illumination necessary for safety and will be directed toward the construction area and away from sensitive habitats, as feasible. Light glare shields will be used to reduce the extent of illumination into sensitive habitats.
9. Ground disturbance and vegetation removal should not exceed the minimum amount necessary to complete work at the site.
10. All areas where revegetation is required will be replanted with native species.

2.4.2 Conservation Measures for Federally Listed Species

11. A qualified biologist will develop an environmental training and will present the training to all crew members prior to them beginning work on the project. The training will include a description of federally listed species with potential to occur, life history and habitat associations, general protection measures, the terms and conditions of project permits, penalties for non-compliance, and the boundaries of the construction areas. A handout will be provided to all participating personnel and at least one copy will be kept onsite during construction activities. Upon completion of the training, crew members will sign a form stating that they attended and understood the training.
12. A seasonally appropriate, focused survey for vernal pools will be conducted in the Action Area no less than one year prior to construction. If any vernal pools are found, they will be flagged and fully avoided. If full avoidance is infeasible, USFWS-protocol San Diego fairy

shrimp surveys will be conducted. If fairy shrimp are found to inhabit any vernal pools that cannot be completely avoided, Section 7 consultation with USFWS will be reinitiated, and a mitigation plan will be developed.

13. Sensitive biological resources (e.g., vernal pools, nesting birds, listed plants) identified in or adjacent to construction work areas during preconstruction surveys will be clearly marked or flagged in the field. Such areas will be avoided during construction as detailed in relevant species-specific measures below.
14. Erosion control materials shall be installed per manufacturing material specifications and must not contain monofilament netting. Only tightly woven netting or similar material will be used for all geo-synthetic erosion control materials such as coir rolls and geo-textiles.

2.4.2.1 Federally Listed Wildlife

15. All construction personnel will visually check for wildlife on or beneath vehicles and construction equipment before moving or operating them.
16. If listed wildlife are observed within the work area or its immediate vicinity, work will stop until the animal leaves the area of its own volition. The animal will not be harried or harassed into leaving the area. If the animal does not leave of its own accord, contact the project biologist for further guidance.
17. During project activities, all trash that may attract wildlife will be properly contained in covered garbage receptacles. Following construction, all trash and construction debris from project sites will be removed.
18. Impacts from fugitive dust during construction will be avoided and minimized through watering, limiting vehicle speeds to 20 miles per hour, controlling vehicle access, and other appropriate measures.
19. A preconstruction survey for Quino checkerspot butterfly host plants will be conducted in areas of suitable habitat that may be impacted by construction (including staging areas) during appropriate blooming periods and no less than one year prior to construction. If found, areas containing host plants will be flagged and avoided.
20. To the greatest extent practicable, work within 300 feet of suitable least Bell's vireo habitat (i.e., riparian habitat associated with Smuggler's Gulch) will be avoided during the vireo breeding season (March 15 to August 31). If work is necessary to begin within 300 feet of suitable vireo habitat during the breeding season, a biologist will perform a preconstruction survey in the area to determine if any nesting vireos are present. If an active nest is present, a 300-foot no-disturbance buffer around the nest will be clearly demarcated, and the area will be avoided until the young have fledged the nest and/or the nest becomes inactive.
21. To the greatest extent practicable, work within 300 feet of suitable gnatcatcher habitat (e.g., coastal sage scrub habitat associated with Smuggler's Gulch) will be avoided during the gnatcatcher breeding season (February 15 to August 31). If work is necessary within 300 feet of suitable gnatcatcher habitat during the breeding season, a biologist will perform a preconstruction survey in the area to determine whether any nesting gnatcatchers are present. If a nest is present, a 300-foot no-disturbance buffer around the nest will be clearly demarcated, and the area will be avoided until the young have fledged and/or the nest becomes inactive.

2.4.2.2 Federally Listed Plants

22. Protocol-level surveys for federally listed plant species with the potential to occur in the Action Area will be conducted in the Action Area during appropriate blooming periods and

no less than one year prior to construction. The survey protocol will follow the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000) and *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (California Department of Fish and Wildlife [CDFW] 2018).

23. If found, a no-work buffer will be established around the listed plant or plant population, and this buffer will be avoided to the maximum extent practicable. The buffer width will be determined in coordination with USFWS.
24. If the listed plants cannot be avoided, a Section 7 consultation with USFWS will be reinitiated, and a mitigation and monitoring plan will be developed.

3 ENVIRONMENTAL BASELINE

3.1 Assessment Methods

3.1.1 Desktop Review

Information on the designated critical habitat and federally listed, proposed, or candidate wildlife and plant species that have potential to occur in the Action Area was obtained from the following sources:

- USFWS IPaC portal (USFWS 2022);
- CDFW California Natural Diversity Database (CNDDB) (CDFW 2022); and
- California Native Plant Society's (CNPS's) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2022).

The CNDDB and CNPS queries were based on a search of the U.S. Geological Survey 7.5-minute quadrangle in which the project is located (Imperial Beach) and the surrounding four quadrangles[7] (Point Loma, National City, Jamul Mountains, and Otay Mesa); Appendix A provides the results of the database queries.

The following existing information and resources were reviewed to further inform and refine the species' potential to occur within the Action Area and the analysis of potential project-related impacts:

- USFWS species profiles, species recovery plans, five-year species reviews, and Federal Register notices proposing species listings and critical habitat designations;
- scientific research and/or peer reviewed journal articles;
- unpublished technical reports and/or survey data;
- conservation and management plans for the area (Tijuana River National Estuarine Research Reserve [TRNERR] Comprehensive Management Plan [TRNERR 2010], Multiple Species Conservation Plan [MSCP] Plan Summary [City of San Diego 2021]);
- citizen science databases including eBird (eBird 2022) and research grade iNaturalist records (iNaturalist 2022);
- Vegetation Classification and Mapping Program (VegCamp) data (CDFW 2021); and

[7] IPaC, CNDDB, CNPS, and NMFS databases do not contain data for areas outside California and/or the U.S. Consideration of adjacent suitable habitat across the international border was analyzed if a species was documented in the Action Area (including historical observations) and the border wall would not inhibit species movement.

- Vegetation Classification Manual for Western San Diego County (SANDAG 2011).

3.1.2 Field Surveys

Two biological reconnaissance surveys were conducted by Stillwater in the Action Area. No species-specific protocol-level wildlife or protocol-level botanical surveys have been conducted for this project to date.

During the reconnaissance survey on April 14–16, 2021, Stillwater wildlife and fisheries biologists and botanists conducted a habitat assessment for listed wildlife and plant species within the Action Area. The assessment focused on areas along the Tijuana River Basin, including Tijuana River (from the international boundary to Dairy Mart Road), the ITP and surrounding infrastructure and staging areas, and Smuggler's Gulch. The habitat assessment included examining the extent and quality of available habitat features and elements (e.g., habitat connectivity and suitable aquatic habitat) and noting all wildlife species, including listed species, observed.

A follow-up biological reconnaissance visit was conducted by a Stillwater wildlife biologist and botanist with USFWS on February 9, 2022. The visit focused on the quality of vegetation types present in the Action Area for Quino checkerspot butterfly and listed plants, as well as the potential for other listed species in the Action Area.

A wetland delineation was conducted by PG Environmental on November 3–4, 2021. The delineation focused on identifying the location and extents of jurisdictional wetlands and waters (federal, state, and California Coastal Commission) within the Action Area. As part of that effort, the entirety of the ITP facilities and adjacent areas were walked to identify features that support characteristics of wetlands or waters. This effort only identified one area with surface soil cracks (i.e., an area where the soil has visible cracks in the surface of the soil, which is a primary indicator that wetland hydrology is present); the area was overgrown by coastal scrub species and other ruderal herbs. However, during the USFWS site visit on February 9, 2022, surface soil cracks were noted in a few additional areas. These areas may qualify as one-parameter wetlands under the California Coastal Commission, therefore a follow-up, seasonally appropriate vernal pool habitat assessment is recommended.

3.2 Tijuana River Watershed Overview

Tijuana River watershed is a 1,750-square-mile watershed that includes portions of San Diego County in California and northern Baja California in Mexico. Approximately three-quarters of the watershed is in Mexico, including the major cities of Tijuana and Tecate. The remaining quarter is in the U.S. and includes portions of the cities of San Diego and Imperial Beach. The Tijuana River originates in Mexico and flows northwest, crossing the international border, into the U.S. and ultimately discharging into the Pacific Ocean via the Tijuana River Estuary. The lower Tijuana River is relatively wide and flat, confined by high mesas to the south, and steep-sloped terraces and developments to the north. The Tijuana River Estuary is a protected coastal wetland and is one of the last coastal wetlands and salt marshes in southern California that is not intersected by a freeway or railroad. In the U.S., the Tijuana River is conserved and managed by the TRNERR, the Tijuana River Valley Regional Park, Border Field State Park, Tijuana Slough National Wildlife Refuge, and the U.S. Navy.

The lower Tijuana River Watershed (contained in the U.S.) is a critical wildlife corridor and designated as a core biological resource area in the MSCP (City of San Diego 2021). The lower Tijuana River is also located within the path of the Pacific Flyway, providing valuable nesting and foraging habitat for migrating birds. The lower Tijuana River area contains a variety of coastal habitats including sand dunes and beaches, open tidal channels and mudflats, salt marshes, fresh-brackish marshes, riparian habitats, coastal sage scrub, and vernal pools (McIlwee 1970).

3.3 Existing Habitat Conditions in the Action Area

3.3.1 Smuggler's Gulch

The coastal sage scrub habitat in the Tijuana River Valley is most concentrated in the southern mesa slopes connecting to the international border. The mesa slopes follow the border from the west near Yogurt Canyon to the east, flattening out after the Nelson Sloan Quarry near the SBWRP (Figure 2-2). Smuggler's Gulch sits near the center of the mesas, a canyon historically carved by water; in 2008 the stream was piped and the canyon was filled to improve U.S. Customs and Border Protection (CBP) access. The new slope was hydroseeded with a native shrub mix that is similar to the surrounding intact vegetation. The canyon of Smuggler's Gulch is constrained by surrounding mesas, the border wall, and Monument Road. The intermittent cobble and sand lined creek that flows through Smuggler's Gulch sustains small patches of riparian habitat and eventually feeds into the pilot channel of the Tijuana River north of Monument Road. Vegetation types within the Smuggler's Gulch area include coastal sage scrub habitat along the slopes of the canyon (e.g., California sagebrush-California buckwheat Alliance and Lemonade berry scrub), scattered riparian habitat alongside the intermittent creek (Mulefat scrub), fragmented areas of grasslands (Mediterranean California Naturalized Annual and Perennial Grassland Semi-Natural Stands), and habitats dominated by invasives or ornamentals (Tamarisk thickets, Eucalyptus Semi-Natural Stands, and remnant ornamental plants). Small portions of each of these vegetation types overlap into the Action Area (i.e., California sagebrush-California buckwheat Alliance, Lemonade berry scrub, Tamarisk thickets, and Eucalyptus Semi-Natural Stands; Figure 3-1). Smuggler's Gulch also contains roads (paved and gravel), a dirt parking area, and infrastructure including the canyon flow diversion structure, gullies, and trash booms.

3.3.2 Monument Road and ITP Land Parcel

Monument Road is a paved road connecting Smuggler's Gulch to the ITP (via Monument Road, Dairy Mart Road, Clearwater Way, and West Tia Juana Street). Monument Road continues to the southwest of the SBWRP, through disturbed areas, gravel parking lots or staging areas, and eventually joining a standalone portion of Dairy Mart Road (that bisects the SBWRP and ITP). The road follows the base of the mesa slopes that connect with the international border. The slopes and mesas contain coastal sage scrub habitat, but most of the areas immediately adjacent to the road are disturbed and/or developed, or are occupied by fragmented alliances of California sagebrush-California buckwheat Alliance, Lemonade berry scrub, Mule fat scrub, Tamarisk thickets, Eucalyptus Semi-Natural Stands, and Four-wing saltbush scrub (SANDAG 2011, VegCamp 2021) (Figures 3-1 and 3-2).

The ITP land parcel and the areas immediately adjacent contain disturbed non-native grasslands, disturbed/landscaped areas (mainly comprised of planted grasses and trees), and the following vegetation types: Coyote brush scrub, Crown daisy Semi-Natural Stands, Desertbroom, California sagebrush-California buckwheat Alliance, Gooding's willow Alliance, Natural Warm-Temperate Riparian and Wetland Semi-Natural Stands, and Mule fat scrub (SANDAG 2011, VegCamp 2021) (Figures 3-1 and 3-2). The ITP site itself is dominated by existing infrastructure including

buildings, parking lots, roads, trails, and surrounding fences but contains remnant patches of vegetation of the following vegetation types: Crown daisy Semi-Natural Stands, Desertbroom, Mule fat scrub, and Four-wing Saltbush Scrub. As noted in Section 3.3.2, during the wetland delineation effort, only one area was observed with surface cracks, and it was overgrown by coastal scrub species and other ruderal herbs. However, during a subsequent survey, a few additional areas with surface cracks were observed, therefore—even though the high level of historical and current disturbance makes it unlikely that suitable conditions are feasible— an additional, seasonally appropriate vernal pool habitat assessment is recommended.

To the west of the ITP is the site of the former Nelson Sloan Quarry (Figure 2-2), which was used for extracting sand and gravel. The slopes surrounding the Quarry contain coastal sage scrub habitat, occasionally intersected by trails or gravel roads. The Quarry is no longer operational, but some of the trails throughout the surrounding mesa are used for hiking, mountain biking, and horseback by visitors of the Tijuana River Valley Regional Park.

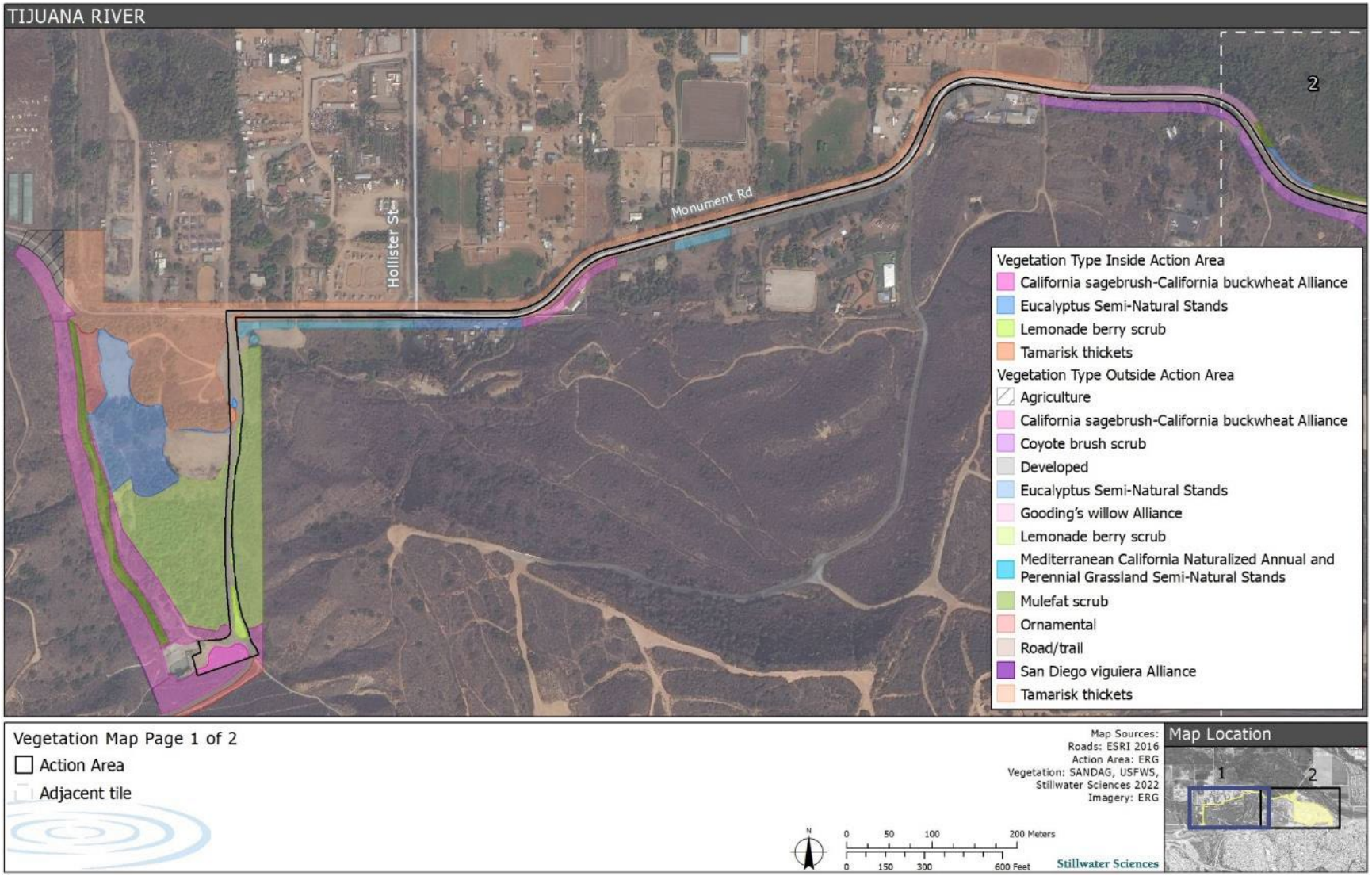


Figure 3-1. Vegetation Types within the Action Area (1 of 2).

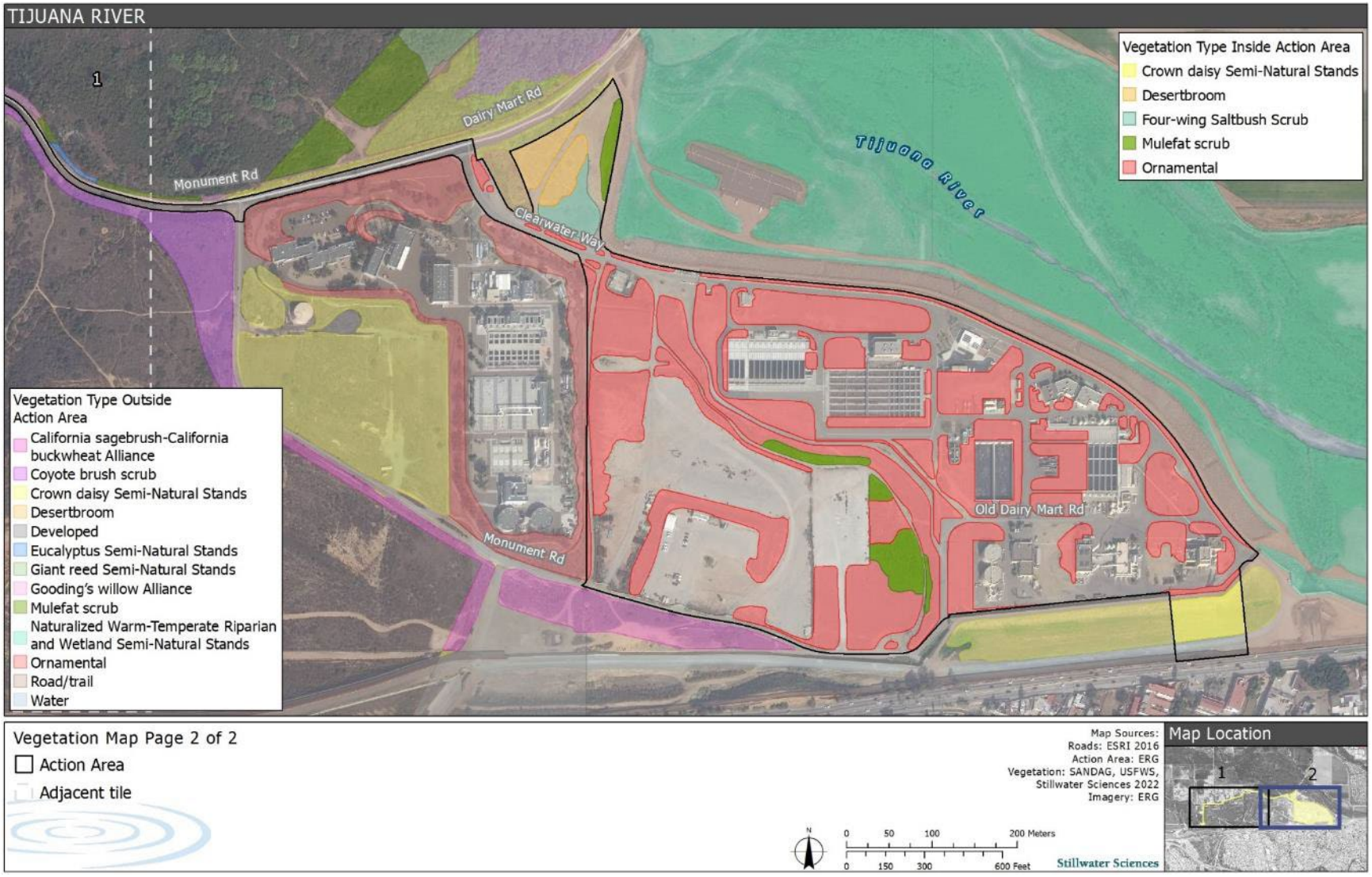


Figure 3-2. Vegetation Types within the Action Area (2 of 2).

4 FEDERALLY LISTED SPECIES ACCOUNTS AND CRITICAL HABITAT

4.1 San Diego Fairy Shrimp

4.1.1 Status and Critical Habitat

San Diego fairy shrimp was federally listed as endangered in 1997. Critical habitat was designated for the species in Orange and San Diego counties in 2003 and updated in 2007 (USFWS 2003a, USFWS 2007a).

4.1.2 Distribution

The San Diego fairy shrimp is a small, aquatic crustacean that is found only in vernal pools and temporary basins within 50 miles of the coast in southern California and northwestern Baja California, Mexico (USFWS 2021a). Historically the shrimp occupied much of the 51,800 hectares of vernal pools that occurred in San Diego County and Orange County (USFWS 2003a). However, because of urban development and habitat degradation due to water management, the species currently occupies only about 877 vernal pool complexes within its range (USFWS 2003a, USFWS 2021a). The shrimp currently occurs throughout parts of San Diego and Orange County and at a single site in Riverside County in 2017 (the first detection of the species east of the coastal range) (USFWS 2021a).

4.1.3 Life History

San Diego fairy shrimp are 0.4 to 0.6 inches long, with a delicate, elongated body, and 11 pairs of legs used for swimming (USFWS 1997a). San Diego fairy shrimp generally emerge between January and March, as seasonal rains fill vernal pools with water and dormant eggs begin to hatch (USFWS 2021a). Once cysts hatch, adults mature and begin mating over the course of seven to 14 days, dependent on water temperature (USFWS 1997a). After fertilization, the eggs will pause development entering a dormant stage, referred to as “cysts” or “resting eggs” (USFWS 2007a). Cysts either drop to the bottom of the pool or remain in the female’s brood sac until she dies and her body sinks to the bottom of the pool (USFWS 1997a). San Diego fairy shrimp typically disappear after about a month, but cysts remain viable after the ephemeral pools have dried, with the ability to withstand extreme temperature variation and last for many years (Simovich and Hathaway 1997, USFWS 1997a). As vernal pools refill with rain, some of the cysts will hatch, and the unhatched will continue to remain viable to hatch during subsequent re-hydrations (Simovich and Hathaway 1997). The accumulation of cysts from many seasons create cyst banks, the development and longevity of which are important for the long-term viability of the species (Simovich 2005). San Diego fairy shrimp feed on algae, diatoms, and particulate organic matter (USFWS 2008a).

San Diego fairy shrimp inhabit vernal pools that are often hydrologically connected to other nearby pools, forming “complexes” (containing between five to 50 pools), acting as population centers for the species (USFWS 2021a, Bohonak 2005). Genetic investigation has shown a large degree of genetic divergence between complex populations, indicating the unlikelihood of individually driven dispersal events over even minor distances (Bohonak 2005). San Diego fairy shrimp can colonize new vernal pools when flood events, birds, or other animals displace and/or carry cysts to other suitable vernal pool locations (USFWS 2008a).

4.1.4 Habitat Associations

Vernal pools in southern California occur on flat topped mesas, in areas with subsurface hardpan layers, and poor draining soils that allow water to pool (Simovich 1998). During a typical rainy season, these pools hold water long enough to support breeding populations of San Diego fairy shrimp, along with other specially adapted flora and fauna (USFWS 1998a). The San Diego Fairy shrimp is adapted to shallow pools from 5 cm to 30 cm deep with water temperatures between 50–68°F (USFWS 1997a).

4.1.5 Potential to Occur in the Action Area

San Diego fairy shrimp are not likely occur in the Action Area, as no obvious evidence of vernal pool complexes (i.e., vernal pools that are hydrologically connected to between five to 50 other nearby pools) was identified during a wetland delineation conducted by PG Environmental in November 2021. However, focused vernal pool surveys have not been conducted, and San Diego fairy shrimp may inhabit shallow and relatively temporary vernal pools. There is a small chance that small vernal pools may occur in the ITP where there are suitable clay or poor draining soils. The nearest documented San Diego fairy shrimp was from 2008 in the Tijuana Slough National Wildlife Refuge, near Oneonta Slough, approximately 2.5 miles northwest of Smuggler's Gulch (SDMMP 2010); an additional undated occurrence was documented in the same area of the refuge (CDFW 2022).

There is no designated critical habitat for San Diego fairy shrimp in or near the Action Area.

4.2 Riverside Fairy Shrimp

4.2.1 Status and Critical Habitat

Riverside fairy shrimp was federally listed as endangered in 1993. Final critical habitat was designated for the species in Ventura, Orange, and San Diego counties in 2012 (USFWS 2012a).

4.2.2 Distribution

The Riverside fairy shrimp is a small, aquatic crustacean found in vernal pools, and other non-vegetated, short-lived, water bodies in southern California (USFWS 2008b). The historical range of the species included vernal pool complexes in Ventura, Riverside, Orange, San Diego, and Los Angeles counties, and northwestern Baja California, Mexico. However, because of development and habitat degradation, the species currently occupies roughly 40 vernal pool complexes across Ventura, Orange, Riverside, and San Diego counties (USFWS 2021b).

4.2.3 Life History

Riverside fairy shrimp are 0.52 to 0.92 inches long and males are distinguished from other species by a second pair of antennae (USFWS 2008b). Like most other fairy shrimp, this species feeds on algae, bacteria, protozoa, rotifers, and bits of detritus (Eng et al. 1990). Riverside fairy shrimp generally emerge between January and March, after seasonal rains fill vernal pools with water, as the cysts (dormant eggs) require seven to 12 days of inundation to hatch (USFWS 2021b, Hathaway and Simovich 1996). Within seven to 10 weeks of hatching (dependent on water temperature), adults reach sexual maturity and will start to reproduce (Hathaway and Simovich 1996). After a successful mating, the female will carry cysts in a brood sac, either dropping cysts to the bottom of the pool or keeping them in the brood sac until she dies and her

body sinks to the bottom of the pool (USFWS 2008b). Riverside fairy shrimp will remain active and alive until their pools dry completely, but cysts can remain viable long after the pools have dried (Hathaway and Simovich 1996, Simovich and Hathaway 1997, USFWS 2008b). As vernal pools refill with rain, some cysts present in the pool's footprint will hatch, with the unhatched continuing to remain viable and for subsequent hatching during re-hydrations (Simovich and Hathaway 1997). This leads to the development of cyst "banks," made up of cysts from multiple reproductive cycles and/or years; the development and longevity of these cyst banks is critical to the long-term viability of the species (Simovich 2005).

4.2.4 Habitat Associations

Riverside fairy shrimp require vernal pools with depths greater than 30 cm, with low solute concentrations, and individuals can withstand a wide range of water temperatures (Hathaway and Simovich 1996, USFWS 2008b). Riverside fairy shrimp rely on the longevity of deep vernal pools, requiring enough water to last through their long hatching, maturation, and breeding cycle (up to 10 weeks) (Simovich and Hathaway 1997). Due to the specificity of pool depth that the species rely on, Riverside fairy shrimp may occur in only one or two specific pools within a large complex of hundreds or even thousands of vernal pools (USFWS 2021b). Riverside fairy shrimp have been found in pools created or modified by human activities, including livestock ponds (USFWS 2021b).

4.2.5 Potential to Occur in the Action Area

Riverside fairy shrimp are not likely to occur in the Action Area. No pools with the requisite depth (i.e., greater than 30 cm) and duration (i.e., eight weeks minimum) for this species were observed in the Action Area during a 2021 wetland delineation by PG Environmental. The nearest documented Riverside fairy shrimp were found between 2002 and 2017 in the canyon complexes of Otay Mesa (Moody Canyon, Dillon Canyon, and Spring Canyon); this area is 2 miles east of the Action Area, past urban development and highways (CDFW 2022).

There is no designated critical habitat for Riverside fairy shrimp in or near the Action Area.

4.3 Quino Checkerspot Butterfly

4.3.1 Status and Critical Habitat

The Quino checkerspot butterfly (a subspecies of the common Edith's checkerspot butterfly [*Euphydryas editha*]) was federally listed as endangered in 1997. Critical habitat for the subspecies is designated in Riverside and San Diego counties (USFWS 2003b).

4.3.2 Distribution

The Quino checkerspot butterfly is a non-migratory butterfly that once occurred in a variety of vegetation types across coastal and interior southern California (USFWS 2003b). The Quino checkerspot butterfly's historical distribution stretched from the western slopes of the Santa Monica mountains across the Los Angeles plains and Transverse ranges to the edge of the upper Anza-Borrego Desert and continued south to El Rosario in Baja California Mexico (Mattoni et al. 1997). The species' current geographic distribution is limited to multiple disparate populations in southwestern Riverside and San Diego counties, and northern Baja California, Mexico (USFWS 2009a). The extant populations of Quino checkerspot butterfly rely on small patches of grassland,

juniper woodland, and open scrub and chapparal communities that support larval host plants and suitable adult nectar sources (Mattoni et al. 1997, USFWS 2003b).

4.3.3 Life History

The Quino checkerspot butterfly goes through four distinct life stages: egg, larva, pupa, and adult butterflies (USFWS 2003b). Typically, there is one generation of butterflies per year that emerge between January and May, dependent on the year's rainfall (Murphy and White 1984, Mattoni et al. 1997). After emergence, the adult female butterflies are typically mated within the first day (USFWS 2003b). Females usually only mate once (males produce a plug after copulation that prevents further mating) and lay one to two egg masses daily, for the next 10 to 14 days, until their death (USFWS 2003b). Females will lay several egg masses containing on average 20 to 150 eggs, for a total of 400 to 800 eggs (Mattoni et al. 1997, USFWS 2003b). The eggs hatch in seven to 14 days and the larval (caterpillar) stage is divided into five to seven instars (periods between molts) before the larvae may begin to undergo pupation (Mattoni et al. 1997, USFWS 2003b).

During the first and second instar, larvae cannot move more than a few centimeters (cm), limiting them to feed only on the primary host plant they were hatched on (USFWS 2009a). At this stage, larvae are usually found in large groups and will spin conspicuous webs (USFWS 2003b). During the third instar, larvae develop increased mobility and will disperse to new plants of the same species (primary host) or different species (secondary host) (Mattoni et al. 1997). During the third or fourth instar, when host plants become desiccated and inedible, larvae will enter an obligate diapause and will only emerge after fall and winter rains increase the forage quality of larval foodplants (Longcore et al. 2003, USFWS 2003b). Diapause is a lowered metabolic state which allows the larvae to conserve resources through the dry summer (Murphy and White 1984, USFWS 2003b, Mattoni et al. 1997). Upon emergence from diapause following the winter rains, larvae will typically undergo three to six more instars before pupating (totaling five to eight instars or larval molts before pupation) (Murphy and White 1984, USFWS 2003b). If food resources to sustain the larvae through pupation are lacking, the larvae may delay pupation an additional year by reentering an additional diapause (Longcore et al. 2003, USFWS 2003b). Pupae are often located under rocks, or on low plants near the ground, and pupation typically lasts 10 days before adults emerge (Mattoni et al. 1997).

Quino checkerspot butterflies are ectothermic and adults cannot readily fly in temperatures below 60 degrees Fahrenheit (°F) (USFWS 2003b). Both adults and larva require open areas with direct sunlight for basking and are often observed in barren spots among vegetation that maximize thermal radiation. These thermodynamic requirements, combined with the species' low meandering flight pattern (flying less than 2 meters [m] high to get around an object), prevent them from occupying dense or closed canopy habitats (Weiss et al. 1988, USFWS 2003b). Quino checkerspot butterflies, especially males, are often observed on hilltops and ridgelines. In these areas males will defend a small territory, chasing away other males, while the females will seek out this high ground in search of a mate (Mattoni et al. 1997, USFWS 2009a). Hill topping has been documented even in areas devoid of host plants, potentially acting as centers of the subspecies' population and potentially important for population survival (USFWS 2003b, USFWS 2009a).

Despite adaptations (e.g., entering diapause), drought and other climatic events are a major mortality factor for the Quino checkerspot butterfly leading to extirpation of local populations (USFWS 2003b, Mattoni et al. 1997). Quino checkerspot butterfly have multiple sets of populations that are demographically isolated from each other, but "interdependent over

ecological time" (Harrison 1988, Mattoni et al. 1997, USFWS 2003b). Isolated populations are thought to be caused by the fragmented habitat and dispersed host plants and amplified by the sedentary nature of the species (USFWS 2003b, USFWS 2009a). Isolated populations of Quino checkerspot butterflies frequently experience localized extirpations, and although individual dispersal is rare, infrequent mass dispersal events (often occurring in tandem with population explosions) can lead to widespread recolonization of suitable habitat patches (Mattoni et al. 1997, Murphy and White 1984, USFWS 2009a, Preston et al. 2012).

4.3.4 Habitat Associations

Quino checkerspot butterflies can be found in open areas within a variety of habitat types that contain the species primary host plants and nectar sources (Longcore et al. 2003, Mattoni et al. 1997). The most important primary host plant for the butterfly is the dwarf plantain (*Plantago erecta*) and the preferred host plant for oviposition and subsequent larval development (if dwarf plantain is not available other native plantain species will be used). Females will select plants that receive high levels of thermal radiation and will remain edible for at least four weeks to last through egg maturation and larval feeding (Singer 1994). Dwarf plantain is associated with fine textured clay soils and is found in forblands, grassland, coastal sage scrub, and open chaparral communities within southern California (USFWS 2003b). Two additional recently identified primary host plants include white snapdragon (*Antirrhinum coulterianum*) and Chinese houses (*Collinsia concolor*) (Pratt and Pierce 2008, USFWS 2003b, USFWS 2009a). White snapdragon and Chinese houses may be important for sustaining certain populations of the species. Adult nectar sources are almost exclusively small annual flowers that co-occur with the larval hostplants and whose flowering aligns with the emergence and fleeting lifespan of the adult butterflies (January to May). Common adult nectar sources include goldfields (*Lasthenia* spp), catseyes (*Cryptantha* spp.), gilias (*Gilia* spp.), ground pink (*Linanthus dianthiflora*), chia (*Salvia columbariae*), and annual trefoils (*Lotus* spp.) (Mattoni et al. 1997).

4.3.5 Potential to Occur in the Action Area

It is unlikely that Quino checkerspot butterfly occurs in the Action Area, as most of the Action Area contains either no habitat or marginally suitable habitat. However, host plants may occur in small numbers, or could become established, in small, fragmented areas within the ITP.

The Quino checkerspot butterfly's host plant, dwarf plantain, can grow in areas containing fine textured clay soil types. There are a few areas within the ITP having these conditions that may support sparse populations of dwarf plantain, particularly in the proposed staging area to the north of the ITP between Dairy Mart Road and Clearwater Way. While the proximity of this area to established populations of dwarf plantain could theoretically facilitate establishment of host plants in the future, it seems unlikely based on degraded site conditions (i.e., presence of ruderal weeds). The slopes of Smuggler's Gulch contain coastal sage scrub habitat; however, the scrub density and predominantly closed canopy likely preclude the presence of Quino checkerspot butterfly. Vegetated areas adjacent to Monument Road are generally developed (e.g., planted with ornamentals and other non-native vegetation) and unsuitable for Quino checkerspot butterfly host plants.

A total of eight adult Quino checkerspot butterflies were documented in the mesa slopes on the nearby Nelson Sloan Quarry property in 2019 and 2020; the host species dwarf plantain was documented extensively in that area as well (91 locations of one to 19 individuals; 76 locations of 20 to 99 individuals; 269 locations of 100 to 999 individuals; and 114 locations of greater than 1,000 individuals) (Dudek 2021). The Nelson Sloan Quarry is located between the Action Area at

Smuggler's Gulch and the ITP, approximately 0.8 miles east and 0.4 miles west, respectively. Despite the proximity of the ITP from the slopes of the Nelson Sloan Quarry, the documented amounts of dwarf plantain decrease substantially as the slopes flatten and eventually connect with Monument Road near the Action Area (Dudek 2021), which indicates there is less chance that the host plants are in the Action Area in substantial numbers. Furthermore, site conditions observed during Stillwater's reconnaissance-level surveys indicate that dwarf plantain is not likely to occur in large numbers in the Action Area.

There is no designated critical habitat for Quino checkerspot butterfly in or near the Action Area.

4.4 Light-footed Ridgway's Rail

4.4.1 Status and Critical Habitat

Light-footed Ridgway's rail (subspecies of the Ridgway's rail [*Rallus obsoletus*] and formerly known as the clapper rail) was federally listed as endangered in 1970. There is currently no proposed or designated critical habitat for the species.

4.4.2 Distribution

The light-footed Ridgway's rail is a year-round resident endemic to southern California and northern Baja California, Mexico. In the United States, this species is found in coastal marshes, lagoons, and maritime environs from Santa Barbara County south through San Diego County to the border with Mexico (USFWS 2009b). The largest populations of the species occur in San Diego, Orange, and Ventura counties with historic populations documented in Santa Barbara and Los Angeles counties (Zembal et al. 2018, USFWS 2009b). The Tijuana Slough historically has the second-largest breeding population of light-footed Ridgway's rails in the state, with 62 active breeding pairs observed in 2018 (Zembal et al. 2018). Adults show high site tenacity and little dispersal from year to year and there is little evidence for seasonal differences in range or numbers within an area (Zembal et al. 1989). Movements of the rails are typically confined to 1,400 feet within the marsh and home ranges may be from 0.8 to 4.1 acres and can include various tidal zones (Zembal et al. 1989). Unfortunately, 90 to 95 percent of the historical coastal wetlands in Southern California have been destroyed, degraded, or fragmented by urban development, reducing the species' suitable habitat and range (Unitt 2004).

4.4.3 Life History

The light-footed Ridgway's rail is a tawny and gray-brown, chicken-sized bird with a slightly downcurved beak and a short, upturned tail. The breeding season for light-footed Ridgway's rails is between March and August with peak nesting activity (i.e., egg laying) for the monogamous pair occurring in April to May. The pair bond between birds lasts throughout the breeding season and can often continue to the next (USFWS 2009b). The male will construct the majority of the relatively large (approximately 20-cm diameter) vegetative nest, woven into live or dry cordgrass (*Sporobolus* sp.) allowing the nest to shift with the tides without being dislodged or damaged (USFWS 2009b, Massey et al. 1984). Nests are typically constructed in the lower littoral zone of the saltwater marsh, around 4 to 18 inches off the ground and include one or two access ramps and occasionally a woven canopy to conceal the nest from above (USFWS 2009b, Massey et al. 1984). Breeding success is correlated with nesting habitat, with highest nest success when nests are placed in cordgrass within the low marsh (Massey et al 1984). When preferred nesting habitat is not available, light-footed Ridgway's rails have been observed nesting in the low marsh (using tidal debris and shorter stands of cordgrass as nesting cover) or in areas of higher ground

surrounded by low marsh (in patches of pickleweed [*Salicornia* sp.]); rails rarely nest in patches of high marsh adjacent to upland areas (Massey et al. 1984). While historically the species was thought to avoid nesting in freshwater habitats, rail nests have been documented in cattails (*Typha* spp.) and tules (*Schoenplectus* spp.) of freshwater areas (Massey et al. 1984, Zembal et al. 2018). The female lays four to eight eggs that the pair will incubate for 18 to 27 days. After hatching, the parents adapt the incubating nest into a "brood nest" serving as a night roost for the chicks; most pairs create one to three additional brood nests (USFWS 1985, Massey et al. 1984). Both parents care for the semiprecocial chicks, with one foraging while the other broods (USFWS 1985).

Nests in low marsh typically fail due to extensive tidal flooding or weather events, while nests in the higher marsh typically fail due to predation by racoons (*Procyon lotor*), opossums *(Didelphis marsupialis*), red (*Vulpes vulpes*) and gray (*Urocyon cinereoargentus*) foxes, rats (*Rattus* spp.), feral cats (*Felis catus*), feral dogs (*Canis familiaris*), striped skunks (*Mephitis mephitis*), and a variety of raptors (Massey et al. 1984, USFWS 2009b).

Light-footed Ridgway's rails are omnivorous and opportunistic foragers with a diet that consists of isopods (*Isopoda*), snails (*Gastropoda*), small crab species (*Brachyura*), crayfish (*Pacifastacus*) insects (e.g., beetles [*Coleoptera*]), spiders (*Aranea*), a variety of small fish (*Neopterygii*), and on occasion plant matter (USFWS 1985). Prey items may be taken by scavenging, probing, diving, and gleaning (USFWS 1985).

4.4.4 Habitat Associations

Light-footed Ridgway's rails need areas with both shallow mudflats for foraging and dense stands of cordgrass (or similar vegetation) for nesting and cover (USFWS 2009b, USFWS 1985). Light-footed Ridgway's rails will spend most of their lives in the dense cover of cordgrass including nesting, foraging, and dispersal (Zembal et al. 1989). Rails will regularly forage outside of the cordgrass belt in the high marsh, along tidal creeks and mudflats (at the vegetation interface), in freshwater vegetation, ditched or ponded water, and on occasion in upland areas (Zembal et al. 1989, USFWS 1985). The movements of light-footed Ridgway's rails are tidally dependent, foraging in shallow water and mudflats during low tides and in the high marsh during high tides. Rails seek refuge during high tide events in upper marsh vegetation, stands of freshwater vegetation, and upland habitat adjacent to wetlands (Zembal et al. 1989). The loss of quality foraging and nesting habitat is the greatest factor affecting the prolonged survival of the species (USFWS 2009b, Massey et al. 1984). Development and urban runoff from areas upstream continue to degrade suitable rail habitat with increased siltation. In 1985, the ocean inlet to the Tijuana Slough National Wildlife Refuge was closed, eliminating tidal influence and thus increasing siltation, as a result breeding light-footed Ridgway's rails were almost eliminated; however, the population has since rebounded (USFWS 2009b, Zembal et al. 1998, Zembal et al., 2018).

4.4.5 Potential to Occur in the Action Area

There is no suitable nesting or foraging marsh/mudflat habitat for light-footed Ridgway's rail in or near the Action Area (in the ITP parcel, along Monument Road, or in Smuggler's Gulch). Additionally, it is unlikely that the Tijuana River upstream of Dairy Mart Road (approximately 0.06 miles from the ITP) would be used for dispersal, as it is routinely managed to reduce or remove vegetation. Moreover, there is no connectivity to any suitable habitat further upstream, as the Tijuana River connects to the flood control/energy dissipation structure east of the ITP and then the channelized river in Mexico. The portion of the Tijuana River located in the Tijuana Slough National Wildlife Refuge contains suitable habitat for light-footed Ridgway's rails, where

there are documented occurrences approximately 2.5 miles from the portion of the Action Area within Smuggler's Gulch (CDFW 2022, eBird 2022). The nearest observation of a light-footed Ridgway's rail to the ITP is from 2009, approximately 1 mile north in the duck ponds near Dairy Mart Road (eBird 2022). The nearest observation of the rail to Smuggler's Gulch is from 2020, near Saturn Boulevard and the Tijuana River, west of Arroyo Cañon Matadero, over half a mile northwest of the Action Area (eBird 2022). Based on the species' habitat associations, site fidelity, and nearest occurrences, it is unlikely that the light-footed Ridgway's rail would occur in the main Action Area, but the species may be using habitats along the Tijuana River downstream of Dairy Mart Road Bridge.

4.5 Least Bell's Vireo

4.5.1 Status and Critical Habitat

Least Bell's vireo (subspecies of the Bell's vireo) was federally listed as endangered in 1986. Critical habitat for the species was designated on February 2, 1994 in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties (USFWS 1992). The critical habitat designation for least Bell's vireo encompasses a total of approximately 38,000 acres at 10 localities through six counties in southern California.

There is designated critical habitat for the least Bell's vireo in the Tijuana River Basin, approximately 730 feet north of the main Action Area (which includes the Tijuana River downstream of Dairy Mart Road Bridge), outside of the construction area. The physical and biological features identified as supporting feeding, nesting, roosting, and sheltering that are essential to the conservation of the least Bell's vireo are described as: "riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upload habitats. Vireos meet their survival and reproductive needs (food, cover, nest sites, and nestling and fledgling protection) within the riparian zone in most areas. In some areas they also forage in adjacent upland habitats."

4.5.2 Distribution

The least Bell's vireo is a neotropical migrant endemic to California and Baja California, Mexico. This species is concentrated in the coastal lowlands containing suitable riparian woodland habitat from Santa Barbara County south to San Diego County. Historically, this species was distributed throughout the Central Valley and other low elevation riverine systems in California and Baja California, Mexico (Franzreb 1989). While it is thought that this species is extirpated from the northern portions of its historical range, some populations have been documented returning to the Central Valley (Kus 2002a, Howell et al. 2010). The most robust populations of vireos in California are currently found along the Santa Margarita River, creeks in Camp Pendleton, San Luis Rey River, and Windmill and Pilgrim creeks (Unitt 2004). Additional populations are scattered around the coastal lowlands of southern California, including an established population in the Tijuana River Valley (approximately 300 breeding pairs in 2004 and 109 pairs in 2017 [CA DPR et al. 2010, Howell and Kus 2018]).

4.5.3 Life History

Least Bell's vireo is a small songbird that is a summer resident in California. In March, this species migrates into California with peak breeding activity (i.e., egg laying) between April and July. Least Bell's vireos have been documented to return to the same breeding sites year after year and throughout generations (Greaves 1989). In late September/early October, vireos will

start their winter migration to southern Baja California, Mexico (Howell and Kus 2018, Zeiner et al. 1990). The path of migration and any stops along the way remain a mystery, with limited sightings of migrating individuals; as such, there is potential that this species flies non-stop to overwintering sites in Baja California (Unitt 2004, Kus et al. 2020).

A monogamous least Bell's vireo pair will build an open baglike or basketlike nest suspended from a small lateral or terminal fork on a low-hanging branch (on average 1 m above the ground) in dense shrubs, small trees, and occasionally herbaceous vegetation (Kus et al. 2020). In San Diego, vireos have a strong preference to nest in willows, including arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), black willow (*Salix nigra*), sandbar willow (*Salix exigua*), and mule fat (seep willow) (*Baccharis salicifolia*). Vireos will also nest in Mexican elderberry (*Sambucus mexicana*), California rose (*Rosa californica*), poison oak (*Rhus diversiloba*), Fremont's cottonwood (*Populus fremontii*), and on occasion exotic hosts, including giant reed (*Arundo donax*) (Kus et al. 2020). In southern California, vireo nest sites are frequently in stands that are between five and 10 years old; in more mature riparian woodlands the nest will usually be placed in the robust understory (Franzreb 1989). Nests are commonly located near the edge of the thicket, allowing easier approach for the pair, however this has the disadvantage of being more easily discovered by predators (Franzreb 1989). If the eggs or young are predated or the nest is damaged, vireos will re-nest within a few days, with up to seven re-nesting attempts in a season (Budnik et al 2000, Kus 2002b). Incubation is done by both parents and generally takes about 14 days until the young hatch. The altricial young are cared for by both parents and fledge in about 10 to 12 days after hatching but may remain in the area for as long as 40 days (Franzreb 1989, Kus et al. 2020).

Breeding success has been impacted by nest brood parasitism of the brown-headed cowbird (Zeiner et al. 1990). Brown-headed cowbirds (*Molothrus ater*) will lay their larger eggs in least Bell's vireo's nests, usually hatching first, with a competitive advantage over the vireo's young. In addition to nest parasitism, vireo's low-to-the-ground nests can be predated by raccoons, Virginia opossums (*Didelphis virginiana*), coyotes (*Canis latrans*), long-tailed weasels (*Mustela frenata*), dusky-footed woodrats (*Neotoma fuscipes*), deer mice (*Peromyscus maniculatus*), house mice (*Mus musculus*), rats (*Rattus rattus*), domestic cats, and gopher snakes (*Pituophis melanoleucus*) (Franzreb 1989, Kus et al. 2020).

A least Bell's vireo's diet consists primarily of insects (e.g., caterpillars [*Lepidoptera*], stinkbugs [*Pentatomidae*], bees and wasps [*Hymenoptera*], weevils [*Rhynchophora*]), and some vegetable matter. Insects are either gleaned from substrate, plucked from substrate while hovering, or sporadically hawked during areal pursuit (Kus et al. 2020).

4.5.4 Habitat Associations

Least Bell's vireos primarily occupy riparian habitats along open water, or dry parts of intermittent streams, generally below 460 m (1,500 feet) in elevation (Kus 2002a). They are commonly associated with the following vegetation types: southern willow scrub, cottonwood forest, mulefat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, wild blackberry, wild rose, and mesquite in desert localities (Franzreb 1989, Kus 2002a, Kus et al. 2020). Most vireo territories contain both dense vegetative cover within 1 to 2 m (3 to 7 feet) off the ground (preferred for nesting), and dense, stratified, overstory canopy (preferred for foraging) (Goldwasser 1981, USFWS 1998b). Least Bell's vireos have been observed to maintain territories that also include upland habitats adjacent to riparian areas, such as coastal sage scrub and grasslands (Franzreb 1989, USFWS 1998b). Individuals have also been

documented to use upland habitats for foraging and for nesting when early spring floods inundate riparian areas (Kus and Miner 1989, USFWS 1998b).

Nesting, hatching, and fledgling success is generally higher in areas surrounded by coastal sage scrub and grasslands but lower in areas surrounded by substantially degraded habitats (i.e., urban areas or housing developments, agriculture, golf courses, campgrounds, and/or sand mines) (Franzreb 1989). Further impacting suitable habitat for the least Bell's vireo was the introduction of the Kuroshio shot hole borer beetle (*Euwallacea kuroshio*), which thrives in riparian habitats, increasing fungal infection and death of suitable nesting willows. The Tijuana River has been one of the most affected areas where the Kuroshio shot hole borer beetle has been detected; a dense willow-dominated woodland (that supported a vireo population) was reduced to a stand of dead trees in one to two years (Howell and Kus 2018).

4.5.5 Potential to Occur in the Action Area

Smuggler's Gulch is the only portion of the Action Area with suitable habitat for least Bell's vireo; this species is unlikely to occur in the ITP. Smuggler's Gulch contains relatively small amounts of riparian habitat suitable for nesting and foraging (approximately one acre). This riparian area is surrounded by coastal sage scrub, providing additional areas for foraging and productive habitat (i.e., surrounding habitat that has been observed to increase nesting success of vireos [Franzreb 1989]) for nesting individuals. During the April 2021 reconnaissance survey (Section 3.1.2), one least Bell's vireo was observed singing from the top of a small tree in the riparian area of Smuggler's Gulch. Multiple observations of the species in Smuggler's Gulch have been documented, including five single males and two breeding pairs in 2004 (CDFW 2022), multiple individuals and pairs in 2021 (eBird 2022), and multiple undated observations (Dudek 2015). Furthermore, multiple nesting territories were documented in a patch of riparian habitat near Arroyo Cañon Matadero, approximately 755 feet (230 m) north of Smugglers Gulch and Monument Road during surveys in 2017 (Howell and Kus 2018).

The portions of the Action Area in the ITP land parcel and along Monument Road do not contain any suitable least Bell's vireo habitat (nesting, cover, or foraging). The lack of habitat and daily operational activities associated with the ITP make it unlikely for the species to disperse through the area. Nearby, the Tijuana River upstream of Dairy Mart Road is routinely managed to remove or reduce vegetation; as such, it lacks the successional riparian habitat for least Bell's vireo nesting.

The Tijuana River adjacent to—and on either side of—Dairy Mart Road bridge (upstream and downstream) contains fragmented riparian habitat with a substantial invasion of giant reed, which is less suitable for nesting vireos. This location near the Action Area does, however, contain marginally suitable foraging habitat, as individuals have been documented in the area in 2021 (eBird 2022). The Tijuana River further downstream from the Action Area has a considerable amount of riparian habitat suitable for nesting vireos. This downstream riparian habitat has documented occurrences of nesting vireos dating back to 1992 and is still currently used by the highly site-tenacious species (Howell and Kus 2018, Unitt 2004).

4.6 Coastal California Gnatcatcher

4.6.1 Status and Critical Habitat

Coastal California gnatcatcher (subspecies of the California gnatcatcher) was federally listed as threatened in 1993. Critical habitat for the species is designated in San Diego, Orange, Riverside, San Bernardino, Los Angeles, and Ventura counties (USFWS 2007b).

4.6.2 Distribution

The coastal California gnatcatcher is a permanent resident endemic to coastal southern California and northern Baja California, Mexico, and commonly at elevations up to 250 m (820 feet) and on occasion up to 500 m (about 1,640 feet) (Atwood and Bolsinger 1992). The largest populations of gnatcatchers in California are found in San Diego, Orange, and Riverside counties, with smaller populations in Los Angeles, San Bernadino, and Ventura counties (Atwood 1992). Gnatcatchers tend to remain in the same home range from year to year and disperse only as far as necessary to find unoccupied territories within suitable habitat patches (Atwood and Bontrager 2020; Braden 1999). Density of shrub cover, composition of plants, habitat quality, surrounding disturbances, and adjacent gnatcatcher territories dictate the size of a gnatcatcher territory (Kucera 1997), ranging between 2 to 14 acres (USFWS 2010a). Home ranges can expand in the non-breeding season and can include the use of adjacent vegetation communities (Atwood and Bontrager 2020). Unfortunately, around 90 percent of the coastal habitat found in California suitable for gnatcatchers has been degraded, fragmented, or lost due to urban development, limiting the species' current and/or available range (Atwood 1992).

4.6.3 Life History

The coastal California gnatcatcher is a very small, long tailed, non-migratory songbird. The breeding season for this species is mid-February through mid-August, with peak nesting occurring from mid-March through mid-May.

Nest building by the pair begins as early as mid-February, with most pairs initiating their nest construction in mid-March (Atwood and Bontrager 2020). Nests are usually placed in a branch fork of California sagebrush (*Artemisia californica*) or on occasion in California buckwheat, black sage (*Salvia mellifera*), or California sunflower (*Encelia californica*) (Bontrager et al. 1995). While nests have been observed in invasive artichoke thistle (*Cynara cardunculus*), all the nests ended up failing (from abandonment or nest collapse) (Atwood and Bontrager 2020). Once a nest site is selected (usually by the male), the pair will start building a small, deep, cone shaped nest out of hemp-like vegetable fibers, curled white sage leaves (*Salvia apiana*), spider webs, plant-down, and feathers (Atwood and Bontrager 2020). The nest location is on average 82 cm above the ground, 16 cm from the nearest outside edge of the shrub, and usually on slopes less than 40 percent (Grishaver et al. 1998, Mock and Bolger 1992). Incubation is done by the pair for about 14 days. Young fledge the nest about 15 to 16 days after hatching but may associate with their parents for several months afterward (ERCE 1990 as cited in USFWS 1997b).

Breeding success of the gnatcatcher has been impacted by nest brood parasitism of the brown-headed cowbirds, leading to increased nest abandonment and lower nest success (Braden et al. 1997). Nest predation is a greater source of nest failure for the species; gnatcatcher's low to the ground nests are predated by raccoons, Virginia opossums, coyotes, gray foxes, long-tailed weasels, California ground squirrels (*Spermophilius beecheyi*), deer mice, roadrunners (*Geococcyx californianus*), California scrub jays (*Aphelocoma californica*), Bewick's wrens

(*Thryomanes bewickii*), gopher snakes, California whipsnake (*Masticophis lateralis*), and California kingsnakes (*Lampropeltis californiae*) (Braden et al. 1997, Grishaver et al. 1998).

The coastal California gnatcatcher's diet consists of arthropods, mainly spiders and beetles (Burger et al. 1999). Gnatcatchers will glean prey from foliage while quickly moving through branches and shrubs, on occasion they will hover-glean for orb-weaving spiders (*Araneus* spp.) from their webs and cochineal scale insects (*Dactylopius coccus*) that are attached to cacti. In San Diego County, gnatcatchers will commonly forage in California sagebrush, California buckwheat, laurel sumac (*Malosma laurina*), and other plant species that are found in their territories (Mock and Bolger 1992).

4.6.4 Habitat Associations

Coastal California gnatcatcher is considered an exclusive resident of coastal sage scrub-dominated plant communities and is obligated to breed within this habitat type (Atwood 1992). Suitable coastal sage scrub typically includes California sagebrush, California buckwheat, bush sunflower, brittlebush (*E. farinosa*), and various species of *Salvia* (Atwood and Bontrager 2020). However, this species has been observed using other habitats, including riparian, chaparral, grassland, and several non-coastal sage scrub plant species, such as Mexican elderberry (*Sambucus mexicanus*), willows (*Salix* spp.), coyote brush (*Baccharis pilularis*), and mulefat (*Baccharis salicifolia*) (Campbell et al. 1998, Kucera 1997). Non-coastal sage scrub habitat was commonly used by gnatcatchers for foraging or short distance dispersal, but a few nest territories were observed in or overlapping the habitat (Campbell et al. 1998). Coastal California gnatcatcher selects nesting habitat with a shrub canopy cover of 50 percent or greater at a height of approximately 3.3 feet. Nest success, fledgling survival, and adult survival are positively correlated with robust vertical and horizontal perennial structure, and suitable nest patches can be significantly different among pairs (Braden 1999).

4.6.5 Potential to Occur in the Action Area

In the Action Area, coastal California gnatcatchers likely use available habitat in Smuggler's Gulch, may use suboptimal areas along Monument Road, and do not likely occur in the ITP.

The slopes of Smuggler's Gulch are dominated by coastal sage scrub habitat, suitable for coastal California gnatcatcher nesting and foraging. Smuggler's Gulch also contains a relatively small patch of riparian habitat that gnatcatchers may occasionally use for foraging or dispersal. Coastal California gnatcatchers have been documented in Smuggler's Gulch in 2016, 2017, 2019, and 2021 (CDFW 2022, eBird 2022), along with multiple undated observations from Dudek (2015).

Vegetation along Monument Road is not likely suitable for gnatcatcher nesting; however, it could be used occasionally by dispersing or foraging gnatcatchers from territories in nearby slopes with coastal sage scrub habitat. Gnatcatchers have been observed near Monument Road at the Tijuana River Valley Regional Park Ranger Station and along the unmarked paved access road to the border wall, west of the Ranger Station, in 2021 and 2022 (eBird 2022).

The ITP land parcel does not contain suitable gnatcatcher habitat for nesting, cover, or foraging, nor is there any suitable habitat adjacent to these areas. The Tijuana River upstream and downstream of Dairy Mart Road, adjacent to the ITP, does not contain suitable coastal sage scrub habitat for nesting gnatcatchers. Occasional observations have been noted near the sod farms and duck ponds on the northern end of the Dairy Mart Road and river overpass, approximately 0.5 miles from the Action Area (eBird 2022). The nearest suitable nesting and foraging habitat for the

gnatcatchers is approximately 0.4 miles to the west of the ITP in the slopes leading to the Nelson Sloan Quarry. The daily operational activities associated with the ITP make it unlikely for the species to disperse through the ITP from suitable habitat outside the Action Area (e.g., the slopes near the Nelson Sloan Quarry).

There is no designated critical habitat for the coastal California gnatcatcher in or near the Action Area.

4.7 Plants

4.7.1 San Diego Thorn-mint

San Diego thorn-mint is an annual herb in the Lamiaceae family that is federally listed as threatened. Critical habitat was designated for the species in Orange and San Diego counties in 2003 and updated in 2007 (USFWS 2003a, USFWS 2007a). It occurs on clay soils on gentle slopes in areas characterized by a low density of forbs and geophytes, and a low density or absence of shrubs (USFWS 2009c) in chaparral, coastal scrub, and valley and foothill grassland habitats at elevations ranging from 10 to 960 m (30 to 3,150 feet), and blooms from April through June (CNPS 2022). It is primarily threatened by urbanization and development (road construction, vehicles, grazing, trampling, foot traffic, recreational activities), as well as erosion and non-native plants (CNPS 2022).

There is a moderate likelihood of San Diego thorn-mint occurring within the Action Area, as there is coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is approximately 3.4 miles northeast of the Action Area near Dennery Canyon (CDFW 2022).

There is no designated critical habitat for San Diego thorn-mint in or near the Action Area.

4.7.2 San Diego Ambrosia

San Diego ambrosia is a perennial rhizomatous herb in the Asteraceae family that is federally listed as endangered. Critical habitat was designated for the species in Riverside and San Diego counties in 2010 (USFWS 2010d). It is primarily found on upper terraces of rivers and drainages (USFWS 2010b), on sandy loam or clay, sometimes alkaline soils in disturbed areas of chaparral, coastal scrub, valley and foothill grasslands, and vernal pools in elevations ranging from 20 to 415 m (65 to 1,360 feet) (CNPS 2022), and blooms from April through October (USFWS 2010b). It is threatened by development, non-native plants, vehicles, road maintenance, and foot traffic (CNPS 2022).

There is a moderate likelihood of San Diego ambrosia occurring within the Action Area, as there is disturbed coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is approximately 1.8 miles northeast of the Action Area in San Ysidro (CDFW 2022).

There is no designated critical habitat for San Diego ambrosia in or near the Action Area.

4.7.3 Thread-leaved Brodiaea

Thread-leaved brodiaea is a perennial bulbiferous herb in the Themidaceae family that is federally listed as endangered. Critical habitat was designated for the species in Orange, Riverside, San Bernardino, and San Diego counties in 2011 (USFWS 2011b). It occurs in

openings in chaparral; cismontane woodland, coastal scrub, playas, valley and foothill grassland, and vernal pools in elevations ranging from 25 to 1,120 m (80 to 3,675 feet), and blooms from March through June (CNPS 2022). The most significant threat to thread-leaved brodiaea is loss of habitat from urbanization and agricultural conversion (USFWS 2009d), including residential development, foot traffic, grazing, illegal dumping, non-native plants, and vehicles. It is potentially threatened by road construction and fuel break maintenance (CNPS 2022).

There is a moderate likelihood of thread-leaved brodiaea occurring within the Action Area, as there is coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is 29.1 miles north of the Action Area near Black Mountain Open Space Park (CDFW 2022).

There is no designated critical habitat for thread-leaved brodiaea in or near the Action Area.

4.7.4 Orcutt's Spineflower

Orcutt's spineflower is an annual herb in the Polygonaceae family that is federally listed as endangered. No critical habitat has been designated for this species (USFWS 2022). It occurs in sandy openings in closed-cone coniferous forest, maritime chaparral, and coastal scrub at elevations ranging from 5 to 410 m (15 to 1,345 feet), and blooms from March through May (CNPS 2022). It is primarily restricted to weathered sandstone bluffs or loose sandy soils in habitats broadly described as coastal or southern maritime chaparral. Orcutt's spineflower is primarily threatened by habitat loss and degradation. Urbanization and development have narrowed the species' natural range and invasive plant encroachment, erosion, and lack of a natural or managed alternative fire regimes have contributed to the alteration and degradation of existing habitats (USFWS 2014).

There is a moderate likelihood of Orcutt's spineflower occurring within the Action Area, as there is coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is 13.5 miles north of the Action Area in Point Loma (CDFW 2022).

There is no designated critical habitat for Orcutt's spineflower in or near the Action Area.

4.7.5 Otay Tarplant

Otay tarplant is an annual herb in the Asteraceae family that is federally listed as threatened. Critical habitat was designated for the species in San Diego County in 2003 (USFWS 2002). It occurs on clay soils in coastal scrub, valley and foothill grasslands in elevations ranging from 25 to 300 m (80 to 985 feet), and blooms from April through June. It is threatened by development, agriculture, vehicles, illegal dumping, foot traffic, non-native plants, habitat disturbance, and Border Patrol activities. Possibly threatened by landfill construction (CNPS 2022).

There is a moderate likelihood of Otay tarplant occurring within the Action Area, as there is coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is 1.7 miles northeast of the Action Area in San Ysidro (CDFW 2022).

There is designated critical habitat for Otay tarplant in the Tijuana River Basin approximately 3.5 miles northeast of, and outside of, the Action Area (Ocean View Hills).

4.7.6 San Diego Button-Celery

San Diego button-celery is an annual/perennial herb in the Apiaceae family that is federally listed as endangered. Critical habitat was designated for the species in Riverside, Orange, and San Diego counties in 1998 (USFWS 1998a). It occurs on mesic soils in coastal scrub, valley and foothill grasslands, and vernal pools in elevations ranging from 20 to 620 m (65 to 2,035 feet), and blooms from April through June. It is threatened by agriculture, urbanization, road maintenance, grazing, vehicles, illegal dumping, non-native plants, and foot traffic (CNPS 2022).

There is a moderate likelihood of San-Diego button-celery occurring within the Action Area, as there is coastal scrub habitat within the Action Area, but it is highly degraded. The closest known population is 2.2 miles east of the Action Area in Pacific Gateway Park (CDFW 2022).

There is no designated critical habitat for San Diego button-celery in or near the Action Area.

4.7.7 Willowy Monardella

Willowy monardella is a perennial herb in the Lamiaceae family that is federally listed as endangered. Critical habitat was designated for the species in San Diego County in 2006 (USFWS 2006). It occurs in alluvial ephemeral washes of chaparral, coastal scrub, riparian forest, riparian scrub, and riparian woodlands at elevations ranging from 160 to 740 m (525 to 2,500 feet), and blooms from June through August (CNPS 2022). It is a geographically narrow endemic species restricted to three watersheds north of Kearny Mesa. Threats affecting willowy monardella populations include urbanization and development, alteration of hydrology, type conversion and habitat degradation due to frequent large fires, and impacts from non-native plant species (USFWS 2012b, CNPS 2022).

There is a moderate likelihood of willowy monardella occurring within the Action Area, as there is suitable habitat within the Action Area, but it is highly degraded. The closest known population is 12.5 miles north of the Action Area near Golden Hill Park (CDFW 2022).

There is no designated critical habitat for willowy monardella in or near the Action Area.

4.7.8 Spreading Navarretia

Spreading navarretia is an annual herb in the Polemoniaceae family that is federally threatened. Critical habitat was designated for the species in Los Angeles, Riverside, and San Diego counties in 2005 and updated in 2010 (USFWS 2010). It occurs in chenopod scrub, shallow freshwater marshes and swamps, and playa and vernal pool habitat in southern California and Baja California (CNPS 2022). It may also occur in man-made depressions and ditches that are often associated with degraded vernal pool habitat. These seasonal depression wetlands possess the same hydrological dynamics as natural vernal pools and playas because they experience ephemeral inundation cycles that most vernal pool species depend on (USFWS 2009e). It can be found at elevations ranging from 30 to 1,300 m (100 to 4,265 feet) and blooms from April through June (USFWS 2009e; CNPS 2022). The most pressing threat to spreading navarretia populations is degradation and destruction of these vernal pools including urbanization, direct habitat loss to development, agricultural conversion, discing (e.g., weed abatement, fire suppression, and agriculture), manure dumping, alteration of hydrology (including urban runoff and watercourse channelization), transportation and flood control projects, grading, pipeline projects, and off-highway vehicles (USFWS 2009e).

Preliminary investigations have concluded that there is a low chance that vernal pools are present within the Action Area (Section 3.3). Therefore, there is a low likelihood of spreading navarretia occurring within the Action Area. The closest known population is 1.75 miles northeast of the Action Area (CDFW 2022).

There is designated critical habitat for spreading navarretia in the Tijuana River Basin, approximately 1.75 miles east of, and outside of, the Action Area (Otay Mesa hills).

4.7.9 California Orcutt Grass

California Orcutt grass is an annual grass in the Poaceae family that is federally endangered. Critical habitat was designated for the species in Los Angeles, Ventura, Riverside, and San Diego counties in 1998 (USFWS 1998a). It is restricted to deep ephemeral vernal pools underlain by clay soils at elevations ranging from 15 to 660 m (50 to 2,165 feet) in southern California and a few occurrences in northern Baja California, Mexico. It blooms from April through August (CNPS 2022). California Orcutt grass is associated with other federally listed taxa that depend on vernal pool habitats, including San Diego button celery, San Diego mesa mint, Otay mesa mint, spreading navarretia, San Diego fairy shrimp, and Riverside fairy shrimp (USFWS 2011a). Like other federally listed vernal pool species, the main threat to California Orcutt grass is loss and degradation of its vernal pool habitat due to urban and agricultural development, grazing, altered hydrology, off-road vehicle use, trampling, grazing, and non-native plants.

Preliminary investigations have concluded that there is a low chance that vernal pools are present within the Action Area (Section 3.3). Therefore, there is a low likelihood of California Orcutt grass occurring within the Action Area. California Orcutt grass is currently extant in Ventura, Los Angeles, Riverside, and San Diego counties from only 28 occurrences (USFWS 2011a). The closest population to the Acton Area is 2 miles east of the Action Area (CDFW 2022).

There is no designated critical habitat for California Orcutt grass in or near the Action Area.

4.7.10 San Diego Mesa Mint

San Diego mesa mint is an annual herb in the Lamiaceae family that is federally endangered. Critical habitat was designated for the species in San Diego County in 1998 (USFWS 1998a). It is restricted to vernal pools in San Diego County where it blooms from April through June at elevations ranging from 90 to 200 m (295 to 655 feet) (CNPS 2022). They are found on coastal terrace vernal pools occurring on gravelly loams called Redding soil; often growing alongside San Diego button-celery and San Diego fairy shrimp. Urbanization (vehicle use, dumping, road maintenance, and possibly non-native plants) of these mesas is the leading threat to San Diego mesa mint populations (USFWS 2009f).

Preliminary investigations have concluded that there is a low chance that vernal pools are present within the Action Area (Section 3.3). Therefore, there is a low likelihood of San Diego mesa mint occurring within the Action Area. The closest population to the Acton Area is about 13 miles north of the Action Area near Balboa Park (CDFW 2022).

There is no designated critical habitat for San Diego mesa mint in or near the Action Area.

4.7.11 Otay Mesa Mint

Otay mesa mint is an annual herb in the Lamiaceae family that is federally endangered. Critical habitat was designated for the species in San Diego County in 1998 (USFWS 1998a). It is restricted to vernal pools on Otay Mesa in southern San Diego County at elevations ranging from 90 to 250 m (295 to 820 feet) and blooms from May through July. Historically, Otay mesa mint had a wider distribution throughout San Diego County but is now known from only three locations on Otay Mesa. Its reproduction and seed germination is highly dependent on the inundation and drying cycles of the vernal pools in which it occurs (USFWS 2010c). Suitable habitat for Otay mesa mint on Otay Mesa is highly threatened by urbanization, agricultural conversion, grazing, off-road vehicle use, trampling, invasion from non-native plants, alteration of the watershed, trash dumping, and drought (CNPS 2022).

Preliminary investigations have concluded that there is a low chance that vernal pools are present within the Action Area (Section 3.3). Therefore, there is a low likelihood of Otay mesa mint occurring within the Action Area. The closest known population is 2 miles northeast of the Action Area (CDFW 2022).

There is no designated critical habitat for Otay mesa mint in or near the Action Area.

5 EFFECTS OF THE PROPOSED ACTION

5.1 Potential Indirect Downstream Effects on Riparian Habitat

This analysis is included to facilitate the evaluation of potential effects on downstream critical habitat for least Bell's vireo (Section 5.3). Implementation of the Core Projects—specifically, Projects C (Tijuana Sewer Repairs) and D (APTP Phase 1), whether performed independently or in combination—would decrease the frequency of dry-weather transboundary river flows and the associated pollutant loadings to the Tijuana River in the U.S. This discussion explores if this reduction in Tijuana River flows may correspondingly reduce the availability of riparian habitat over time (e.g., by potentially lowering groundwater which may stress the riparian vegetation and degrade the overall riparian quality) to a degree that would adversely modify least Bell's vireo critical habitat. This may also indirectly affect federally listed plants, described in Section 5.3.

Table 5-1 summarizes the estimated effects that Alternative 1 would have on transboundary flows and pollutant loadings in the Tijuana River.

Table 5-1. Impacts on Transboundary Flows in the Tijuana River – Alternative 1.

Projects [a]	Flow days		Flow volume		BOD_5 load	
	Days/yr	Percent change	Billion gal/yr	Percent change	Tons/yr	Percent change
Current conditions [b]	153	N/A	17.5	N/A	1,670	N/A
Project C only [c]	79	-48%	16.9	-3%	660	-60%
Project D only [d]	73	-52%	16.7	-5%	1,210	-28%
Alternative 1 maximum (Projects C + D)	68	-56%	16.5	-6%	562	-66%

[a] Projects A and B would result in negligible or no changes to transboundary river flows.
[b] Current conditions were calculated using Tijuana River flow data from January 2016 through January 2022, during a period when PB-CILA capacity was 23 MGD. This analysis assumes that future baseline transboundary river flow conditions will be similar to those represented in this historical period of flow data and estimates the projects' effectiveness at reducing transboundary flows under these future baseline conditions.
[c] Assumes Project C reduces untreated wastewater in the Tijuana River in Mexico down to 5 MGD. Reflects PB-CILA reliably diverting flows up to 23 MGD. Impact of Project C on transboundary river flows would be less if PB-CILA is capable of reliably diverting more than 23 MGD with the recent (2021–22) upgrades.
[d] Reflects PB-CILA, with new/rehabilitated conveyance line, reliably diverting flows up to 35 MGD (bypassing PB-1A).

Implementation of Projects C and D would decrease the cumulative volume of transboundary river flows by up to approximately 1.00 billion gallons per year (3,070 acre-feet/year), which equates to a 6 percent reduction in annual flow. EPA and USIBWC conducted an additional analysis to illustrate the potential impacts of the Core Projects on transboundary river flows during different portions of the rainfall season. The analysis used historical stream gage data from the 2016 through 2019 rainfall years (i.e., May 1, 2016, through April 30, 2020)[8] to represent future baseline transboundary river flow conditions and estimated the projects' effectiveness at reducing transboundary flows under these future baseline conditions. The following assumptions were made to define seasons, rainfall year, and dry weather for the analysis:

- The *wet season* is defined as October 1 through the following March 31.
- The *dry season* is defined as May 22 through September 7 (to approximate Memorial Day and Labor Day, respectfully).
- The full *rainfall year* is defined as May 1 through the following April 30.
- *Dry-weather days* are defined as the periods occurring at least five days after the most recent precipitation registered at San Diego International Airport and during which the river flow rate does not exceed 23 MGD (as higher flow rates are potentially indicative of stormwater in the river, potentially due to precipitation elsewhere in the watershed). Flows on dry-weather days can occur at any time of the year when the river diversion and pumping system is not functioning as designed.

The results of this analysis are presented in Table 5-2. Additionally, EPA and USIBWC created a series of charts that 1) depict historical transboundary river flows from the 2000 through 2020 rainfall years, categorized by season and dry weather conditions, and 2) illustrate the portion of those transboundary flows that could have been prevented if the Core Projects were retroactively

[8] This analysis, and the analysis presented in Table 5-1, are based on different ranges of historical stream gage data. The two analyses therefore result in different characterizations of current conditions (which also represent assumed future baseline conditions) and slightly different estimates of the Core Projects' potential impacts on those future baseline conditions (e.g., 6 percent vs. 4 percent reduction in total annual flow volume).

implemented (this is applied only to the more recent 2016 through 2020 rainfall years). These charts, which are presented in Figure 5-1, Figure 5-2, and Figure 5-3, help to illustrate how the frequency and volume of future transboundary river flows (following implementation of the Core Projects) would be expected to compare to historical transboundary flows during different portions of the rainfall season.

During the dry season, implementation of the Core Projects would eliminate transboundary river flows other than the occasional wet-weather flow that exceeds 35 MGD. By preventing dry-season flows that have become more frequent since the 2017 rainfall year, implementation of the Core Projects would be expected to result in future dry-season flow conditions that more closely resemble historical conditions since 2000 as depicted in Figure 5-1 and Figure 5-2. During most of this 21-year period, a typical dry season has featured fewer than 10 days with river flows (i.e., less than 10 percent of dry-season days have flows) and less than 100 MG of total flow over the course of the season.

During the wet season, implementation of the Core Projects would allow for the diversion of dry-weather flows and very small wet-weather flows of up to 35 MGD. This would be expected to reduce wet-season transboundary river flow days by approximately 32 percent (37 fewer days of wet-season flows, on average). However, this change equates to only a 3 percent reduction in total wet-season flow volume because it would not affect wet-weather flows that exceed 35 MGD, which contribute the significant majority of annual flows in the Tijuana River. The reduced wet-season flows following implementation of the Core Projects would be expected to be generally consistent, in terms of frequency and volume, with historical conditions since 2000 as depicted in Figure 5-1 and Figure 5-2. Because of the shutoff protocols for the PB-CILA river diversion under Project D, implementation of the Core Projects would not mitigate impacts to the river or estuary resulting from extreme weather events.

During a typical rainfall year, implementation of the Core Projects would reduce transboundary river flow days by approximately 46 percent (80 fewer days of flows, on average), equating to a 4 percent reduction in total annual flow volume. The reduced flows following implementation of the Core Projects would be expected to be generally consistent, in terms of frequency and volume, with historical conditions since 2000 as depicted in Figure 5-1 and Figure 5-2.

As shown in Table 5-2 and Figure 5-3, implementation of the Core Projects would be expected to eliminate dry-weather transboundary flows (approximately 43 days per year, on average) and the associated pollutant loadings in the Tijuana River.

Table 5-2. Impacts on Transboundary Flows in the Tijuana River, by Portion of Rainfall Year (Annual Averages, Based on Data for 2016 through 2019 Rainfall Years) – Alternative 1.

Portion of Rainfall Year	Flow Days			Flow Volume (MG)		
	Current Conditions [a]	Alternative 1 Maximum (Projects C + D) [b, c, d]	Percent Change	Current Conditions [a]	Alternative 1 Maximum (Projects C + D) [b, c, d]	Percent Change
Full rainfall year	171	91	-46%	20,848	20,033	-4%
Wet season only	118	81	-32%	17,643	17,072	-3%
Dry season only	17	0.5	-97%	99	24	-76%
"Dry weather" conditions only [e]	43	0	-100%	167	0	-100%

[a] Calculations are based on Tijuana River stream gage data from the 2016 through 2019 rainfall years (i.e., May 1, 2016, through April 30, 2020), during a period when PB-CILA capacity was 23 MGD. These calculations exclude stream gage data from the outlier 2020 rainfall year due to the near-constant shutdown of the PB-CILA river diversion throughout the 2020 dry season. This analysis assumes that future baseline transboundary river flow conditions would be similar to those represented in this historical period of flow data and estimates the projects' effectiveness at reducing transboundary flows under these future baseline conditions.

[b] Projects A and B would result in negligible or no changes to transboundary river flows.

[c] Assumes Project C reduces untreated wastewater in the Tijuana River in Mexico down to 5 MGD. Reflects PB-CILA reliably diverting flows up to 23 MGD. Impact of Project C on transboundary river flows would be less if PB-CILA is capable of reliably diverting more than 23 MGD with the recent (2021–2022) upgrades.

[d] Reflects PB-CILA, with new/rehabilitated conveyance line, reliably diverting flows up to 35 MGD (bypassing PB-1A).

[e] For purposes of this analysis, "dry weather" conditions indicate that the flow occurred at least five days after the most recent precipitation registered at San Diego International Airport, and that the flow rate did not exceed 23 MGD. A select few flow events that exceeded the 23-MGD threshold were considered dry weather because they occurred at a time of year with no registered precipitation, and/or because they varied only slightly above 23 MGD during a period that was predominantly dry weather.

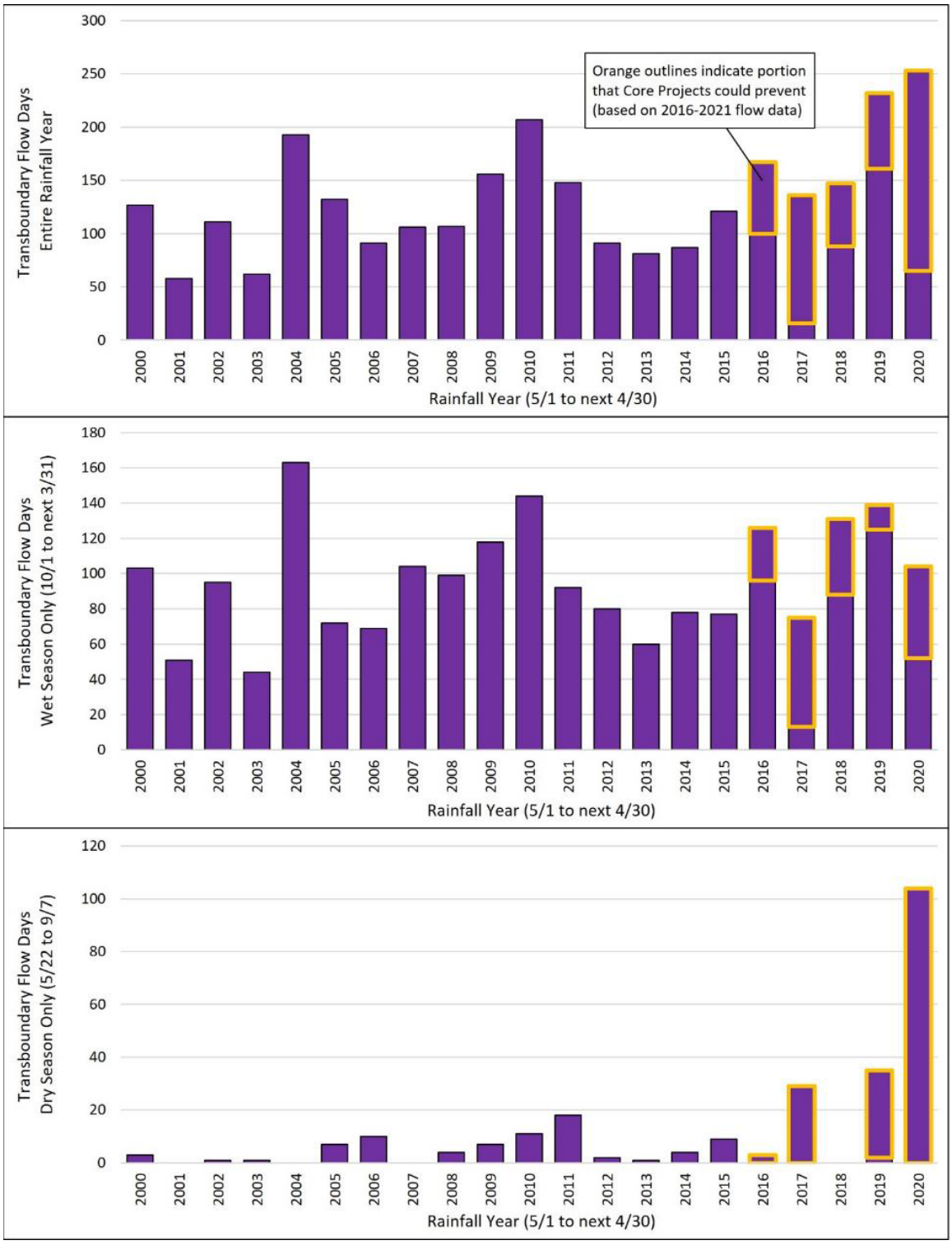


Figure 5-1. Transboundary Flow Days in the Tijuana River per Rainfall Year (2000–2020) and Portion Targeted by Alternative 1

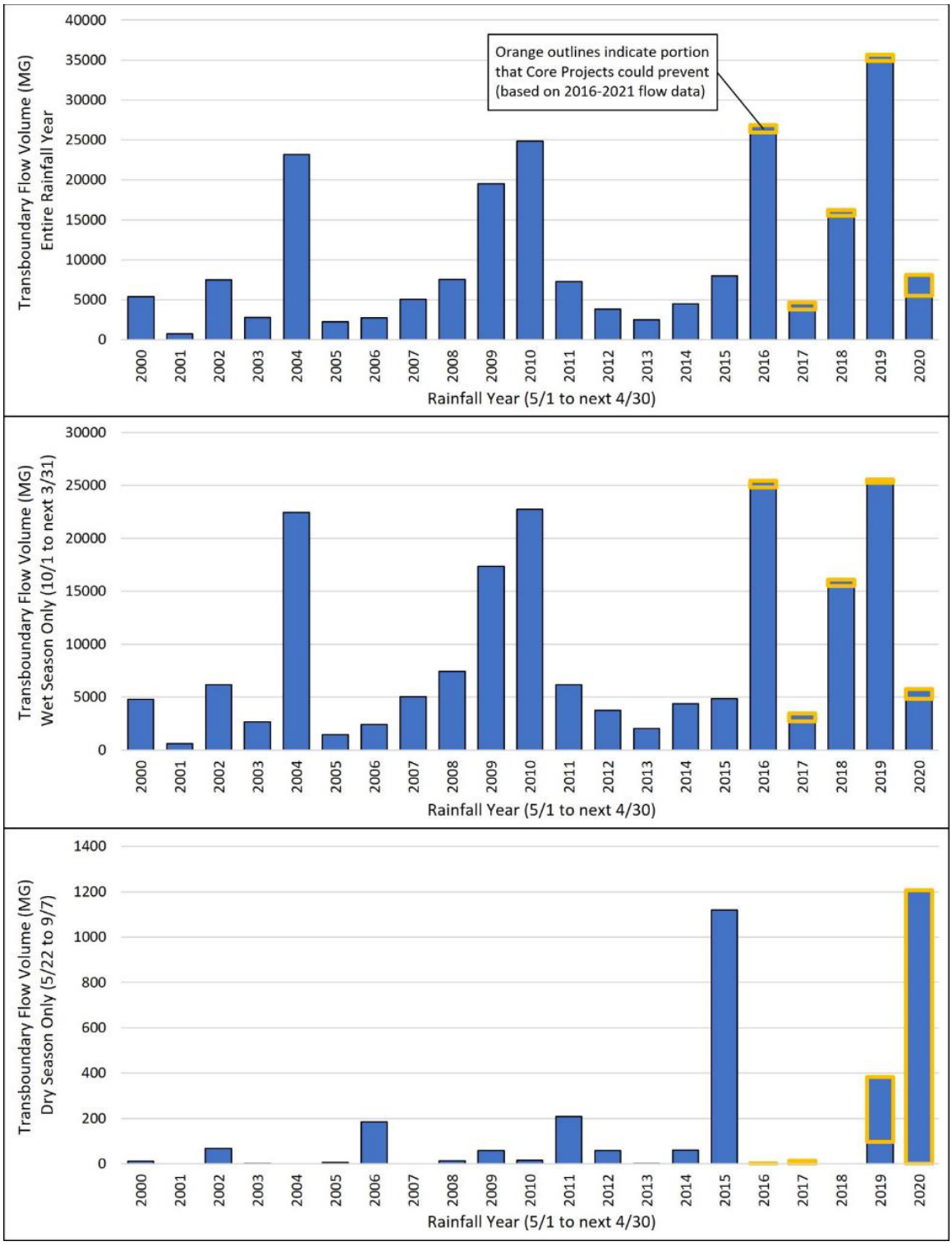
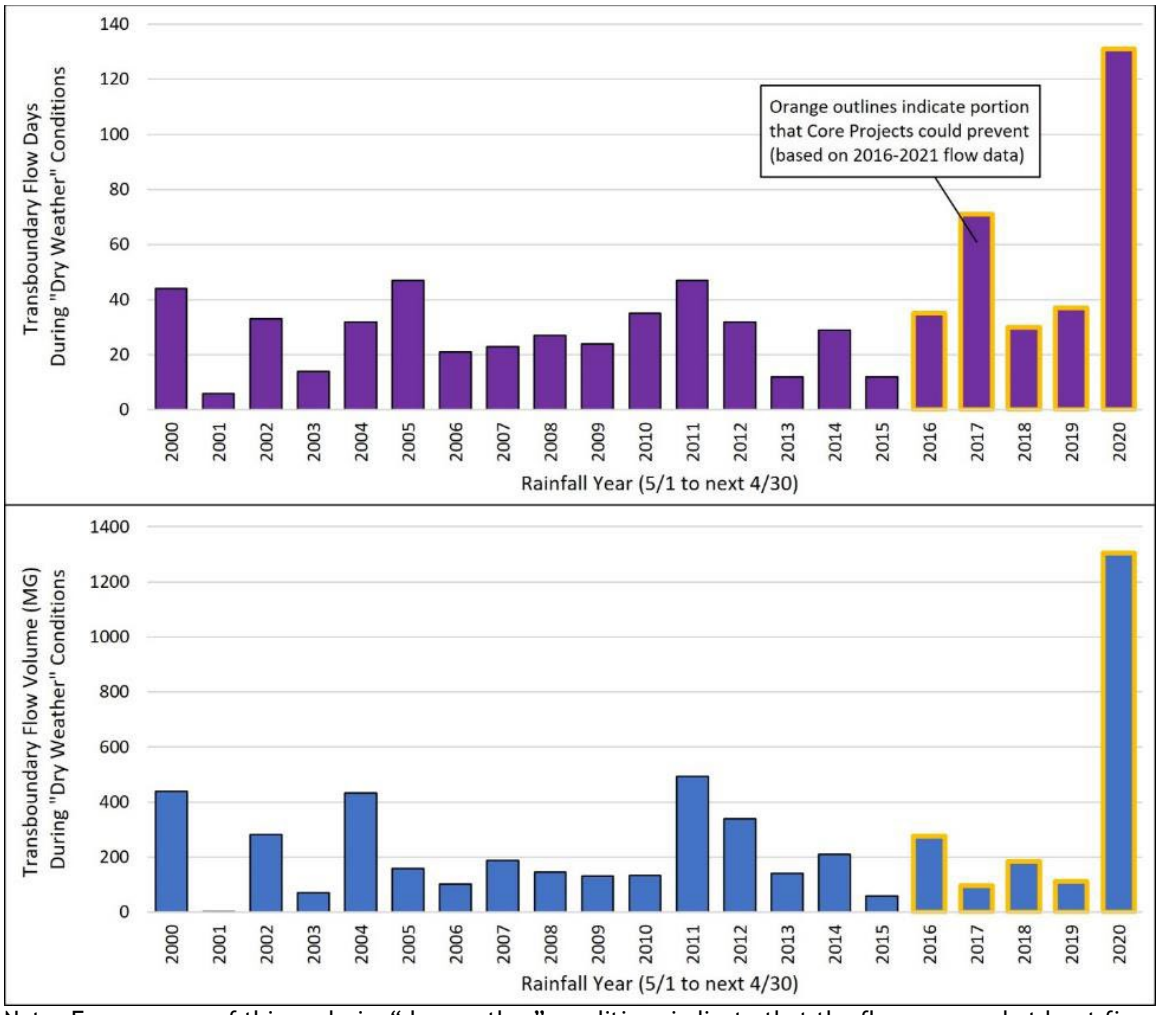


Figure 5-2. Transboundary Flow Volume in the Tijuana River per Rainfall Year (2000–2020) and Portion Targeted by Alternative 1



Note: For purposes of this analysis, "dry weather" conditions indicate that the flow occurred at least five days after the most recent precipitation registered at San Diego International Airport, and the flow rate did not exceed 23 MGD. A select few flow events that exceeded the 23-MGD threshold were considered dry weather because they occurred at a time of year with no registered precipitation, and/or because they varied only slightly above 23 MGD during a period that was predominantly dry weather.

Figure 5-3. Dry-Weather Transboundary Flow Days in the Tijuana River per Rainfall Year (2000–2020) and Portion Targeted by Alternative 1.

EPA and USIBWC also considered whether the estimated surface flow reductions in the river would potentially have an adverse effect on groundwater levels and riparian vegetation and habitat. The Core Projects would target the diversion of dry-weather flows and a very small portion of wet-weather flows (i.e., when PB-CILA is operational), a substantial portion of which would otherwise be expected to infiltrate to the alluvial aquifer before reaching the estuary, depending on the flow rate and saturation conditions. The surface flow reduction would take place over the course of several years as pipeline repairs are performed in Tijuana under Project C and as the reliability and capacity of the river diversion system increases under Project D. The Natural Safe Yield (the amount of groundwater that can be used from an aquifer without long-term effects on the volume of groundwater and groundwater levels in the aquifer) for the Tijuana Groundwater Basin has been estimated at approximately 5,000–6,800 acre-feet/year. However, EPA understands that these estimates do not account for contributions from untreated

transboundary sewage flows (Rempel 1992). The Natural Safe Yield of the Tijuana Groundwater Basin following implementation of the Core Projects is therefore expected to remain similar to past estimates, indicating a surplus of groundwater that would continue supporting baseflows in reaches of the Tijuana River downstream of Dairy Mart Road Bridge. Also, as noted above, implementation of the Core Projects would not affect wet-weather transboundary river flow events that saturate the wider floodplain, fill ponds and other depressions, and gradually recharge the aquifer.

Transboundary river flow conditions after Core Project implementation would be expected to be generally consistent, in terms of frequency and volume, with historical conditions since 2000 (excepting the 2017 and 2020 rainfall years, which had unusually frequent dry-weather transboundary flows). Therefore, any changes to surface water and groundwater interactions as a result of the implementation of the Core Projects would not have an adverse effect on riparian habitat and thus not adversely affect downstream riparian habitats.

Operations under the Core Projects would not result in any impacts to wetlands other than through the changes in the frequency, magnitude, and pollutant loadings of transboundary river flows described above (described in the PEIS which includes Alternative 1 "Core Projects," currently in preparation.).

Projects A (Expanded ITP) and B (Tijuana Canyon Flows to ITP) would result in negligible or no changes to transboundary river flows. Project A would potentially reduce untreated wastewater overflows from the sanitary sewer to the Tijuana River caused by mechanical failures at PB1-B; however, its primary purpose is to provide additional treatment capacity for flows that otherwise would discharge to the coast via SAB Creek. Project B would result in no changes in transboundary river flows but would potentially reduce the amount of contaminated transboundary dry-weather flows in Goat Canyon and Smuggler's Gulch by eliminating the reliance on pump stations whose mechanical issues may cause occasional wastewater overflows into the canyons in Mexico.

5.2 Potential Effects of the Proposed Action on Federally Listed Wildlife

5.2.1 San Diego Fairy Shrimp

San Diego fairy shrimp do not likely occur in the Action Area as no evidence of vernal pools or vernal pool complexes has been identified to date, and field observations suggest there is a low probability that vernal pools occur within the Action Area (Section 3.3). However, focused vernal pool surveys have not been conducted, and San Diego fairy shrimp may inhabit shallow and relatively temporary vernal pools. San Diego fairy shrimp could be directly affected if the project's facility expansion or any staging area is sited on an occupied vernal pool, even if dry (dry occupied vernal pools contain cyst banks for the species). Impacts may also include the crushing or displacement of cysts to unsuitable locations by project equipment or personnel.

Conservation Measures 9 and 10 include surveys for vernal pool habitat and flagging and complete avoidance, if found. If vernal pools cannot be completely avoided, and protocol-level surveys detect San Diego fairy shrimp, Section 7 consultation with USFWS will be reinitiated, and a mitigation and monitoring plan will be developed.

The proposed Action ***may affect but is not likely to adversely affect*** San Diego fairy shrimp.

5.2.2 Riverside Fairy Shrimp

Riverside fairy shrimp are not likely to occur in the Action Area, as there are no pools with the requisite depth (i.e., greater than 30 cm) and duration (i.e., minimum eight weeks) for this species in the Action Area.

The proposed Action will have ***no effect*** on Riverside fairy shrimp.

5.2.3 Quino Checkerspot Butterfly

Most of the Action Area contains no habitat or marginally suitable habitat for Quino checkerspot butterfly. However, host plants may occur in small numbers, or could become established in relatively small, fragmented areas within the ITP.

Potential direct project-related effects on Quino checkerspot butterfly include the loss (e.g., removal), reduction, or damage (e.g., disturbance to roots or limbs) of occupied host plants or disruption of essential behaviors (e.g., feeding, pupation, diapause periods). Other direct project-related effects include crushing, killing, or injury of individual eggs, pre- or post-diapause larvae, or butterflies from construction personal, vehicles, or equipment (though adult Quino checkerspot butterflies are mobile and may be able to avoid construction personnel and/or equipment).

Potential indirect project-related effects on Quino checkerspot butterflies include those from fugitive dust produced by construction. Dust may cover the eggs and larvae, leading to death by smothering or reducing (interrupting) their lifecycle. Elevated dust levels could impact respiration by the adults and larvae, not allowing them to respire normally.

While Quino checkerspot butterflies have a relatively low potential to occur due to marginally suitable habitat, host plants may occur in small numbers in the proposed staging area between Dairy Mart Road and Clearwater Way. Conservation Measures 15 and 16 include focused surveys for Quino checkerspot butterfly host plants during the appropriate bloom time, and fugitive dust prevention during construction activities. If host plants are found during focused surveys, they will be flagged and avoided to ensure that no suitable habitat for the species is disturbed or impacted. Additionally, Conservation Measures 8, 12, and 13 (worker environmental awareness training, equipment checks, and allowing animals to leave the area on their own volition) will further reduce potential project-related impacts to dispersing adult Quino checkerspot butterflies.

The proposed Action ***may affect but is not likely to adversely affect*** Quino checkerspot butterfly.

5.2.4 Light-footed Ridgway's Rail

There is no suitable nesting or foraging marsh/mudflat habitat for light-footed Ridgway's rail in or near the main Action Area (in the ITP land parcel, along Monument Road, or in Smuggler's Gulch). As such, no direct or indirect project-related effects on the light-footed Ridgway's rail are anticipated in the main Action Area.

Light-footed Ridgway's rail may occur in marsh/mudflat habitats along the Tijuana River downstream of Dairy Mart Road Bridge. They are known to occur in the portion of the Tijuana River located in the Tijuana Slough National Wildlife Refuge (Section 4.4.5). The proposed Action would reduce the frequency and volume of dry-weather flows in the Tijuana River near the international border. However, under current conditions, EPA's understanding is that a substantial portion of these dry-weather flows infiltrate to the alluvial aquifer before reaching the

estuary (depending on the flow rate and saturation conditions) and are therefore not believed to substantially influence downstream estuarine marsh and mudflat habitats. Therefore, operations under the proposed Actions are not expected to result in a substantial reduction of estuarine marsh and mudflat habitats suitable for light-footed Ridgway's rail.

Implementation of the proposed Action would improve downstream water quality, thus reducing wildlife exposure to toxic substances and ponding that can encourage spread of disease vectors. This is expected to provide associated benefits to light-footed Ridgway's rail using the Tijuana River Estuary downstream of the main Action Area.

The proposed Action ***may affect but is not likely to adversely affect*** light-footed Ridgway's rail.

5.2.5 Least Bell's Vireo

This species is unlikely to occur in the ITP area or along Monument Road. Smuggler's Gulch is the only portion of the Action Area with suitable habitat for least Bell's vireo. Potential direct project-related effects on least Bell's vireo in Smuggler's Gulch include the disturbance (e.g., harassment) of an individual, or actions that could lead to the failure of a nest (e.g., damage to the nest and/or the vegetation containing the nest). Noise and vibration associated with the use of heavy equipment during project construction in this area may lead to direct effects on the species by disrupting vireo behaviors in adjacent habitat by masking intraspecific communication and/or startling birds. Continued disturbance from construction noise could result in displacement, nest abandonment, and/or reproductive loss in the suitable habitats of Smuggler's Gulch surrounding the project. Displaced vireos could have increased risk of predation, death, or injury, or could be unable to find nearby suitable and available nesting habitat (i.e., habitat that does not overlap with other vireo nest territories). In addition, an increase in fugitive dust from project activities could temporarily degrade surrounding suitable vireo habitat.

The project includes Conservation Measure 17 (preconstruction nest surveys for least Bell's vireo), which will ensure that any active nest found within 300 feet of the Action Area will be given an appropriate no-disturbance buffer to prevent disturbance or abandonment from project activities. Additionally, Conservation Measures 8, 12, 13, and 16 (worker environmental awareness training, equipment checks, animals allowed to leave the area on their own volition, and fugitive dust prevention) will further reduce potential project-related impacts on least Bell's vireo.

There are no anticipated indirect project-related effects on least Bell's vireo in the main Action Area from the loss or reduction of preferred habitat and/or food sources, as suitable riparian habitat in the main Action Area is not proposed for removal or alteration. If open-cut trenching is used for the proposed conveyance line, it would be confined to the existing roadway in Smuggler's Gulch and along Monument Road, as well as the undeveloped strip of land adjacent to Clearwater Way and West Tia Juana Street, and would not result in indirect project-related effects on least Bell's vireo.

The proposed Action ***may affect but is not likely to adversely affect*** least Bell's vireo.

5.2.6 Coastal California Gnatcatcher

In the Action Area, coastal California gnatcatchers could likely use available habitat in Smuggler's Gulch and may use suboptimal areas along Monument Road. This species is unlikely to occur in the ITP. Potential direct project-related effects on coastal California gnatcatcher in Smuggler's Gulch and along Monument Road include disturbance (e.g., harassment) of an

individual, or actions that could lead to the failure of a nest. Noise and vibration associated with the use of heavy equipment during project construction may lead to direct effects on the species by disrupting gnatcatcher behaviors in adjacent habitat by masking intraspecific communication and/or startling birds. Continued disturbance from construction activities could result in displacement, nest abandonment, and/or reproductive loss in the surrounding suitable coastal sage scrub habitats of Smuggler's Gulch. Displaced gnatcatchers could have increased risk of predation, death, or injury, or could be unable to find nearby suitable and/or available nesting habitat (i.e., not overlapping with other gnatcatcher nest territories). An increase in fugitive dust from project activities could temporarily degrade surrounding suitable gnatcatcher habitat. Proposed construction activities and the presence of construction personnel and equipment along Monument Road are not anticipated to have direct impacts on the species; the road is frequently used by nearby residents, park visitors, and CBP making it unsuitable for nesting.

The project includes Conservation Measure 18 (preconstruction nesting gnatcatcher survey) that will ensure that any active nest found within 300 feet of the Action Area is given an appropriate no-disturbance buffer to prevent disturbance or abandonment from project activities. Additionally, Conservation Measures 8, 12, 13, and 16 (worker environmental awareness training, equipment checks, animals allowed to leave the area on their own volition, and fugitive dust prevention) will further reduce potential project-related impacts on coastal California gnatcatchers.

There are no anticipated indirect project-related effects on coastal California gnatcatcher from the loss or reduction of preferred habitat and/or food sources, as suitable coastal sage scrub habitat in the Action Area is not proposed for removal or alteration. If open-cut trenching is used for the proposed conveyance line, it would be confined to the existing roadway in Smuggler's Gulch and along Monument Road, as well as the undeveloped strip of land adjacent to Clearwater Way and West Tia Juana Street, and would not result in indirect project-related effects on coastal California gnatcatcher.

The proposed Action ***may affect but is not likely to adversely affect*** coastal California gnatcatcher.

5.3 Potential Effects of the Proposed Action on Critical Habitat

In the 1994 final rule designating critical habitat for the least Bell's vireo, the following examples were provided of actions that may constitute destruction or adverse modification of critical habitat:

25. Removal or destruction of riparian vegetation.
26. Thinning of riparian growth, particularly near ground level.
27. Removal or destruction of adjacent chapparal or other upland habitats used for foraging.
28. Increases in human-associated or human-induced disturbance.

Additionally, stream channelization, water impoundment or extraction, water diversion, livestock grazing, intensive recreation, and conversion of presently existing riparian or adjacent upland areas to residential, agricultural, or commercial use are identified as specific actions that could adversely affect vireo critical habitat.

There is no designated critical habitat for least Bell's vireo in the main Action Area. As such, there will be no direct removal, destruction, and/or thinning of riparian vegetation within

designated critical habitat, and no removal or destruction of adjacent chapparal or other upland habitats used for foraging.

Designated critical habitat is present outside of the main Action Area along the Tijuana River downstream of Dairy Mart Road Bridge. Least Bell's vireo has been known to nest in the considerable amount of riparian habitat in this area (Section 4.5.5). As described in Section 5.1, transboundary river flow conditions after Core Project implementation would be expected to be generally consistent, in terms of frequency and volume, with historical conditions since 2000 (excepting the 2017 and 2020 rainfall years, which had unusually frequent dry-weather transboundary flows). Therefore, any changes to surface water and groundwater interactions as a result of the implementation of the Core Projects would not have an adverse effect on riparian habitat and thus would not adversely affect downstream designated critical habitat for least Bell's vireo.

The proposed Action ***may affect but is not likely to adversely affect*** designated critical habitat for least Bell's vireo.

5.4 Potential Effects of the Proposed Action on Federally Listed Plants

Potential direct project-related effects on listed plants with the potential to occur in the Action Area (i.e., San Diego thorn-mint, San Diego ambrosia, thread-leaved brodiaea, Orcutt's spineflower, Otay tarplant, San Diego button-celery, willowy monardella, spreading navarretia, California Orcutt grass, San Diego mesa mint, and Otay mesa mint), in the absence of any mitigation, include eradication or damage of individual plants or removal of the entire population. Since there is some potential for listed plants to be present within the Action Area, Conservation Measure 19 (protocol-level surveys) will be implemented. If any listed plant species are documented, a no-work buffer will be established, and a worker environmental awareness training will be conducted (Conservation Measures 20 and 8). If avoidance is not feasible, Section 7 consultation with USFWS will be reinitiated, and a mitigation and monitoring plan will be developed (Conservation Measure 21).

Potential indirect project-related effects on listed plants with the potential to occur in the Action Area, in the absence of any mitigation, include degradation of habitat. Riparian-associated species (i.e., willowy monardella) may occur in habitats along the Tijuana River downstream of Dairy Mart Road Bridge (Section 4.7.7). As described in Section 5.1 and Section 5.3, any changes to surface water and groundwater interactions as a result of the implementation of the Core Projects would not have an adverse effect on riparian habitat and thus would not adversely affect riparian-associated listed plant species.

The proposed Action ***may affect but is not likely to adversely affect*** all special-status plant species with the potential to occur in the Action Area (Table 5-3).

Table 5-3. Potential Effects of the Proposed Action on Federally Listed Plants.

Plant Species	Determination
San Diego thorn-mint (*Acanthomintha ilicifolia*)	***May affect but is not likely to adversely affect***
San Diego ambrosia (*Ambrosia pumila*)	
Thread-leaved brodiaea, (*Brodiaea filifolia*)	
Orcutt's spineflower (*Chorizanthe orcuttiana*)	
Otay tarplant (*Deinandra conjugens*)	
San Diego button-celery (*Eryngium aristulatum* var. *parishii)*	
Willowy monardella (*Monardella viminea*)	
Spreading navarretia (*Navarretia fossalis*)	
California Orcutt grass (*Orcuttia californica*)	
San Diego mesa mint (*Pogogyne abramsii*)	
Otay mesa mint (*Pogogyne nudiuscula*)	

6 CONCLUSION AND DETERMINATION

Based on the information discussed above, it is determined that:

- The proposed Action ***may affect but is not likely to adversely affect*** San Diego fairy shrimp, Quino checkerspot butterfly, light-footed Ridgway's rail, least Bell's vireo, coastal California gnatcatcher, and the listed plants specified in Section 5.7.
- The proposed Action will have ***no effect*** on Riverside fairy shrimp.
- The proposed Action ***may affect but is not likely to adversely affect*** least Bell's vireo critical habitat.
- The proposed Action ***may affect but is not likely to adversely affect*** all special-status plant species with the potential to occur in the Action Area (Table 5-3).

Incorporating general BMPs and Conservation Measures for the project (described in Section 2.4) will minimize the potential for project-related effects on San Diego fairy shrimp, Quino checkerspot butterfly, light-footed Ridgway's rail, least Bell's vireo, coastal California gnatcatcher, and listed plants specified in Section 5.7.

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Appendices

Appendix A

Database Query Results for Federally Listed, Proposed, and Candidate Species

Table A-1. Database Query Results for Federally Listed Plant Species.

Common Name (Scientific Name)	Query Sources	Federal Status	Family	Life Form	Blooming Period[2]	Elevation Range[2] (feet)	Habitat Associations[2]	Likelihood to Occur in the Action Area?
San Diego thorn-mint *(Acanthomintha ilicifolia*)	CNPS, CNDDB, USFWS	FT	Lamiaceae	annual herb	April–June	30–3,150	Clay soils in openings of chaparral, coastal scrub, and valley and foothill grassland; vernal pools	Moderate; degraded coastal scrub habitat is present within the Action Area
San Diego ambrosia *(Ambrosia pumila*)	CNPS, CNDDB, USFWS	FE	Asteraceae	perennial rhizomatous herb	April–October	65–1,360	Sandy loam or clay, sometimes alkaline soils and often disturbed areas of chaparral, coastal scrub, valley and foothill grassland, vernal pools	Moderate; degraded coastal scrub habitat is present within the Action Area
Del Mar manzanita *(Arctostaphylos glandulosa* subsp. c*rassifolia*)	USFWS	FE	Ericaceae	perennial evergreen shrub	December–June	0–1,200	Sandy soils in maritime chaparral	None; potential habitat not present
Coastal dunes milk-vetch *(Astragalus tener* var. *titi*)	CNPS, CNDDB	FE	Fabaceae	annual herb	March–May	0–165	Sandy soils in coastal bluff scrub; coastal dunes, or often vernally mesic areas of coastal prairie	None; potential habitat not present
Encinitas baccharis *(Baccharis vanessae*)	USFWS	FT	Asteraceae	perennial deciduous shrub	August, October, November	195–2,360	Maritime chaparral, cismontane woodland	None; species is not within elevation range of Action Area
Thread-leaved brodiaea *(Brodiaea filifolia*)	USWFS	FE	Themidaceae	perennial bulbiferous herb	March–June	80–3,765	Openings in chaparral; cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools	Moderate; coastal scrub habitat is present within the Action Area

Common Name (Scientific Name)	Query Sources	Federal Status	Family	Life Form	Blooming Period[2]	Elevation Range[2] (feet)	Habitat Associations[2]	Likelihood to Occur in the Action Area?
Salt marsh bird's-beak *(Chloropyron maritimum* subsp. *maritimum* [synonym *Cordylanthus maritimus* subsp. *maritimus*])	CNPS, CNDDB, USFWS	FE	Orobanchaceae	annual herb (hemiparasitic)	May–October (sometimes November)	0–100	Coastal dunes, coastal salt marshes and swamps	None; potential habitat not present
Orcutt's spineflower *(Chorizanthe orcuttiana)*	CNPS, CNDDB, USFWS	FE	Polygonaceae	annual herb	March–May	5–410	Sandy openings in closed-cone coniferous forest, maritime chaparral, coastal scrub	Moderate; coastal scrub habitat is present within the Action Area
Otay tarplant *(Deinandra conjugens)*	CNPS, CNDDB, USFWS	FT	Asteraceae	annual herb	(sometimes April) May–June	80–985	Clay soils in coastal scrub, valley and foothill grassland	Moderate; coastal scrub habitat is present within the Action Area
San Diego button-celery *(Eryngium aristulatum* var. *parishii*)	CNPS, CNDDB, USFWS	FE	Apiaceae	annual / perennial herb	April–June	65–2,035	Mesic soils in coastal scrub, valley and foothill grassland, vernal pools	Moderate; coastal scrub habitat is present within the Action Area
Mexican flannelbush *(Fremontodendron mexicanum)*	CNPS, CNDDB, USFWS	FE	Malvaceae	perennial evergreen shrub	March–June	30–2,350	Gabbroic, metavolcanic, or serpentinite soils in closed-cone coniferous forest, chaparral, cismontane woodland	None; potential habitat not present
Willowy monardella *(Monardella viminea)*	CNPS, CNDDB, USFWS	FE	Lamiaceae	perennial herb	June–August	160–740	Alluvial ephemeral washes in chaparral, coastal scrub, riparian forest, riparian scrub, riparian woodland	Moderate; coastal and riparian scrub is present within the Action Area
Spreading navarretia *(Navarretia fossalis)*	CNPS, CNDDB, USFWS	FT	Polemoniacea	annual herb	April–June	100–4,265	Chenopod scrub, shallow freshwater marshes and swamps, playas, vernal pools	Low; there is low likelihood that vernal pool habitat is present in the Action Area

Common Name (Scientific Name)	Query Sources	Federal Status	Family	Life Form	Blooming Period[2]	Elevation Range[2] (feet)	Habitat Associations[2]	Likelihood to Occur in the Action Area?
California Orcutt grass *(Orcuttia californica)*	CNPS, CNDDB, USFWS	FE	Poaceae	annual herb	April–August	45–2,165	Vernal pools	Low; there is low likelihood that vernal pool habitat is present in the Action Area
San Diego mesa mint *(Pogogyne abramsii)*	CNPS, CNDDB, USFWS	FE	Lamiaceae	annual herb	March–July	295–655	Vernal pools	Low; there is low likelihood that vernal pool habitat is present in the Action Area
Otay Mesa mint *(Pogogyne nudiuscula)*	CNPS, CNDDB, USFWS	FE	Lamiaceae	annual herb	May–July	295–820	Vernal pools	Low; there is low likelihood that vernal pool habitat is present in the Action Area

[1] Status codes:
Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act

[2] CNPS (2022) unless otherwise cited.

Table A-2. Database Query Results for Federally Listed Fish and Wildlife Species.

Common Name *Scientific Name*	Query Sources	Federal Status[1]	Distribution in California	Habitat Associations	Likelihood to Occur and Nearest Documented Occurrences to Action Area
Invertebrates					
San Diego fairy shrimp *Branchinecta sandiegonensis*	CNDDB, USFWS, MSCP	FE	Southern California coastal mesa system in Orange and San Diego counties	Occupies coastal vernal pool complexes and similar ephemeral wetland types	Low; documented occurrence near Oneonta Slough (in designated critical habitat), approximately 2.5 miles north of Smuggler's Gulch (from 2008 and an undated observation) (SDMMP 2010, CDFW 2022); known to occupy vernal pool complexes in the TRNERR (IDEALS-AGEISS 2016); suitable coastal vernal pool habitat is not suspected to be present in the Action Area
Riverside fairy shrimp *Streptocephalus woottoni*	CNDDB, USFWS, MSCP	FE	Santa Barbara to San Diego; critical habitat designated in Ventura County, Orange County, and San Diego County	Occupies vernal pools, ponds, and other ephemeral pools or pool complexes	Low; multiple documented occurrences between 2002 and 2017 in the canyon complexes of Otay Mesa (Moody Canyon, Dillon Canyon, and Spring Canyon), indicating a possible population within 2 miles of the Action Area, but separated by urban development and highways (CDFW 2022); suitable coastal vernal pool habitat is not suspected to be present in the Action Area
Monarch butterfly[2] (Western North American ACU) *Danaus plexippus*	USFWS	FC	Coastal California	Coastal California groves of blue gum eucalyptus (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*); milkweed (*Asclepias* spp.) is a host plant required for species' breeding	None/Low; no suitable overwintering groves in the Action Area
Hermes copper butterfly *Lycaena hermes*	CNDDB	FPT	From the vicinity of Fallbrook in northern San Diego County south to near Santo Tomás in Baja California, Mexico	Host plants include spiny redberry (*Rhamnus crocea*) in coastal sage scrub and chaparral vegetation; primary nectar source is California buckwheat (*Eriogonum fasciculatum*)	Low; Action Area outside of species' known range; documented occurrences from 2004 and 2006 near Sweetwater Reservoir, approximately 10 miles from the Action Area (CDFW 2022)

Common Name ***Scientific Name***	**Query Sources**	**Federal Status[1]**	**Distribution in California**	**Habitat Associations**	**Likelihood to Occur and Nearest Documented Occurrences to Action Area**
Quino checkerspot butterfly *Euphydryas editha quino*	CNDDB, USFWS	FE	Coastal slopes of southern California, from Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties	Grasslands, coastal sage scrub, chamise chaparral, red shank chaparral, juniper woodland, and semi-desert scrub; host plants consist of native species of plantain	Moderate; documented occurrence from 2018 and 2020 in the Nelson Sloan Quarry Property between the ITP and Smuggler's Gulch (Dudek 2021); Additional occurrences have been documented in 2001 near Otay Valley Regional Park, approximately 6 miles from Action Area (CDFW 2022); suitable habitat on the mesa slopes near Smuggler's Gulch
Fish					
Tidewater goby *Eucyclogobius newberryi*	CNDDB, USFWS	FE	San Diego County north to the mouth of the Smith River in Del Norte County	Coastal lagoons and uppermost zone of brackish large estuaries consisting of fairly still but not stagnant water and high oxygen levels; prefer sandy substrate for spawning, but can be found on silt, mud, or rocky substrates; can occur in water up to 4.6 m in lagoons and within a wide range of salinities (0–42 ppt)	None; no suitable habitat in the Action Area; no documented occurrences in the project vicinity
Unarmored threespine stickleback *Gasterosteus aculeatus williamsoni*	CNDDB	FE	Federal listing refers to Upper Santa Clara River, Bouquet Creek and Soledad Canyon Creek.	Cool (<75.2°F [24°C]), clear water with abundant vegetation	None; no suitable habitat in the Action Area; no documented occurrences in the Project vicinity
Amphibians					
Western spadefoot[3] *Spea hammondii*	CNDDB	Status Review[4]	Near Redding, south throughout the Central Valley and nearby foothills; Coast Ranges south of Monterey Bay; and coastal southern California south of the Transverse Mountains and west of the Peninsular Mountains	Areas with sparse vegetation and/or short grasses in sandy or gravelly soils; primarily in washes, river floodplains, alluvial fans, playas, alkali flats, among grasslands, chaparral, or pine-oak woodlands; breeds in ephemeral rain pools with no predators	Low/Moderate; historical occurrences documented approximately 1 mile from the Action Area, most recent occurrence from 2004 was documented less than 1 mile from Smuggler's Gulch (CDFW 2022); No suitable habitat identified in the Action Area

Common Name ***Scientific Name***	**Query Sources**	**Federal Status[1]**	**Distribution in California**	**Habitat Associations**	**Likelihood to Occur and Nearest Documented Occurrences to Action Area**
Arroyo toad *Bufo californicus*	CNDDB, USFWS, MSCP	FE	San Luis Obispo County to Baja California	Washes, arroyos, sandy riverbanks, riparian areas with willows, sycamores, oaks, cottonwoods; needs exposed sandy streamsides with stable terraces for burrowing, with scattered vegetation for shelter, and areas of quiet water or pools free of predatory fishes with sandy or gravel bottoms without silt for breeding	Low; documented occurrences near Sweetwater Reservoir (in 2003), and Sweetwater River downstream of Loveland Reservoir (in 2001 and 2005), over 10 miles from the Action Area (CDFW 2022); Smuggler's Gulch contains a small section of marginally suitable habitat
California red-legged frog *Rana draytonii*	MSCP	FT	Largely restricted to coastal drainages on the central coast from Mendocino County to Baja California; in the Sierra foothills south to Tulare and possibly Kern counties	Breeds in still or slow-moving water with emergent and overhanging vegetation, including wetlands, wet meadows, ponds, lakes, and low-gradient, slow moving stream reaches with permanent pools; uses adjacent uplands for dispersal and summer retreat	None; no suitable habitat in Action Area; species' is presumed extirpated from southern California coastal historical range (Nafis 2022)
Reptiles					
Green sea turtle *Chelonia mydas*	CNDDB, NMFS	FT	Warm waters of the Pacific coast, primarily from San Diego south; does not nest in California	Uses convergence zones in the open ocean and benthic feeding grounds in coastal areas; nests on sandy ocean beaches	None; documented occurrence from 2009 in San Diego Bay National Wildlife Refuge, approximately 6 miles from Action Area (CDFW 2022); no suitable habitat in Action Area; nesting does not occur in California
Birds					
California condor *Gymnogyps californianus*	USFWS	FE	The Coast ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi mountains., and southern Sierra Nevada	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude; deep canyons containing clefts in the rocky walls provide nesting sites; forages up to 100 miles from roost/nest	None; outside of species' range

Common Name ***Scientific Name***	**Query Sources**	**Federal Status[1]**	**Distribution in California**	**Habitat Associations**	**Likelihood to Occur and Nearest Documented Occurrences to Action Area**
Light-footed Ridgway's rail *Rallus obsoletus levipes*	CNDDB, USFWS	FE	Coastal Santa Barbara to Baja California	Coastal salt marshes with tall dense California cordgrass, wrack deposits, and available high marsh zones to provide refugia during high tides	Low/Moderate; documented occurrence from 2007 near Border Field State Park (CDFW 2022); nests in the Tijuana River Estuary, potentially the second largest population in the U.S. (CA DPR et al. 2010); no suitable nesting or foraging habitat in the Action Area
Western snowy plover *Charadrius nivosus nivosus*	CNDDB, USFWS, MSCP	FT	Nests in locations along the California coast, including the Eel River in Humboldt County; nests in the interior of the state in the Central Valley, Klamath Basin, Modoc Plateau, and Great Basin, Mojave, and Colorado deserts; winters primarily along coast	Barren to sparsely vegetated beaches, barrier beaches, salt-evaporation pond levees, and shores of alkali lakes; also nests on gravel bars in rivers with wide flood plains; needs sandy, gravelly, or friable soils for nesting	Low; documented sightings 2019 and 2020 in Border Field State Park, Imperial Beach, and along Monument Road (eBird 2022); nesting documented in 2006 near the Tijuana River mouth area and surrounding dunes (CA DPR et al. 2010); no suitable nesting or foraging habitat in the Action Area
California least tern *Sternula antillarum browni*	CNDDB, USFWS, MSCP	FE	Pacific coast from San Francisco to Baja California	Sparsely vegetated coastal beaches and estuaries near shallow waters, above high tide line	Low; eBird sightings from 2019 within 1 mile of Smuggler's Gulch and downstream of Tijuana River (eBird 2022); nesting has been documented in 2006 on the beaches of the Tijuana River Estuary (CA DPR et al. 2010); no suitable nesting or foraging habitat in the Action Area
Western yellow-billed cuckoo *Coccyzus americanus*	CNDDB	FT	Breeds in limited portions of the Sacramento River and the South Fork Kern River; small populations may nest in Butte, Yuba, Sutter, San Bernardino, Riverside, Inyo, Los Angeles, and Imperial counties	Summer resident of valley foothill and desert riparian habitats; nests in open woodland with clearings and low, dense, scrubby vegetation	None; documented occurrence from 2015 near Lower Otay Reservoir, approximately 8 miles from Tijuana River Basin (CDFW 2022); outside of species' known range
Southwestern willow flycatcher *Empidonax traillii extimus*	CNDDB, USFWS, MSCP	FE	In lowland southern California, breeds on the San Luis Rey River, San Diego County; on Camp Pendleton; and on the Santa Ynez River, Santa Barbara County[5]	Riparian habitat, commonly wider than 10 m; nesting occurs in native willow (*Salix* spp), non-native tamarisk (*Tamarix* spp.), and other riparian vegetation stands 4–7 m high	High (foraging only); documented sightings along the Tijuana River within 1 mile of Tijuana River Basin in 2018–2020 (eBird 2022); observed near Dairy Mart Road during the April 2021 site visit by Stillwater Sciences; suitable foraging habitat upstream of Dairy Mart Road

Common Name ***Scientific Name***	**Query Sources**	**Federal Status**[1]	**Distribution in California**	**Habitat Associations**	**Likelihood to Occur and Nearest Documented Occurrences to Action Area**
Least Bell's vireo *Vireo bellii pusillus*	CNDDB, USFWS, MSCP	FE	Summer resident; breeds in scattered locations around southern California	Nests in dense vegetative cover of riparian areas; often nests in willow or mulefat; forages in dense, stratified canopy	High; documented occurrences within Tijuana River Basin and Smuggler's Gulch (CDFW 2022, eBird 2022, CA DPR et al. 2010); observed in Smuggler's Gulch and northwest of Dairy Mart Road (near Sunset Road, the Gravel/Duck Ponds, and along the Sunset trail to Tijuana River) during the April 2021 site visit by Stillwater Sciences; suitable riparian habitat in Smuggler's Gulch and Tijuana River Basin north of Dairy Mart Road; designated Critical Habitat in Tijuana River Basin
Coastal California gnatcatcher *Polioptila californica californica*	CNDDB, USFWS	FT	Permanent resident of southern California	Low, coastal sage scrub in arid washes, on mesas, and on slopes	High; documented occurrences from 2021 in Smuggler's Gulch (eBird 2022); additional occurrences from 2020 within 1 mile of the Action Area, and throughout access roads to Tijuana River National Estuarine Research Reserve (Monument Road) (eBird 2022)
Mammals					
Pacific pocket mouse *Perognathus longimembris pacificus*	CNDDB, USFWS	FE	Southern coast from Marina del Rey and El Segundo in Los Angeles County, south to the Mexican border in San Diego County; only three small wild populations presumed to remain, one in Dana Point Headlands (Orange County) and two in Marine Corps Base Camp Pendleton (Northern San Diego County); one reintroduced population in Laguna Coast Wilderness Park (Laguna Beach)	Fine-grain, sandy, or gravelly substrates in the immediate vicinity of the Pacific Ocean	None; species presumed extirpated (CDFW 2022)

[1] Status codes:
Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
FPT = Federally proposed as threatened

FC = Federal candidate species

[2] Monarch butterfly is a candidate species and not yet listed or proposed for listing. There are no Section 7 requirements for candidate species though agencies may consider them when making natural resource decisions. This species is not discussed or analyzed further in the BA.

[3] Western spadefoot is under status review and not yet listed or proposed for listing. There are no Section 7 requirements for species under status review. This species is not discussed or analyzed further in the BA.

[4] In July 2015, after a 90-day review in response to a petition to list the western spadefoot toad, USFWS determined that there was sufficient evidence to support the potential listing of the species (FWS-R8-ES-2015-0066). In January 2020, the USFWS initiated a status review (12-month finding), requesting information to support a Species Status Assessment and inform a possible future critical habitat determination. Although the species in not an official candidate for listing at this time, it has been included in this section in anticipation of possible future listing.

[5] Range determinations for southwestern willow flycatcher http://www.prbo.org/calpif/htmldocs/species/riparian/willow_flycatcher.htm

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