Draft
Environmental Assessment

Narlon Bridge Replacement Project
UPRR Santa Barbara Subdivision MP 291.33

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	microgram(s) per cubic meter
30 CES/CEIE	30th Civil Engineering Squadron, Environmental Section
ACAM	Air Conformity Applicability Model
Air Force	U.S. Air Force
APE	area of potential effects
APZ	accident potential zone
BA	Biological Assessment
Base	Vandenberg Air Force Base
BMP	Best Management Practice
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCA	California Coastal Act of 1972
CCC	California Coastal Commission
CCR	*California Code of Regulations*
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2e	CO_2 equivalents
CRLF	California red-legged frog
CRPR	California Rare Plant Ranks
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act
DTSC	California Department of Toxic Substances Control
EA	Environmental Assessment
EMS	Air Force Environmental Management System
EO	Executive Order

EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
ESBB	El Segundo blue butterfly
ESHA	environmentally sensitive habitat areas
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FRA	Federal Railroad Administration
GHG	greenhouse gas
GIS	geographic information system
IPaC	Information for Planning and Consultation
IRP	Installation Restoration Program
lbs/day	pounds per day
LCZ	lateral clear zone
m	meter
MBBB	Morro Bay blue butterfly
MP	Mile Post
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NRO	National Reconnaissance Office
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
O_3	ozone
OHWM	ordinary high-water mark
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PM_{10}	particulate matter with aerodynamic diameter less than or equal to 10 microns

$PM_{2.5}$	particulate matter with aerodynamic diameter less than or equal to 2.5 microns
POL	petroleum, oil, and lubricant
ppm	parts per million by volume
project	Narlon Bridge Replacement Project
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gas
ROI	region of influence
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SBCAPCD	Santa Barbara County Air Pollution Control District
SHPO	State Historic Preservation Officer
SLC	Space Launch Complex
SO_2	sulfur dioxide
SPRR	Southern Pacific Railroad
SR	State Route
SSPP	Strategic Sustainability and Performance Plan
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Plan
SWRCB	State Water Resources Control Board
tons/year	tons per year
TPH	total petroleum hydrocarbons
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance
VAFB	Vandenberg Air Force Base
VOC	volatile organic compound
WDR	Waste Discharge Requirement

1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This Environmental Assessment (EA) analyzes the potential environmental effects of removing and replacing the Union Pacific Railroad (UPRR) Narlon Bridge, a deteriorating steel bridge constructed in 1896 crossing San Antonio Creek. The Narlon Bridge Replacement Project (project) will include "in-line" construction of a new replacement bridge in the same location as the existing bridge, with similar materials and design; construction of two temporary access/work bridges (one on either side of the existing Narlon Bridge) to facilitate use of equipment and to avoid impacts to San Antonio Creek; and use of adjacent Vandenberg Air Force Base (VAFB or Base) property for three staging and access areas. The Air Force, Thirtieth Space Wing (30th SW has prepared this EA per National Environmental Policy Act (NEPA) implementing regulations 40 *Code of Federal Regulations* (CFR) 1500-1508 and U.S. Air Force (Air Force) Regulation 32 CFR 989. The Air Force is the lead agency for NEPA compliance on the Proposed Action.

UPRR, as the project proponent, needs to replace the Narlon Bridge, which is located on UPRR's privately-owned right-of-way (ROW) within the boundaries of VAFB. UPRR requires access to VAFB (federal) property to access the project site, construct temporary access bridges, and temporarily stage equipment and materials during construction. For UPRR to remove and replace its Narlon Bridge, UPRR needs staging workspace that exceeds its privately-owned ROW dimensions. Logistically, and due to the large size of the bridge components, construction entirely within the ROW is impossible. Because UPRR will access federal property for workspace, it needs the Air Force to grant it a license agreement. Therefore, the project is subject to environmental evaluation under federal law, to comply with NEPA. This EA evaluates environmental impacts that could occur on both VAFB and UPRR property for the entire bridge replacement project. Per Air Force Instruction 32-9003, *Granting Temporary Use of Air Force Real Property*, the plans to grant UPRR a license to enable UPRR to use federal land for staging and access.

1.1 Project Location

The Narlon Bridge is on UPRR property, which passes through VAFB, located along the northwestern Santa Barbara County coast, approximately 15 miles southwest of Santa Maria, California, and 55 miles northwest of Santa Barbara, California (see Figure 1-1). The UPRR's Narlon Bridge crosses San Antonio Creek and is located within the Casmalia U.S. Geological Survey (USGS) 7.5-minute quadrangle at UPRR Mile Post (MP) 291.33 on the Santa Barbara Subdivision (see Figure 1-2). The bridge is located approximately 0.73 mile east of and inland from the Pacific Ocean. The bridge elevation is approximately 88 feet above mean sea level, with San Antonio Creek at approximately 25 feet above mean sea level at this location.

1.2 Purpose and Need

The existing Narlon Bridge was constructed in 1896. The bridge supports the Santa Barbara Subdivision of UPRR, the only route by which freight and passenger traffic may travel through Ventura, Santa Barbara, and San Luis Obispo Counties. This includes Amtrak's Coast Starlight route that provides passenger rail service from Seattle, Washington, to Los Angeles, California, and Amtrak's Pacific Surfliner transit line between San Diego and San Luis Obispo, California.

The main purpose of the Proposed Action is to maintain rail capacity, which will maintain public access, recreation, and transit opportunities, and protect water and air quality through the provision

of continued rail service to and along Southern California coastal cities and towns. The benefits of the project result directly from the main purpose, and not from any ancillary component.

The need for the Proposed Action is to replace the deteriorating steel bridge crossing San Antonio Creek. Since the bridge's construction in 1896, the steel supports have corroded and deteriorated, rendering the bridge in need of replacement. The need for the Proposed Action is also to maintain UPRR safety standards, comply with Federal Railroad Administration (FRA) regulations, and maintain uninterrupted service for freight and passenger rail. The existing bridge poses a safety risk to the continued use of the rail for interstate commerce and passenger service, if not replaced. If the bridge continues to deteriorate, it may be deemed unsafe, and rail traffic would not be allowed to cross. Without this bridge, rail traffic would have to be diverted inland to California's Central Valley, southeast to Barstow, back to Los Angeles, and up to Santa Barbara, resulting in delays to passenger and freight trains.

Replacement of the Narlon Bridge will be conducted on private property, UPRR ROW. However, access and staging will require use of adjacent property owned by VAFB. Therefore, to complete the Proposed Action, UPRR needsa license agreement from VAFB.

1.3 Scope of the Environmental Assessment

Consistent with 32 CFR 989 and Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), the scope of analysis in this EA is defined by the potential range of environmental impacts resulting from implementing the Proposed Action and alternatives (see Chapter 2). This EA describes and evaluates potential environmental impacts that could result from the Proposed Action and alternatives, as well as possible cumulative impacts from other planned actions on VAFB. It also identifies all relevant permits for the Proposed Action. In addition, this EA describes measures to avoid or minimize environmental impacts that could result from the Proposed Action.

1.4 Interagency and Intergovernmental Coordination and Consultation

VAFB coordinated with U.S. Fish and Wildlife Service (USFWS) under section 7 of the federal Endangered Species Act (ESA) on September 18, 2012, and provided a Biological Assessment (BA) detailing the potential effects on federally recognized threatened and endangered species in relation to the Proposed Action. An addendum to the BA was submitted on November 19, 2012, to further define the footprint of the Proposed Action. A Biological Opinion (BO), which concluded that the Proposed Action is not likely to jeopardize the continued existence of the species analyzed, was issued by the USFWS on August 29, 2013. On April 17, 2019, USFWS concluded that revisions to the project description made since 2013 do not require reinitiation of the BO. The BA, addendum, and 2013 BO and 2019 letter are included as Appendices A, B, and C (respectively) of this EA.

The Proposed Action is a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA). Because the Proposed Action has the potential to affect cultural resources and/or historic properties, VAFB coordinated with the State Historic Preservation Officer (SHPO) under 36 CFR 800. VAFB determined that implementation of the Proposed Action will have no adverse effect on significant cultural resources and/or historic properties within the project area, provided specific conditions were implemented (refer to Section

2.2.11.7 and Section 4.4.1; Lebow and Smallwood 2019). SHPO concurs with the determination of no adverse effect, and the letter of concurrence is included as Appendix D.

Under Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, the Air Force is also required to consult with federally recognized Native American tribes that have an affiliation with VAFB's property. The Air Force, therefore, consulted with the Santa Ynez Band of Chumash Indians. VAFB sent two letters to the Santa Ynez Band of Chumash Indians informing them of the Proposed Action on May 1, 2013. A site visit of the Proposed Action Area with VAFB and representatives from the Santa Ynez Band of Chumash Indians was conducted on May 7, 2013. Native American monitors were present during cultural resource surveys conducted in 2014, November 2016, and November 2018. The Air Force recommends that a Native American monitor be present during ground-disturbing project activities near the cultural resource site to the southeast of the Narlon Bridge.

In addition to interagency coordination, the following permits are received or will be obtained for the proposed bridge replacement:

- Compliance with National Emission Standards for Hazardous Air Pollutants (NESHAP) for asbestos and lead as administered by the Santa Barbara County Air Pollution Control District (SBCAPCD) (see Section 3.1, Air Quality).
- Consistency Certification from California Coastal Commission (CCC), granted on May 9, 2019, in compliance with the Coastal Zone Management Act (CZMA; Appendix E, Staff Report and Letter from CCC) (see Section 3.8, Land Use).
- Statewide General Waste Discharge Requirements (WDRs) for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction, Order No. 2004-0004-DWQ, administered locally by Regional Water Quality Control Board (RWQCB) (Appendix F, Letter from RWQCB) (see Section 3.3, Water Resources).
- The U.S. Army Corps of Engineers (USACE) determined that the project will not involve a discharge of dredged or fill material within water(s) of the United States (i.e., San Antonio Creek) pursuant to 33 CFR 325.9. USACE also determined that the project does not involve work or structures in or affecting navigable waters and, therefore, will not be regulated under Section 10 of the Rivers and Harbor Act, if the activity is performed in the manner described in the application (Appendix G, Letter from USACE dated February 28, 2019) (see Section 3.3, Water Resources).
- The Federal Aviation Administration (FAA) requires a 7460 Notice of Proposed Construction for the use of temporary construction cranes for the project. The FAA conducted an aeronautical study under the provisions of 49 United States Code, Section 44718. An FAA determination of hazard to navigation was received on May 10, 2019, and stated that there was no hazard due to the Proposed Action.

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Selection Standards

This section describes the Proposed Action and alternatives, including the selection criteria for alternatives. CEQ regulations for implementing the Procedural Provisions of NEPA establish several policies for federal agencies, including "using the NEPA process to identify and assess the reasonable alternatives to the Proposed Action that will avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2(e)). The range of reasonable alternatives evaluated in this EA was identified by the extent to which they met the purpose and need of the Proposed Action and the following selection standards:

- **Selection Standard 1:** Meet the conditions of the Air Force for access to VAFB and use of VAFB property.
- **Selection Standard 2:** Meet engineering standards, UPRR safety and operational requirements, and FRA standards.
- **Selection Standard 3:** Avoid impacts to waters of the U.S. and sensitive biological and cultural resources to the extent feasible.

Based on the selection criteria above, UPRR determined that the Proposed Action is the only action alternative that fulfills the purpose and need while avoiding impacts to San Antonio Creek, minimizing impacts to other sensitive biological and cultural resources, and meeting VAFB access requirements and UPRR safety and engineering standards.

2.2 Alternative A: Proposed Action

The Proposed Action includes in-kind replacement of the 720-foot-long open-deck Narlon Bridge crossing San Antonio Creek with the same or similar materials and design (see Figure 2-1 for site view plans and Figures 2-2 and 2-3 for cross-sectional bridge plans), as well as construction of two temporary access/work bridges 40 feet wide by 360 feet long on either side of the existing bridge to facilitate use of equipment and avoid impacts to San Antonio Creek. The Proposed Action will be implemented in four phases at six general areas that comprise the Proposed Action Area (as described in Section 2.2.1) that totals approximately 24.01 acres. Phase 1 involves installation of environmental protection measures while Phase 2 entails preparation of access and laydown areas at the six project areas discussed below. Phase 3 involves removal and replacement of the Narlon Bridge in segments and may require use of several staging areas. Phase 4 consists of demobilization of all equipment and restoration or revegetation of affected area.

2.2.1 Description of the Proposed Action Area

The Proposed Action Area totals approximately 24.01 acres and comprises six areas (described below, summarized in Table 2-1 and shown on Figure 1-2) including the bridge itself, staging and parking areas, and associated existing access roads and rail line.

1. **Narlon Bridge Project Site** is approximately 300 feet wide and 1,730 feet long, and encompasses approximately 10.55 acres (see Figure 2-4). It includes the UPRR ROW near the bridge (50 feet from centerline on either side of tracks) and VAFB property 100 feet on either side of the UPRR ROW, as well as staging areas outside the ROW. The project site is bisected

by San Antonio Creek and its surrounding riparian corridor, and central dune scrub dominates the areas to the north and south of the riparian habitat. The central dune scrub and riparian habitat within the ROW was heavily managed for over 100 years and are mowed regularly as required for bridge maintenance, while the habitat on VAFB property is relatively undisturbed. Within the project site, two staging areas totaling approximately 2.93 acres will be used for the most active staging operations. Southwest of the bridge, a 1.4-acre staging area includes a historically disturbed area used by UPRR and VAFB for maintenance activities. This area will be graded and temporary shoring installed as required. South of the bridge, an approximate 1.53-acre staging area encompasses both UPRR and VAFB property. Fill will be added as needed to this area to level the surface for equipment and materials.

2. **Tangair Staging Area** is approximately 1.93 acres and is located approximately 2.5 miles south of the Narlon Bridge. It is located on UPRR property along the east side of approximately 565 linear feet of track, where the ROW is approximately 300 feet wide. The staging area is composed of bare dirt with a few small, scattered eucalyptus trees. This area may be used as a spoils pile laydown area and/or materials staging area. There is a spur track on VAFB property 200 feet south of the staging area that may be used for storing materials in rail cars.
3. **Narlon Station Staging Area** is approximately 4.6 acres. It is located on UPRR property approximately 1.3 miles northwest of the bridge along approximately 980 linear feet of track, on the east side of the tracks, where the ROW is over 100 feet wide. The area outside the track bed is composed entirely of central dune scrub. This area may be used for stockpiling bridge parts adjacent to an existing siding track.
4. **Rail Garrison Staging Area** consists of an approximate 1.5-acre paved area on VAFB property, approximately 1.6 acres on VAFB property along a spur track, and approximately 2.4 acres within the UPRR ROW. It is located at the terminus of Umbra Road and consists of a loading dock and paved area (also known as Facility 1887) that connects to a rail spur constructed by the Air Force in 1981 for the Rail Garrison Program. Central dune scrub surrounds the paved area, spur track, and UPRR tracks. The existing paved area may be used for a temporary office, equipment staging, and materials storage. The adjacent spur track on VAFB property may be used for movement of equipment or materials by rail from the staging area to the UPRR main line, then to the Narlon Bridge Project Site. The area on the south side of the spur track (approximately 1.6 acres along 1,970 linear feet of track) may be used as an access road, along with the UPRR ROW on the east side of the main line (approximately 2.4 acres along 1.05 linear miles of track), allowing vehicle traffic to travel between the staging area and the bridge.
5. **Watt Road** may require temporary access improvements by mowing in discrete areas to allow large vehicle and equipment access. Certain corners and curves on Watt Road and the unimproved road to the bridge may require temporary central dune scrub reduction by mowing up to an additional 6 feet outside road edges for large vehicle and equipment access (see Figure 1-2). Areas of temporary disturbance may total up to 8,800 square feet (0.2 acre). No permanent road widening will occur.
6. **Building 1785** consists of an approximate 1.23-acre abandoned building and parking lot located on VAFB property on 13th Street just north of the intersection with Watt Road. The

paved parking lot in front of the building will be used for a temporary office and worker vehicle parking.

TABLE 2-1. NARLON BRIDGE REPLACEMENT PROJECT PROPOSED ACTION AREAS

Site Name	Ownership	Action Type	Acres
1. Narlon Bridge Project Site	UPRR and VAFB	Active work zone and staging (equipment and materials)*	10.55
2. Tangair Staging Area and spur track	UPRR (staging area) and VAFB (spur track)	Staging (spoils piles and/or materials)	1.93
3. Narlon Station Staging Area	UPRR	Staging (materials)	4.60
4. Rail Garrison Staging Area (Facility 1887, existing asphalt pad), spur track, and ROW	VAFB (staging area and spur track) and UPRR	Staging (office, equipment and materials)	1.50
		Vehicle access along spur track and on ROW	4.00
5. Watt Road access	VAFB	Temporary access improvement by mowing discrete areas for vehicle access	0.20
6. Building 1785	VAFB	Staging (temporary office and vehicle parking)	1.23
		Total	24.01

* Approximately 2.93 acres will be used for the most active staging operations outside of the riparian zone. A 1.4-acre staging area southwest of the bridge will be graded. An approximate 1.53-acre staging area south of the bridge may require fill to be added to level the surface for equipment and materials.

2.2.2 Construction Schedule

The project is expected require 12 months to construct from site preparation to project completion. Vegetation removal (mowing/pruning to between 2 to 6 inches) will be scheduled first, in the fall/winter of 2019. Fiber optics temporary relocation will be implemented immediately following vegetation reduction. Environmental protection measures such as exclusion fences and erosion control will be installed. Access roads and laydown areas will be prepared, followed by staging and site preparation (e.g., crane pads, access bridges). Bridge replacement will follow in early 2020. The bridge will be replaced in a series of changeouts. During each changeout, train service will be suspended for one or more days, during which one or more old bridge spans will be removed and the same number of new spans installed on existing foundations. There may be several weeks between each changeout to allow for the old span(s) to be hauled away and materials for the new span(s) to be brought in and made ready. Construction is schedule for completion in mid- to late 2020, and equipment will be demobilized. Site restoration, including re-contouring disturbed areas, will be implemented immediately following construction (see Section 2.2.8). Restoration will take approximately 3 months to install and will be monitored for 5 years post-construction, through 2025.

2.2.3 Phase 1: Site Preparation

Narlon Bridge Project Site: All vegetation in project area will be mowed except for riparian vegetation on the streambanks of San Antonio Creek. Environmental protection measures will be installed (see Section 2.2.11). Exclusion fencing will be installed around riparian areas, and protective fencing will be installed to protect cultural sites. A monitoring well located on the west side of the bridge will be protected with a temporary steel plate cover. Precise identification of the location of buried fiber optic cables parallel to the bridge may be conducted by "potholing" with a rubber-tired excavator or backhoe. A small-bucket on a rubber-tire excavator would excavate approximately 10 holes that are 3 to 4 feet deep (5 cy total). Temporary spoils will be placed on a tarp, and holes immediately refilled upon location of the cables. The location of buried cables will be flagged to avoid damage due to ground-disturbing activities. Temporary fiber optic cables (contingency cables) will be placed above-ground, along the east side of the bridge staging area to protect communication utilities during bridge replacement operations. Cables will be encased in protective pipes and laid on top of mowed vegetation. To cross San Antonio Creek, the cables will be hung on two 12-inch diameter 15-foot poles, one on each side of the creek, anchored with guy wires. A rubber-tired mini-excavator will be used to dig 7-foot-deep post holes (2 cy total), while the guy wires will be anchored by ground screws which will be screwed in by hand. On the access road crossing, fiber cables will be protected in steel sleeves imbedded within the top 24 inches of the existing roadbed. Additional roadbed material may be placed over the conduit and covered with steel plates. The location of buried cables and of temporary contingency cables are shown on Figure 2-1. Sediment control Best Management Practices (BMPs) will be implemented to protect San Antonio Creek.

Certain corners and curves on the access road within the work area may require temporary central dune scrub reduction by mowing up to an additional 6 feet outside road edges to allow large vehicle and equipment access.

Tangair Staging Area: Eucalyptus tree resprouts may be removed.

Narlon Station Staging Area: Vegetation will be mowed in this staging area, if needed.

Rail Garrison Staging Area (Near Facility 1887): Dune scrub vegetation along the ROW and spur line would be mowed as needed to reduce fire fuel and to provide safe access for pedestrian travel (e.g., Brandt rail truck engineer). Safe access along the ROW for pedestrian access is required by the FRA for worker safety. A temporary project office may be placed on the asphalt cul-de-sac, and utilities including water near Tethys Road (Building 1833) and electricity (e.g., pole D3-02/25-40) would be connected. Any new water lines would be placed above ground on existing road shoulders and protected from aboveground vehicle movement. Maintenance on the spur track would be conducted, as needed, to prepare it for transport of equipment and/or materials via rail car.

Watt Road: Unimproved roads to the bridge site from Watt Road will be mowed where necessary to a width of 15 feet. Certain corners and curves on Watt Road and the unpaved road to the bridge may require temporary central dune scrub reduction by mowing up to an additional 6 feet outside road edges to allow large vehicle and equipment access. Groundwater wells along Watt Road will be protected; wells that are next to the road and at risk of being driven over will be protected by temporary steel plate covers and wells further from the road will be protected by t-posts and rope.

Building 1785: A temporary office will be placed on the existing pavement, and power will be connected, if available. The existing pavement will be used for parking worker vehicles. The building will not be used.

2.2.4 Phase 2: Site Improvements and Staging

Narlon Bridge Project Site: Access roads will be improved within the work area by placing road base and grading the roads flat and placing geotextile fabric and/or geogrid on steep roads.

The 1.4-acre southwest staging area will be created by excavating slope to a maximum cut depth of 22 feet, placing road base, and installing temporary shoring as needed. The 1.53-acre staging area south of the bridge will be created by placing approximately 1,650 cubic yards (cy) of clean fill and road base as needed. Three crane pads will be graded at the southeast, northeast, and northwest corners of the bridge with maximum cut or fill depths of up to 12, 9, and 25 feet, respectively (see Figure 2-1 for crane pad sizes). Road base will be placed on crane pads. A temporary at-grade crossing will be installed south of the bridge abutment to allow one-way traffic flow through the work area. The temporary crossing will be closed at night by a heavy-duty cable locked between K-rail or bollard posts.

Temporary construction access bridges (see Figure 2-1) will be installed for 300-ton cranes to cross the creek in a manner elevated above, and thus minimizing effects on, riparian and creek habitats. The access bridges will begin and end at access roads or staging areas, allowing cranes and equipment to move directly on to the bridges (see Figure 2-1). The access bridges will consist of driven steel piles with steel caps and steel stingers (beams) covered with timber mats. A total of 180 pilings will be used (these may be HP14x89 or 24-inch-diameter pipe piles). The pilings which are to be placed over the location of the buried communications fiber will be placed on timber mats in order to avoid damaging the fiber. Areas up to 14 feet by 14 feet will be graded to create a level surface for these timber mats. Up to 15 timber mats will be required, and up to 13 of these will be located in the riparian area (a total of 2,548 square feet of area disturbed, and up to a total of 47 cy of cut/fill required). Approximately 15 to 20 linear feet of the bridge's width will be constructed on VAFB property, with approximately 90 piles located on VAFB property and approximately 90 piles located on UPRR property. The access bridges will be built span-by-span, handrails installed, and crane mats placed down.

Three temporary work platforms will be placed west of the bridge in the riparian area (see Figure 2-1), and will be used to stage new bridge spans prior to installation and hold old bridge spans after they are removed. These staging platforms will allow materials to be staged in the riparian area without impacting riparian habitat. The three temporary staging platforms will be supported by a total of 12 24-inch-diameter pipe piles, and will be located on VAFB property.

Tangair Staging Area: Grading may be done as needed.

Narlon Station Staging Area: No grading or road improvements will be necessary.

Rail Garrison Staging Area: No grading or road improvements will be necessary.

Watt Road: Layers of road base will be added on Watt Road and on other unpaved roads used by the project, and roads will be maintained within existing width. All fill material will be approved by VAFB 30th Civil Engineer Squadron (30 CES) and Environmental Specialists. On steep roadways, a geogrid will be placed under road base for stabilization.

Building 1785: No grading or road improvements will be necessary. Only the parking area will be used; the building will not be used.

2.2.5 Phase 3: Construction

Narlon Bridge Project Site: Cranes and equipment to construct the new railroad bridge will be mobilized, brought onsite via rail and/or existing roads, and assembled. Bridge steel will be delivered as needed according to the number of spans to be replaced in the upcoming changeout. Bridge tower bents and deck spans will be preassembled in laydown areas according to the sequence of erection, and assembled components will be staged strategically as the time of changeout approaches. To support the existing bridge during changeout, temporary supports will be installed under existing bridge spans. Areas up to 5 feet by 3 feet will be graded to create a level surface for timber mats for the temporary supports. Up to 24 timber mats will be required, and up to 16 of these will be located in the riparian area (a total of 240 square feet of area disturbed, and up to a total of 9.6 cy of cut/fill required). All timber mats and temporary supports will be located outside the creek channel. Other temporary bracing or guying of the existing bridge will be installed if necessary. A new wing-wall will be installed at the north abutment where the existing wing-wall has failed.

During a track outage, a portion of existing track and bridge will be removed. New steel towers will be installed on existing foundations, and new steel spans and new deck and rails will be installed and connected to allow for train passage. The removed bridge materials will be staged in the laydown areas or on the temporary work platforms. After each changeout, the demolished bridge materials will be cut into smaller pieces onsite, processed, loaded, and hauled out to a recycler or licensed disposal area. This process will be repeated over several different track outages until the bridge is completely replaced.

Night work may be necessary during bridge changeout operations. Night lighting will be needed to facilitate night work.

The bridge replacement involves reuse of existing foundations without additional foundation work. In the unlikely event that a foundation is damaged, repair will be implemented during construction operations. Supplemental support of a damaged foundation may include driven steel piling, excavation up to 3 feet in depth around an existing pedestal, reinforcing steel placement, and cast-in-place concrete encasement of existing masonry pedestals. Total volume of concrete to be used in the event of a foundation repair could range from approximately 29 to 60 cy, with 15 cy of the material being located below existing grade.

If the original underground fiber optic cables are damaged during construction operations, the Fiber Optics Contingency Plan will be implemented (see Appendix H), and a new conduit will be bored under San Antonio Creek.

Tangair, Narlon Station, and Rail Garrison Staging Areas: Staging areas may be used for materials storage and equipment staging during construction.

Watt Road: Watt Road and other VAFB access roads will be maintained during construction. Unimproved access roads will be graded to maintain safe conditions and improved with road base as needed.

Building 1785: Parking lot will be used for a temporary office and worker vehicle parking. (The building will not be used.)

2.2.6 Phase 4: Demobilization and Restoration

Narlon Bridge Project Site: Large cranes will be broken down and loaded out. Temporary access bridges and work platforms will be removed span-by-span and materials kept in staging areas before being hauled off via rail and/or access road. Fiber optics temporary poles and cables will be removed. The temporary at-grade crossing will be removed and those materials hauled offsite. Crane pads and other disturbed areas including staging areas will be re-contoured to match existing grade. Equipment will be broken down and loaded out. Debris and/or excess spoils will be removed and disposed of at a legally permitted and regulated commercial landfill. Vegetation restoration and revegetation will be conducted according to the Restoration Plan (see Section 2.2.8).

Tangair Staging Area: Staged or stored spoils, equipment, and/or materials will be removed from the area. No vegetation restoration will be necessary.

Narlon Station Staging Area: If this area is used, staged or stored equipment and materials will be removed from the area. Areas of mowed vegetation will be restored or vegetated according to the Restoration Plan (see Section 2.2.8).

Rail Garrison Staging Areas: If used, the project office will be removed and utilities will be disconnected. Staged or stored equipment and materials will be removed from the area. Areas of mowed vegetation will be restored or vegetated according to the Restoration Plan (see Section 2.2.8).

Watt Road: Asphalt pavement repairs will be completed, if necessary, on Watt Road and other paved VAFB roads including 13th Street and Umbra Road, which may be damaged by construction traffic. Repairs will include grinding, overlay of hot mix asphalt, and re-striping, as needed. Unpaved access road improvements including road base, geogrid, and/or geotextile fabric will be left in place. Areas of mowed vegetation will be restored or revegetated according to the Restoration Plan (see Section 2.2.8).

Building 1785: Temporary office (if still in use) will be removed and power disconnected.

2.2.7 Ground Disturbance

Ground disturbance will take place within the UPRR ROW and on VAFB property in staging areas, along the buried fiber optic cable, and adjacent to the ROW where temporary access bridge pilings will be driven in (see Sections 2.2.3 and 2.2.4). The project will include up to 2,900 cy of total net fill in approximately 2.2 acres of central dune scrub habitat (see Figure 2-1). All cut/fill earthmoving activities will take place outside the riparian zone, except for up to 7 cy of temporary soil disturbance for fiber potholing and support poles for temporary fiber (see Section 2.2.3), up to 47 cy of cut/fill for placement of timber mats under access bridge piles to protect buried fiber optic cable (see Section 2.2.4), and up to 9.6 cy of cut/fill for timber mats under temporary bridge supports (see Section 2.2.5). No work will occur within the ordinary high-water mark (OHWM) of San Antonio Creek. No roads will be widened, and no new roads will be created for the project. When construction is complete, crane pads and other disturbed areas including staging areas will be re-contoured to match existing grade, and staging areas on VAFB will be returned to their pre-project conditions.

2.2.8 Restoration of Proposed Action Area

Staging areas on VAFB will be returned to their pre-project conditions. The ROW will be maintained according to federal standards for vegetation on railroad property on or immediately adjacent to the roadbed (49 CFR 213.37). For example, areas graded for crane pads will be re-contoured to pre-project contours. Disturbed areas within the maintained UPRR ROW will be revegetated and restored to equal size with native species associated with central dune scrub or riparian habitats. Revegetation species will be those that can persist and thrive in the UPRR ROW where vegetation maintenance (e.g., brush clearing) is routinely conducted. Disturbed areas on VAFB property will be stabilized with erosion controls and permanently restored with local native vegetation. These areas will be restored to equal size, quality, and species composition as pre-affected habitat. See the Vegetation Restoration and Monitoring Plan (Appendix I) for further details. Restored and revegetated areas will be monitored quarterly for the first 2 years and annually for the next 3 years to ensure performance standards are met.

UPRR agreed with CCC to provide additional mitigation by invasive species removal at a 3:1 ratio for areas graded or filled, and a 2:1 ratio for areas mowed and affected by construction activities for many months (e.g., a year). This additional mitigation will be calculated based on actual project impacts and will involve invasive species removal. The area proposed for invasive species removal will be reviewed and approved by CCC and Base environmental staff prior to construction. See Additional Mitigation Plan (Appendix J) for further details and a map of the proposed additional mitigation area.

2.2.9 Roads and Access

UPRR will use VAFB roads to and from Narlon Bridge to transport construction crews and equipment. This includes paved roads from VAFB gates to the project site and unpaved roads around Narlon Bridge. Primary ingress and egress to the work area will be from 13th Street to Watt Road on the east side of the bridge. Construction traffic will travel one-way east to west through the Narlon Bridge Project Site, loop around and cross over the temporary at-grade crossing to the south of the bridge, and rejoin Watt Road (see Section 3.9, Transportation).

No new roads will be created for the project. Unimproved roads to and through the bridge site from Watt Road will be mowed to allow large vehicle and equipment access. No permanent road widening will occur. Layers of road base may be added on unimproved roads used by the project. All fill material will be approved by VAFB 30 CES and Environmental Specialists. On steep road slopes, a geogrid may be put down under road base to stabilize the road surface. VAFB roads will be maintained by UPRR during construction and returned to pre-project condition, with exception of roads improved with road base, which will be left in place.

Rail spur track at Rail Garrison may be used for rail transport and storage of materials. Equipment may travel along the ROW road bed adjacent to the spur line and mainline tracks beginning at the cul-de-sac on Umbra Road, and down the UPRR ROW approximately 1 mile to the north end of the bridge (approximately a 12- to 20-foot-wide path east of the track bed, depending on the location of track signals and switches that extend into the ROW). Road base may be added within the ROW to level the roadbed for equipment travel.

2.2.10 Project Equipment Needs

Construction equipment necessary to complete the project is presented in Table 2-2. The exact type of equipment used may vary slightly, but this list can be used to analyze project impacts related to air quality and traffic.

TABLE 2-2. PROPOSED EQUIPMENT NEEDS TO COMPLETE THE PROPOSED ACTION

Equipment	Number Needed	Estimated Duration
Cat 330 Excavator	1	10 months
4,000-gallon Water Truck	1	10 months
Cat 430 Backhoe	1	11 months
CP56 84-inch Roller	1	8 months
Cat 966 Loader	1	11 months
100-ton Crawler Crane	1	10 months
60-ton Rough Terrain Hydraulic Crane	1	10 months
250-ton Crawler Crane	1	4 months
Cat D6 Dozer	1	10 months
Drill Attachment for CIDH	1	5 months
1-ton Flatbed Truck	1	11 months
2-ton Flatbed Truck	1	11 months
Light Plant	12	10 months
60-foot Manlift	1	10 months
Foreman Pickup	3	11 months
Fixed Pile Leads	2	10 months
¾-ton Crew Pickup	5	11 months
Cat TH103 Forklift	1	11 months
400-amp Welder	1	4 months
Welder's Rig	1	4 months
185-cubic-foot-per-minute Compressor	3	11 months

2.2.11 Environmental Best Management Practices

The environmental BMPs outlined below will result in avoidance and/or minimization of adverse effects to environmental resources from implementation of the Proposed Action.

2.2.11.1 Air Quality

The following BMPs shall be implemented to decrease air emissions associated with the Proposed Action:

- Prior to construction, portable equipment meeting the criteria defined in the *Final Regulation Order* for the Statewide Portable Equipment Registration Program (CARB 2012), effective

February 19, 2011, and amended November 30, 2018, shall be registered in the program or shall have a valid SBCAPCD Permit to Operate.

- Idling of heavy-duty diesel trucks during loading and unloading activities shall be limited to 5 minutes, with auxiliary power units used whenever possible.

The following control measures shall be implemented to decrease diesel emissions. Diesel engines operated in California are required to meet California Air Resources Board's (CARB's) established standards, which may be more stringent than federal mandates.

- Engine size in equipment used for the project shall be minimized.
- The use of equipment shall be managed to minimize the number of pieces of equipment operating simultaneously and total operation time for the project.
- Engines shall be maintained in tune according to manufacturer or operator specification.
- If applicable, U.S. Environmental Protection Agency (EPA)- or CARB-certified diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters shall be installed.
- When applicable, equipment powered by diesel engines shall be retrofitted to meet the Air Toxics Control Measures for Off-Road Vehicles.
- Diesel construction equipment meeting the CARB Tier 3 emission standards for off-road heavy-duty diesel engines shall be used, if feasible.
- If appropriate, diesel-powered equipment shall be replaced by electric equipment.

Although emissions exceeding applicable standards are not proposed from the Proposed Action, the following SBCAPCD Rule 345, Control of Fugitive Dust from Construction and Demolition Activities, dust-control measures shall be implemented to further decrease fugitive dust emissions from ground-disturbing activities:

- Use water trucks or sprinkler systems to keep all areas of equipment or vehicle movement damp enough to prevent dust from leaving the site.
- Minimize the amount of disturbed area and reduce onsite vehicle speeds to 15 miles per hour or less. Treat disturbed areas by watering, revegetating, or by spreading soil binders until the area is paved or otherwise developed so that dust generation shall not occur.
- Soil stockpiled for more than 2 days shall be covered, kept moist, or treated with soil binders to prevent dust generation.
- Implement a dust control program during construction activities.
- No materials or soil shall be loaded onto trucks for transport unless at least one of the following dust prevention techniques is used:
  - Use properly secured tarps or cargo coverings that cover the entire surface area of the load or a container-type enclosure.
  - Maintain a minimum of 6 inches of freeboard below the rim of the truck bed where the load touches the sides of the cargo area and minimize the potential that peak loads might extend above any part of the upper edge of the cargo area.
  - Water the bulk material to minimize the loss of material to wind or spillage.

- Implement other effective dust prevention control measures approved in writing by the SBCAPCD Control Officer.

- Visible roadway dust as a result of active operations, spillage from transport trucks, track-out and carry-out, and erosion shall be controlled by implementing any of the following measures: track-out grates of gravel beds at each egress point, wheel washing at each egress point during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding.
- Visible roadway dust shall be removed from paved roadways at the end of each workday, when bulk material removal ceases. Visible roadway dust could be removed with either a vacuum sweeper or a wet sweeper.

2.2.11.2 Soil Management

Although not anticipated, if affected soil is encountered, the soil cannot be reused. Rather, it must be disposed of offsite at a California Department of Toxic Substances Control (DTSC)-approved landfill. Affected soil is identified based on visual staining and odor. Visual staining is defined as soil whose natural condition appears altered. If affected soil is encountered, the affected soil must be segregated, and the UPRR construction manager shall be immediately contacted. VAFB Hazardous Waste Program Manager shall be notified if contaminated soil is discovered.

2.2.11.3 Imported Borrow

Borrow material is anticipated to be road base, a material unlikely to contain any weed seeds. All borrow material brought onto the job site to accomplish grading and embankment work shall be first tested by the contractor to determine that the borrow material is acceptable for UPRR use, to ensure that (1) the borrow material meets the specifications and (2) the borrow material does not contain any contamination or naturally occurring radiologic material or any other material deemed under any applicable current federal, State, or local agency law, statute, rule, or regulation to be of environmental concern. Imported-fill analytical results shall be submitted to the VAFB Hazardous Waste Program Manager for review and approval prior to transport to, or placement of fill soils on Vandenberg property. If any other material than road base (e.g., soil) is brought to the site, it will be tested for presence of seeds. If seeds occur in the borrow material, locations where borrow material are placed will be monitored and weeds abated annually over a 5-year period.

Pursuant to DTSC Information Advisory – Clean Imported Fill Material, potential fill sources shall be analyzed for the following:

Potential Contaminants Based on the Fill Source Area

Fill Source	Target Compounds
Land near an existing freeway	Lead (EPA test methods 6010B and 7441A) PAHs (EPA test method 8310)
Land near a mining area or rock quarry	Metals (EPA test methods 6010B and 7471A) Asbestos (polarized light microscopy) pH
Agricultural land	Pesticides (EPA test methods 8081A or 8080A) Organophosphorus pesticides (EPA test method 8141A)

Potential Contaminants Based on the Fill Source Area

Fill Source	Target Compounds
	Chlorinated herbicides (EPA test method 8151A) Metals (EPA test methods 6010B and 7471A)
Residential/acceptable commercial land	VOCs (EPA test method 8260B; collected by 5035) SVOCs (EPA test method 8270C) TPH (8015 modified) PCBs (EPA test method 8082) Metals (EPA test methods 6010B and 7471A) Asbestos (OSHA method ID-191)

Notes:
OSHA = Occupational Safety and Health Administration
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
SVOC = semivolatile organic compound
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Pursuant to California DTSC Information Advisory – Clean Imported Fill Material, test frequency shall be as follows:

Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every 1/2 acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	**Samples per Volume**
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards +1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards +1 sample per each additional 1,000 cubic yards

2.2.11.4 Disposal

The following measures shall be implemented for disposal operations:

- All cleared and grubbed material shall be disposed of offsite unless otherwise directed, and shall comply with federal, State, and local regulations. Pieces of rail, broken ties, and rubble within the grading limits shall be removed in a legal and proper manner.
- Material being disposed of shall not be burned.
- No material shall be disposed of in the grading footprint.

- Large trees, willows, and shrubs may be shredded into mulch and used for capping slopes and ditch bottoms.
- Large pieces of concrete or stone greater than 16 inches in diameter encountered during grading shall be removed offsite. Stockpiling of pieces shall be allowed outside of the riparian zone prior to removal.
- Disposal of material offsite shall be to a certified recycler or landfill except for treated wood waste (e.g., ties, bridge timbers, etc.), which shall be disposed of in an offsite permitted solid waste landfill in California and shall not be recycled.
- Staging, labeling, and shipping of treated wood waste to the offsite permitted solid waste landfill in California shall be completed per the *California Code of Regulations* (CCR) alternative management standards for treated wood waste (CCR Title 22, Division 4.5, Chapter 34).

2.2.11.5 Biological Resources

The following BMPs shall avoid or minimize impacts to biological resources including sensitive habitats, wetlands, waters of the U.S., plants, and wildlife species.

- Equipment vehicles (dozers, mowers etc.) shall be cleaned of weed seeds prior to use in the Proposed Action Area to prevent the introduction of weeds. Prior to site transport, any skid plates shall be removed and cleaned. Equipment should be cleaned of weed seeds daily especially wheels, undercarriages, and bumpers. Prior to leaving the project area, for vehicles that have caked-on dirt or mud, vehicles shall be cleaned with hand tools such as bristle brushes and brooms at a designated exit area; vehicles may subsequently be washed at the AAFES car wash or approved wash area. For vehicles with dry dusted dirt on vehicles (and no caked-on dirt or mud), prior to leaving a site at a designated exit area, equipment vehicles shall be thoroughly brushed; vehicles may alternatively be air blasted on site.
- The edge of riparian vegetation shall be shown on construction plans, as will the boundaries of the work area.
- Construction fencing shall be placed along the outer edge of the Proposed Action Area to protect the dune scrub and riparian habitat from incidental impacts.
- During construction, riparian vegetation shall be left undisturbed along San Antonio Creek channel banks in all areas. Streambank vegetation shall be clearly delineated by a qualified biologist.
- Clearing, grubbing, pruning, and mowing shall occur prior to bird nesting season (February 15 to August 15). Riparian vegetation in the work area shall be cut to approximately 2 to 6 inches, with roots and no less than 2 inches of stem remaining to allow plants to re-grow when construction is complete and to provide permanent erosion control.
- Biological monitor shall be present during clearing, grubbing, pruning, and mowing activities; crane pad construction (earth-moving activities); and during any vegetation removal. The biological monitor shall document compliance with all best practices and environmental compliance items for the project. The biological monitor shall be qualified to move wildlife from the project areas as needed.

- Crane mats may be used within riparian areas to prevent soil compaction by heavy equipment.
- Appropriate BMPs shall be used at the site to prevent sediment pollution from entering San Antonio Creek. Erosion control measures shall include both temporary and permanent protection, including but not limited to installation of silt fence, straw wattles, erosion control fabrics, and hydroseed. A SWPPP shall be prepared and implemented by qualified practitioners.
- No diversion or dewatering shall occur within the live channel.
- If excavations below the water table are necessary for footing repair or fiber optic cable replacement, a dewatering plan shall be prepared and approved by the Regional Water Quality Control Board (RWQCB) and VAFB prior to construction. Wet spoils removed from excavations shall be contained in aboveground, bermed structures that prevent dirty water from entering the creek. Water shall be pumped into a container such as a Baker tank, or equivalent. If excess water is captured, it shall be tested for water quality according to RWQCB Region 3 standards. Excess water may be used for dust control. Or, if filtered water quality is at or above San Antonio Creek water quality, water may be discharged to the creek in a manner that does not increase turbidity in the creek (e.g., through a vegetated filter) with appropriate approval from RWQCB Region 3. Biological monitoring may include additional patrols of banks and isolated pools and turbidity testing in San Antonio Creek.
- All hazardous materials required to operate and maintain construction equipment shall be properly used per manufacturer's specifications.
- The contractor shall follow an approved spill prevention plan, including procedures to ensure that all equipment is properly maintained and free of leaks, and all necessary repairs incorporate proper spill containment.
- Hazardous materials shall be properly stored and managed in secured areas located outside of the San Antonio Creek riparian corridor.
- Mobile equipment shall be staged, repaired, and maintained at least 500 feet outside the San Antonio Creek riparian corridor. Large equipment such as cranes shall be staged adjacent to the bridge, outside of the live stream. Fueling of equipment shall be conducted in pre-designated areas, outside of the live stream. Spill containment materials shall be placed around the equipment before refueling. Standing equipment (e.g., cranes) shall be outfitted with drip pans and hydrocarbon absorbent pads.
- If it is necessary to refuel or repair equipment within the riparian corridor, a qualified biologist shall be present to document protection of water quality and biological resources.
- Stationary equipment operating within or over the riparian area shall be placed on protective mats to minimize riparian habitat impacts. The protective mats will be sufficient in size, material, and design to prevent contamination of the creek.
- Night lighting required for construction shall be limited to areas that buffer light from reaching foredune habitat west of the project to minimize impacts to federally listed birds. Night lighting shall face down and inland to prevent light pollution and protect sensitive coastal bird habitat.

- Preconstruction surveys for nesting Western snowy plover and California least tern shall be conducted between March 1 and September 30 by a USFWS-approved biologist prior to bridge change-out operations to determine if these federally listed birds are nesting on beach or dune habitat west of the Narlon Bridge. If either species is found to be nesting west of the bridge, a qualified biological monitor shall be present during night lighting operations to monitor effects of night lighting.
- All temporary disturbed areas, including the access roads, shall be restored or revegetated (at a minimum) to the original condition, per the Restoration Plan.
- Disturbed riparian areas shall be planted with native riparian vegetation from cuttings and container stock. Live stake planting shall occur when soil moisture is high, in the fall or winter following the completion of construction. The riparian edge shall be reseeded with the riparian seed mix specified in the Restoration Plan.
- Disturbed dune scrub vegetation shall be seeded with the scrub seed mix specified in the Restoration Plan.
- California special-status plants (San Luis Obispo monardella, California spineflower, and Blochman's ragwort) shall be counted and mapped prior to construction, and seed shall be collected from within and adjacent to the project area. Seed shall be planted in appropriate habitat during site restoration activities.

Nesting Habitat Best Management Practices

- Monitor and protect sensitive nesting birds near construction activities. If construction must occur between February 15 through August 15, no more than 14 days prior to commencement of construction activities, a qualified biologist shall conduct a preconstruction survey for the presence of nesting birds. If an active nest of any federal- or State-listed threatened or endangered bird species, bird species of concern, or any species of raptor is identified within 300 feet of construction activities (within 500 feet for raptors) during such preconstruction surveys, or is otherwise identified during construction, UPRR shall notify all appropriate State and federal agencies within 24 hours and shall develop an appropriate action plan specific to each nest occurrence that shall be consistent with any recommendations of those agencies. Measures to be considered shall include, but not be limited to, modifying construction activities to avoid, minimize, and mitigate impacts to nesting birds, such as through implementing buffer zones around nests, installing sound-blocking BMPs, limiting the duration of construction activities, and/or re-locating construction-related machinery and activity.
- If active nests (nests with eggs or chicks) of common species are located within 300 feet of construction activities, the qualified biologist shall establish an appropriate avoidance buffer that ranges from 50 to 300 feet based on the species' biology and the current and anticipated disturbance levels occurring near the nest. The objective of the buffer shall be to reduce nest disturbance for common bird species. All buffers shall be marked with high-visibility flagging or fencing, and, unless approved by the qualified biologist, no construction activities shall be allowed within the buffers until the young have fledged from the nest or the nest fails. A qualified biologist shall monitor all work within 300 feet of the nest. The biologist shall immediately cease all project activity if the nesting birds show any signs of disturbance or distress.

- A preconstruction survey report shall be prepared upon completion of the survey and submitted to the VAFB environmental staff. The report shall discuss fencing or flagging of the buffer zone and make recommendations on additional monitoring requirements. A map of the project site and nest locations shall be included with the report.

Aquatic Species Best Management Practices

- Water quality parameters shall be measured prior to the commencement of the project in a manner that minimizes adverse impacts to the unarmored threespine stickleback, tidewater goby, and California red-legged frog (CRLF).
- A contingency plan shall be developed for the recovery and salvage of unarmored threespine sticklebacks, tidewater goby, and CRLFs in the event of a local toxic spill or accidental dewatering of their respective habitats.
- All project activities that may affect the CRLF, unarmored threespine stickleback, tidewater goby, or their respective habitats shall be monitored by a USFWS-approved biologist.

California Red-legged Frog Best Management Practices

- Qualified biologists shall brief all project personnel prior to their participation in construction activities. At a minimum, the briefing shall include a description of the project components and techniques, a description of the listed species occurring in the project area, and the general and specific measures and restrictions to protect the species during implementation of the project.
- Prior to start of construction activities, exclusionary silt fencing shall be installed to adequately exclude CRLF from the project area during active construction. These fences may be opened during periods of no construction (e.g., on weekends) to prevent entrapment of CRLF.
- USFWS-approved biological monitor(s) under the project's BO or one with a valid 10(a)(1)(A) permit for CRLF shall be on-call to relocate CRLF. The approved biological monitor shall be present onsite during all construction activities occurring in the riparian zone. Each day, prior to the start of construction activities in the riparian zone, biologist(s) shall survey the work sites for CRLF and look under parked vehicles and heavy equipment frequently (especially before work starts in the morning). CRLF captured during surveys or construction activities shall be relocated to the nearest suitable habitat outside of the project area.
- All trash shall be removed from the site daily or secured in a predator-resistant container to avoid attracting predators to the site.

El Segundo Blue Butterfly Best Management Practices

- Where seacliff buckwheat is present, vegetation maintenance shall be conducted prior to construction, after larvae have fallen into the soil for the pupal stage of their life cycle.
- Seacliff buckwheat shall be replanted on VAFB property to replace and enhance habitat for the El Segundo blue butterfly (ESBB).

Other Special-status Wildlife Species Best Management Practices

- Focused preconstruction surveys for Blainville's horned lizard and Northern California legless lizard shall be conducted by a qualified biologist prior to vegetation mowing that may affect potentially suitable habitat. If either species is found to be present, they shall be captured by a qualified biologist and removed to an appropriate area well outside the project area.
- A preconstruction survey shall be conducted to locate occupied American badger dens within 150 feet of project areas. The survey shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities. If active non-maternal dens are found, the entrances will be blocked with soil, sticks, and debris for three to five days to discourage the use of these dens prior to construction. The den entrances will be blocked to an incrementally greater degree over the 3-to-5-day period. After the project biologist determines that badgers have stopped using active dens, the dens will be hand-excavated with a shovel to prevent re-use during construction. If an active maternal badger den is found, a buffer of 150 feet identified with orange construction fencing shall be installed under the direction of the project biologist in a manner sufficient to protect the den from construction equipment. Construction activities shall not commence within the exclusion area until the natal den is no longer active and the badgers have moved of their own accord.

2.2.11.6 Water Resources

In addition to the BMPs listed in Section 2.2.11.5, the following BMPs shall be implemented to avoid or minimize impacts to water resources:

- The construction contractor shall follow National Pollutant Discharge Elimination System (NPDES) Construction General Permit requirements including preparation and implementation of a SWPPP. The SWPPP shall include BMPs for erosion and sediment control, non-stormwater management, spill prevention and control, vehicle and equipment fueling and maintenance, solid waste management, concrete waste management, stockpile management and septic waste management.
- The construction contractor shall adhere to accepted California BMP manuals, such as the California Stormwater Quality Association BMP Manual.
- Riparian vegetation shall be left undisturbed along San Antonio Creek channel banks in all areas.
- Sediment control BMPs will be implemented to protect San Antonio Creek during grading of pads for the temporary supports and fiber optic cable work near the channel.
- Erosion control measures shall include both temporary and permanent protection, including but not limited to installation of silt fence, straw wattles, erosion control fabrics, and hydroseed.
- All temporary sediment and erosion control devices including silt fence and wattles with plastic netting shall be removed upon project completion.
- The 30 CES Environmental Section will review any dewatering plan and proposed discharges of wastewater to grade.

2.2.11.7 Cultural Resources

VAFB and UPRR shall comply with all conditions stipulated in the SHPO's concurrence letter as part of Section 106 of the National Historic Preservation Act compliance. These conditions include the following:

- An archaeological monitor shall be present during construction through or adjacent to any known site, regardless of a site's National Register of Historic Places (NRHP) eligibility, and in any area where buried sites are possible.
- Within and adjacent to the Proposed Action Area, to prevent vehicles and equipment from inadvertently encroaching upon areas where archaeological deposits exist (particularly where CA-SBA-707, -708, and -2165 exist), UPRR shall install exclusionary fencing consisting of T-posts, attach a rope barrier to the T-posts, and attach signage to the rope at 100-foot intervals indicating an Environmentally Sensitive Area. This barrier shall be installed along access routes through the historic properties, and along the outer edge of the Proposed Action Area. Environmentally Sensitive Areas shall be shown on construction plans.
- If ground-disturbing activities result in the discovery of cultural resources or human remains during construction, work in that area shall be halted, the VAFB archaeologist shall be notified of the discovery, and the Air Force shall re-open the Section 106 process with SHPO. Work shall resume after reaching agreement on an acceptable resolution. Project construction outside the discovery location shall continue while the Air Force, SHPO, and the Tribe seek agreement on an acceptable resolution. Procedures established in 36 CFR 800.13 and the VAFB Integrated Cultural Resources Management Plan (if located on property subject to VAFB jurisdiction) shall be followed.

2.2.11.8 Geology and Earth Resources

- Erosion and sediment shall be controlled by implementation of any of the following measures: track-out grates of gravel beds at each egress point, wheel washing at each egress point during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding. A SWPPP shall be prepared that includes BMPs for erosion and sediment control.
- Visible roadway dust shall be removed from paved roadways at the end of each work day, when bulk material removal ceases. Visible roadway dust may be removed with either a vacuum sweeper or a wet sweeper.

2.2.11.9 Hazardous Materials and Solid Waste Management

- Proper disposal of hazardous waste shall be accomplished through identification, characterization, sampling, and analysis of wastes generated.
- All hazardous materials shall be properly identified and used per manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment. Wastes generated during construction and demolition shall be disposed of offbase by the contractor. However, to the greatest extent practicable, the contractor shall segregate all waste and manage the wastes separately. To the extent practicable, recyclable construction and demolition waste (e.g., steel rail and support assemblies) shall be transported to a recycler.

- All equipment shall be properly maintained and free of leaks during construction and maintenance activities. All necessary equipment maintenance and repairs shall be performed in pre-designated controlled, paved areas to minimize risks from accidental spillage or release. Prior to construction, a Spill Prevention Pollution Control Plan specific to this Proposed Action shall be submitted to 30 CES/CEI for approval.
- UPRR shall coordinate with VAFB regarding transport and use of hazardous materials (e.g., diesel fuel) for work outside of UPRR property prior to implementing the Proposed Action. Complying with VAFB requirements for use and transport of hazardous materials on Base property shall minimize the potential for adverse effects to occur.
- UPRR shall comply with federal OSHA requirements during construction and annual maintenance activities.
- UPRR shall be wholly responsible for the management and disposal of all hazardous and solid waste generated as a result of this project. This includes full accountability for any possible spill response and reporting.
- A Health and Safety Plan shall be developed and implemented. In addition, UPRR shall coordinate with the 30th Space Wing Safety-Weapon Safety prior to implementing the Proposed Action to minimize the potential for adverse effects to occur from unexploded ordnance (UXO) issues. Awareness training shall be incorporated into the worker health and safety protocol to minimize potential adverse impacts from UXO, biological hazards (e.g., snakes and poison oak), and physical hazards (e.g., rocky and unstable terrain).

2.2.11.10 Transportation

- Project personnel shall be encouraged to carpool to reduce traffic on VAFB roads.
- Construction traffic during periods of high volume may be able to enter from the north via the Titan Gate to bypass the Main Gate.
- Most of the equipment and materials shall be brought in through the Lompoc gate (Santa Lucia Road).
- A separate security checkpoint may be set up for construction traffic to avoid tying up VAFB security checkpoints.
- Truck trips shall be scheduled during non-peak traffic hours to the greatest extent practicable.

2.2.11.11 Public Utilities

If underground communication lines are damaged during construction operations, a new conduit shall be bored under San Antonio Creek, and the BMPs listed in the Fiber Optic Contingency Plan (Appendix H) shall be implemented.

2.3 Alternative B: No Action Alternative

Under the No Action Alternative, the existing Narlon Bridge, constructed in 1896, would continue to deteriorate and remain out of compliance with UPRR design specifications and with FRA regulations. Bridge maintenance would no longer suffice to make the structure serviceable for the transport of commodities and passengers. The inability to transport goods and materials to and

from VAFB could affect the 30 SW's mission to improve infrastructure and support operations (e.g., use of the Rail Garrison infrastructure). Although VAFB does not currently use UPRR rail for mission materials, the UPRR rail system could be utilized if needed, as the mission changes. SpaceX has upgraded a spur which is used for their mission. VAFB is also in communication with UPRR to discuss what services can be provided to use their tracks for the Base's mission.

The existing Narlon Bridge would continue to pose a safety risk to the continued use of the rail. Noncompliance with rail safety requirements could result in potential interruption in rail service and or even possible bridge failure, which could result in impacts to sensitive biological and cultural resources near the existing bridge. Neither UPRR standards for bridge safety nor FRA standards could be maintained, and service would be interrupted as the bridge continues to deteriorate over time.

Amtrak runs six trains per day across the Narlon Bridge. Between San Luis Obispo and Santa Barbara, Amtrak runs Coast Starlight (one north and one southbound) and Pacific Surfliner (two per day north and southbound). The Coast Starlight runs from Seattle through Portland and Sacramento to Los Angeles. These trains carry more than 2,000 people per day, which is the equivalent of 1,000 cars (at two persons/car). Freight (long-haul loads) uses the rail 2 times per week, plus local haulers use the rail 2 times per week. Each freight train provides the equivalent of approximately 250 commercial truck trips per train.

If rail transport is not available between San Luis Obispo and Santa Barbara due to bridge failure or outage, surface road transport would add more than 1,000 commercial trucks per week and 7,000 cars per week, equating to about 32,000 vehicle trips per month. Alternative rail travel would route trains via Sacramento, through the Central Valley, across the Tehachapi Range to Barstow, to connect to Los Angeles. This would adversely affect air quality, greenhouse gas (GHG) emissions, and energy use, and would increase traffic congestion.

2.4 Other Alternatives Considered and Eliminated from Further Analysis

In addition to the Proposed Action, three alternative bridge project designs were considered during the planning process. These alternatives were evaluated by use of selection standards outlined in Section 2.1. All alternatives met Selection Standard 1 (Air Force conditions for access and use of VAFB property) and Selection Standard 2 (UPRR safety, operational, and engineering standards). Alternatives were thus eliminated based on their conformance to Selection Standard 3 (avoid/minimize impacts to sensitive biological and cultural resources). All three of the eliminated alternatives would have greater temporary and/or permanent impacts to sensitive resources. The three alternatives are described below, and a comparison of resource impacts that would result from the Proposed Action and the three eliminated alternatives is presented in Table 2-3.

TABLE 2-3. TEMPORARY AND PERMANENT IMPACT ACREAGES OF PROJECT ALTERNATIVES

	Temporary Impact (acre)	Permanent Impact (acre)	Duration of Impact
Proposed Action	24.01	0.0	1 year
Concrete Bridge Design	26.4	0.019	2 years
Cellular Fill Design	25	0.8	1 year
Continuous Changeout	26.28	0.0	Less than 6 months

2.4.1 Concrete Bridge Design

The bridge would be approximately 760 feet in length and span San Antonio Creek. The approximate 16-foot-wide bridge deck would be supported by 11 new concrete columns anchored by drilled footings ranging in diameter from 4 feet to 9 feet cast-in-place concrete. The largest span between support columns would be approximately 180 feet. Two of the concrete columns ("bents") would be located in the riparian zone. This would permanently affect 0.005 acre of riparian habitat and 0.014 acre of central dune scrub. Pile boring and filling operations would require dewatering of drilled shafts. Water would be pumped into storage tanks, tested, and if clean, discharged back into San Antonio Creek per a dewatering plan. Dirty water would be removed to a legal disposal site. Mud spoils from drilling operations would need to be temporarily stored onsite before being hauled to legal disposal locations. The bridge would be made of concrete, which would necessitate the construction and operation of a concrete batch plant on VAFB property, either at Rail Garrison or the Tangair Staging Area. Concrete trucks would travel between the batch plant and the bridge construction site on existing paved and unpaved roads. This bridge design is covered under the 2013 BO issued by USFWS. This alternative was eliminated due to the increased size and duration of temporary and permanent impacts.

2.4.2 Cellular Fill Design

The bridge would be constructed of cellular concrete. Cellular concrete would fill the bridge footprint and would have the appearance of a solid wall. There would be five arched openings within the bridge structure, one over San Antonio Creek, one over the unpaved VAFB road to the south of the creek, and three within riparian and upland habitat. This would permanently affect up to 0.4 acre of riparian habitat and up to 0.4 acre of central dune scrub. There may also be impacts to wildlife movement within the riparian corridor. It is unclear whether the presence of the structure within the floodplain would impede water flow during a 100-year flood. The cellular concrete would be mixed onsite at the bridge; thus, a concrete batch plant would not be necessary. This alternative was eliminated because of the increased size of temporary and permanent impacts.

2.4.3 Continuous Changeout

Instead of replacing each span of the bridge separately in multiple changeouts separated by weeks, the bridge spans would be replaced in one long changeout lasting 1 to 2 weeks. This would shorten the duration of the construction process and reduce the duration of temporary riparian and central dune scrub impacts. It would also require at least three times the staging area acreage within the Narlon Bridge Project Site to have all materials ready for installation, adding at least 3.5 acres of temporary disturbance in central dune scrub habitat to the bridge staging area. This alternative was eliminated because of the increased size of temporary impacts.

3 AFFECTED ENVIRONMENT

This chapter describes the existing and affected environment around and within the Proposed Action Area for the Proposed Action and No Action Alternative. The area described may be confined to the Proposed Action Area, or a wider regional area may be considered, depending on the resource under discussion.

This EA analyzes the following resource areas in detail: air quality; biological resources, wetlands, and waters of the United States; water resources; cultural resources; socioeconomics; geology and earth resources; hazardous materials, solid waste, and human health and safety; land use; transportation; and utilities. The following resources were evaluated and determined either to not have the potential to occur or to result in negligible impacts:

- **Environmental Justice.** Per EO 12898, *Environmental Justice*, the potential effects of the Proposed Action on minority and low-income communities were evaluated. No impacts to minority and/or low-income populations will occur because neither the Proposed Action Area nor the anticipated impacts will be located near or extend to residential areas or to populations identified as minority or low income.
- **Noise (humans).** Noise above existing levels will occur during construction activities. The project site is in an undeveloped location with no sensitive noise receptors (i.e., housing, schools, or hospitals) near construction activities. Threatened and endangered species and other wildlife potentially or known to occur within or near the Proposed Action may be affected by noise. These impacts are evaluated in Section 3.2 (Biological Resources, Wetlands, and Waters of the U. S.) of this EA.
- **Recreation.** Access to the Narlon Bridge within VAFB is restricted by the Air Force, and the project area is not open to the public for outdoor recreation; therefore, impacts to recreational resources will not occur.
- **Visual Resources.** The replacement bridge will appear identical to the existing bridge. Access to VAFB is controlled by the Air Force, and access to the Proposed Action Area is not open to the public for viewing; therefore, impacts on visual resources will be considered negligible.

3.1 Air Quality

3.1.1 Definition of Resource

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million [ppm] by volume).

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as carbon monoxide (CO), sulfur dioxide (SO_2), lead, and some particulates, are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as ozone (O_3), nitrogen dioxide (NO_2), and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. Fine particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}) and fine particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ can also be formed as secondary pollutants through chemical reactions or by gaseous pollutants condensing into fine aerosols. In general, emissions that are considered "precursors" to secondary pollutants in the atmosphere (such as reactive organic gases (ROGs) and oxides of nitrogen (NO_x), which are considered precursors for O_3), are the pollutants for which emissions are evaluated to control the level of O_3 in the ambient air.

Criteria air pollutants evaluated include VOCs, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. GHG emissions were also evaluated, as they are expected to contribute to potential climate change impacts.

EPA and CARB are the primary agencies responsible for enforcing air quality regulations. The Federal and California Clean Air Acts (CAAs) requires states to develop and implement strategies to attain the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). The CAAQS were established by CARB and are generally more stringent than the NAAQS, except for the 1-hour NO_2 and SO_2 standards, and include four additional pollutants. Table 3-1 summarizes both the current NAAQS and CAAQS. Because the CAAQS are generally more stringent than the NAAQS, attainment of the CAAQS would require more emission reductions than what would be required to show attainment of the NAAQS. Similar to the federal system, the State requirements are based on the severity of the ambient air quality standard violation within a region (i.e., the region's attainment status).

TABLE 3-1. NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary [a]	Secondary [b]
Ozone	8 hours 1 hour	0.070 ppm 0.09 ppm	0.070 ppm —	0.070 ppm —
PM_{10}	Annual arithmetic mean 24 hours	20 µg/m^3 50 µg/m^3	— 150 µg/m^3	— 150 µg/m^3
$PM_{2.5}$	Annual arithmetic mean 24 hours	12 µg/m^3 —	12 µg/m^3 35 µg/m^3	15 µg/m^3 35 µg/m^3
CO	8 hours 1 hour	9.0 ppm 20 ppm	9 ppm 35 ppm	— —
NO_2	Annual arithmetic mean 1 hour	0.030 ppm 0.18 ppm	0.053 ppm 0.100 ppm	0.053 ppm —

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary [a]	Secondary [b]
SO_2	24 hours	0.04 ppm	—	—
	3 hours	—	—	0.5 ppm
	1 hour	0.25 ppm	0.075 ppm	—
Lead	Calendar quarter	—	1.5 µg/m^3	1.5 µg/m^3
	Rolling 3-month average	—	0.15 µg/m^3	0.15 µg/m^3
	30-day average	1.5 µg/m^3	—	—
Visibility-reducing particles [c]	8 hours	—	—	—
Sulfates	24 hours	25 µg/m^3	—	—
Hydrogen sulfide	1 hour	0.03 ppm	—	—
Vinyl chloride	24 hours	0.01 ppm	—	—

[a] Primary Standards represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[b] Secondary Standards represent the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a population.

[c] In 1989, CARB converted the general statewide 10-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer."

Source: CARB, 2016

Notes:

— = No applicable standard

µg/m^3 = microgram(s) per cubic meter

3.1.2 Federal Requirements

The CAA of 1970 and subsequent amendments specify regulations for controlling the nation's air quality. EPA is responsible for implementing most aspects of the CAA and has established NAAQS for the following criteria pollutants: CO, PM_{10}, $PM_{2.5}$, O_3, NO_2, SO_2, and lead. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety.

EPA designates a region meeting an air quality standard for a given pollutant as being in "attainment" for that pollutant. If the region is not meeting an air quality standard, it is designated as being in "nonattainment." Areas once designated as nonattainment areas that recently met the standard are designated "maintenance" areas. Areas with insufficient data to facilitate designation or areas where designations have yet to be made are "unclassified."

EPA requires facility owners and operators to report GHG emissions under the Mandatory Reporting of Greenhouse Gases Rule (40 CFR 98). This project will not be subject to federal GHG emissions reporting as it does not result in the construction or operation of any stationary emission sources identified in 40 CFR 98.2(a)(1) through (a)(3).

New Source Review

New Source Review (NSR) is required for stationary sources with a potential to emit any pollutant regulated under the federal CAA equal to or exceeding specified major source thresholds of 100

or 250 tons per year, depending on the source's industrial classification. SBCAPCD is the delegated authority for permitting stationary sources subject to the NSR process.

EO 13432

EO 13432 ensures all necessary actions integrate environmental accountability into an agency's day-to-day decision-making and long-term planning processes, with pollution prevention as the primary objective to the environmental management system process.

Air Force Instruction (AFI) 32-7040

AFI 32-7040 provides details of the Air Force Air Quality Compliance and Resource Management Program and explains how to assess, attain, and sustain compliance with the CAA and other federal, state, and local environmental regulations. While much of this document is geared towards establishing standardized procedures for preparing annual emissions inventories, it also requires the completion of a General Conformity applicability analysis and General Conformity determination per 40 CFR 93 to ensure a proposed action does not interfere with the applicable State Implementation Plan. Under AFI 32-7040, an Air Quality Impacts Analysis must also be completed to analyze and disclose all ambient air impacts and any permit requirements involving attainment criteria pollutant emissions, hazardous air pollutant emissions, and emissions of other regulated pollutants under the CAAs. If applicable, these analyses will be completed by use of the Air Conformity Applicability Model (ACAM) or other approved tool.

General Conformity

Under 40 CFR 93 and the provisions of Part 51, Subchapter C, Chapter I, Title 40, Appendix W of the CFR, of the CAA as Amended, federal agencies are required to demonstrate that federal actions conform with the applicable State Implementation Plan.

The EPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas. Because Santa Barbara County is an unclassified/attainment area for all NAAQS, the General Conformity Rule does not apply to the Proposed Action at VAFB.

3.1.3 Local Requirements

SBCAPCD regulates stationary sources of air pollution and establishes emission limitations and control requirements for various sources, based on their source type and magnitude of emissions. For example, SBCAPCD Rule 345, Control of Fugitive Dust from Construction and Demolition Activities, establishes limitations on the generation of fugitive dust emissions from construction and demolition sites (SBCAPCD 2010). SBCAPCD also implements a permit program for new or modified stationary sources of air pollutants.

Under the California CAA, SBCAPCD is required to develop an air quality plan to achieve and/or maintain compliance with federal and state nonattainment criteria pollutants within the air district. The most recent of these plans was prepared in 2016, and evaluates a number of emission reduction measures for stationary sources (SBCAPCD 2016). SBCAPCD has also issued guidance on the scope and content of environmental reviews under California Environmental Quality Act, which identifies thresholds for determining a project's significance (SBCAPCD 2017).

GHGs are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The accumulation of GHGs in the atmosphere influences the long-term

range of average atmospheric temperatures. The SBCAPCD has investigated several control strategies and mitigation measures to reduce emissions and decrease ambient concentrations of harmful pollutants, to help protect public health by reducing exposure to air pollutants that pose the greatest health risk, and to reduce GHG emissions to protect the climate (SBCAPCD 2019a).

3.1.4 Regional Setting

The climate of the Proposed Action Area is Mediterranean, characterized by warm, dry summers and mild, relatively damp winters. The average annual precipitation is approximately 19.41 inches. Because of the project site's proximity to the coastline, marine air from the Pacific Ocean has a strong moderating effect on air temperatures at this location, with average temperatures ranging from 46 to 76 degrees Fahrenheit (U.S. Climate Data 2019).

3.1.4.1 Attainment Status

VAFB is located within Santa Barbara County, which is within the South Central Coast Air Basin. The South Central Coast Air Basin comprises three counties: San Luis Obispo, Santa Barbara, and Ventura. The SBCAPCD is responsible for regulating stationary sources of air emissions in Santa Barbara County. Presently, Santa Barbara County is in attainment/unclassified for all NAAQS for all criteria pollutants and in attainment/unclassified for all CAAQS except for ozone and PM_{10} (SBCAPCD 2019b). As of April 2017, Santa Barbara County is designated as nonattainment-transitional for the State 8-hour O_3 standard.[1] Santa Barbara County violates the State PM_{10} standard. The major sources of O_3 in Santa Barbara County are from motor vehicles, the petroleum industry, and solvent usage. Sources of PM_{10} include mineral quarries, grading, demolition, agricultural tilling, road dust, and vehicle exhaust (SBCAPCD 2017).

CARB and SBCAPCD operate a network of ambient air monitoring stations in Santa Barbara County to measure ambient concentrations of air pollutants. The nearest air monitoring station to the Proposed Action Area is the VAFB station, which measures all criteria pollutants except $PM_{2.5}$. The closest $PM_{2.5}$ monitoring station to the project site is located on South H Street in Lompoc. Monitoring data collected at VAFB station show one exceedance of the State and federal 8-hour O_3 standards in 2017, 35 days of measured exceedances of the State 24-hour and annual PM_{10} standards, and 2 days of measured exceedances of the federal 24-hour PM_{10} standard. Monitoring data collected at the Lompoc station show 4 days of measured exceedances of the federal 24-hour $PM_{2.5}$ standard and no exceedances of the State and federal annual $PM_{2.5}$ standards (SBCAPCD 2019a).

3.1.4.2 Greenhouse Gases

The most common GHGs emitted from natural processes and human activities include CO_2, methane, and nitrous oxide. Total GHG emissions from a source are often reported as CO_2 equivalents (CO_2e).

In the United States, the primary source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light duty

[1] An area is designated nonattainment-transitional if, during a calendar year, the State standard is not exceeded more than three times at any one monitoring location.

trucks, other trucks, buses, and motorcycles) make up the largest source (second to electricity generation) of GHG-emitting sources. The primary GHG emitted is CO_2, which is generated mostly from fossil fuel combustion. Similarly, this project's main source of GHG emissions comes from the combustion of diesel and gasoline from construction equipment and other vehicles.

3.2 Biological Resources, Wetlands, and Waters of the U.S.

3.2.1 Region of Influence

The region of influence (ROI) considered in this EA for biological resources encompasses the region surrounding the six locations of the Proposed Action Area (see Section 2.2.1 and Figure 1-2), and San Antonio Creek and its associated riparian corridor downstream from the Narlon Bridge to the Pacific Ocean. The project location is approximately 1 mile from the coastline, at the intersection of the southern extent of the Santa Lucia Range of the Coast Ranges and the northwestern edge of the Santa Ynez Mountains of the Transverse Ranges. The northern and central portions of the Proposed Action Area are situated on the stabilized sand dunes of San Antonio Terrace, and the southern portion (Tangair Staging Area) is situated on the Burton Mesa.

San Antonio Creek is approximately 28 miles long within an approximate 150-square-mile watershed (Muir 1964) and provides hydrologic connectivity to estuarine and marine habitats (USFWS 2019). Upstream land use is primarily undeveloped natural habitat and agriculture, though urban development is also present in Los Alamos.

3.2.2 Methodology

The Proposed Action Area was surveyed for biological resources initially in 2011, and findings were reported in the BA (Althouse and Meade, Inc. 2012; Appendix A). These initial surveys inspected the Proposed Action Area to document wildlife, plants, and habitats. Follow-up botanical surveys were conducted in 2018 and 2019 to reassess the Proposed Action Area, document current site conditions, and gather updated information on the distribution of special-status and sensitive botanical resources. Wildlife species were observed and recorded during multiple site visits to the Proposed Action Area between 2011 and 2019. Bat surveys were conducted within the Narlon Bridge Project Site in order to determine whether bats may be roosting on the Narlon Bridge structure. Surveys were conducted for two nights in June 2019 using Petterson 500X bat detectors, and data was analyzed with SonaBat software. The complete lists of wildlife and plant species documented in the Proposed Action Area are included as Appendix K.

Review of relevant literature, reports, plans, and biological information was conducted prior to surveys to determine the known and potential biological resources near the Proposed Action Area. The California Natural Diversity Database (CDFW 2019) and the California Native Plant Society (CNPS) On-line Inventory of Rare and Endangered Plants of California (CNPS 2019) databases were queried for special-status species records within a 5-mile radius of the Narlon Bridge Project Site. The designated search area encompasses approximately 136 square miles (87,220 acres) of land and includes the Casmalia and Surf USGS 7.5-minute quadrangles. Additional special-status species research consisted of reviewing previous biological reports for the area (Pierson et al. 2002; Stanek and Whitfield 2017; Lehman 2018), data collected by VAFB environmental staff, online databases of specimen records maintained by the Consortium of California Herbaria, and

the Information for Planning and Consultation (IPaC) tool maintained by USFWS. Special-status species records were evaluated based on the presence of potentially suitable habitats present in the Proposed Action Area as well as any current or past records of occurrence nearby. Complete lists of potential special-status plant species are provided in Appendix L.

3.2.3 Wetlands and Waters of the U.S.

Under Section 404 of the Clean Water Act (CWA), wetlands are defined as areas that are "inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas (EPA, 40 CFR 230.3; USACE, 33 CFR 328.3). Waters of the U.S. most commonly encompass navigable waters bound by the OHWM, adjacent wetlands, and relatively permanent tributaries. EO 11990, *Protection of Wetlands*, dated May 24, 1977, and amended by EO 12608 on September 9, 1987, requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to enhance their natural and beneficial values.

A wetland delineation survey was conducted for the Proposed Action Area, *Delineation of Potentially Jurisdictional Wetlands and Waters for Narlon Bridge Replacement: Santa Barbara Subdivision Mile Post 291.33* (Appendix M). The wetland delineation followed methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (USACE 2008a), and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b). The wetlands survey area comprised approximately 21.2 acres near the Proposed Action Area, including a total of 2.54 acres of riparian habitat.

The approximate 319 linear feet of drainage with average OHWM of 21 feet wide (0.15 acre) were found to meet criteria for federal other (non-wetland) waters under CWA Section 404. San Antonio Creek contains dense algal mats, narrowleaf cattails, and water parsnip, as well as arroyo willows that encroach into the stream and thus meet the criteria for hydrophytic vegetation (see Figure 3-1).

The additional 2.39 acres of willow riparian vegetation outside and adjacent to the OHWM of San Antonio Creek and within the Proposed Action Area meet the definition of state wetland by California Department of Fish and Wildlife (CDFW), RWQCB, CCC, and the County of Santa Barbara (see Figure 3-1). This riparian habitat is classified as a broad-leaved deciduous scrub-shrub and persistent emergent palustrine wetland dominated by multi-stem arroyo willows and/or hydrophytic herbs. This upland area contained neither hydric soil nor hydrology and, therefore, will not be of federal jurisdiction.

3.2.4 Vegetation Resources

Most of the Proposed Action Area is extensively disturbed as a result of routine and ongoing road and facility maintenance activities. Exotic plant species with the ability to rapidly colonize disturbed areas dominate much of the Proposed Action Area. Native vegetation is biologically diverse, and the sandy dunes support special-status plant species. Vegetation types and potential special-status plant species are discussed in the following sections. A complete list of plant species observed in the Proposed Action Area is reported in Appendix K.

3.2.4.1 Vegetation Types

Three vegetation types were identified in the Proposed Action Area: arroyo willow riparian, central dune scrub (Holland 1986), and anthropogenic and ruderal (Holland and Keil 1995; Figure 3-1). Table 3-2 provides acreages, locations, and rarity status (global/state ranks) of each vegetation type within the Proposed Action Area.

Within the Narlon Bridge Project Site, the central dune scrub and arroyo willow riparian habitats within the UPRR ROW are subject to routine vegetation maintenance activities, and dune scrub and riparian vegetation composition and density differs between managed and unmanaged areas. The Narlon Station Staging Area is within the ROW but not subject to vegetation maintenance activities in decades; it, therefore, supports relatively undisturbed central dune scrub vegetation. However, much of the central dune scrub habitat in the Narlon Bridge Project Site is dominated by invasive species and is of a lower habitat quality. Vegetation adjacent to roads, railroad tracks, and within the maintained ROW supports ruderal, weedy, and/or invasive non-native species.

TABLE 3-2. VEGETATION RESOURCES

Habitat Type	Location	Global/State Rank	Approximate Acreage
Arroyo Willow Riparian	Along San Antonio Creek	G4/S4	2.54
Central Dune Scrub	Throughout the Proposed Action Area	G3/S3	14.8
Anthropogenic and Ruderal	Occasional in the Proposed Action Area, including roads and paved areas	--	6.67

Global/State Ranks:
G3/S3 – Vulnerable
G4/S4 – Apparently Secure

Arroyo Willow Riparian

San Antonio Creek is a perennial stream that flows through VAFB, west to the Pacific Ocean. Narlon Bridge spans San Antonio Creek approximately 1.2 miles upstream of its confluence with the ocean. San Antonio Creek supports arroyo willow riparian habitat, which is characterized by arroyo willow (*Salix lasiolepis*) thickets that dominate the canopy along creekbanks. Understory vegetation is composed of poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), poison hemlock (*Conium maculatum*), giant wildrye (*Elymus condensatus*), mugwort (*Artemisia douglasiana*) and other occasional herbs and shrubs. A portion of this habitat is within the UPRR ROW, and the vegetation is maintained by brush cutting approximately every other year. One special status plant species, black flowered figwort (*Scrohpularia atrata*) was observed in this habitat.

Central Dune Scrub

Central dune scrub habitat occurs in upland areas of the Proposed Action Area including the Narlon Bridge Project Site north and south of the riparian habitat, the Narlon Staging Area, around the edges of the Rail Garrison Staging Area and spur line, and along Watt Road. This habitat occurs on sandy semi-stabilized dunes and supports a diversity of plant species. Mock heather (*Ericameria ericoides*) dominates the shrub layer with scattered seacliff buckwheat (*Eriogonum parvifolium*) and other occasional shrub species such as bush lupine (*Lupinus arboreus*) and

California sage (*Artemisia californica*). The herbaceous layer is dominated by the invasive perennial veldt grass (*Ehrharta calycina*) with patches of non-native iceplant (*Carpobrotus edulis*). Other occasional herbs include coastal golden yarrow (*Eriophyllum staechadifolium*), California poppy (*Eschscholzia californica*), and common sandaster (*Corethrogyne filaginifolia*). Three special-status species were documented in this habitat: San Luis Obispo monardella (*Monardella undualata* ssp. *undulata*), California spineflower (*Mucronea californica*), and dune ragwort (*Senecio blochmaniae*).

Anthropogenic and Ruderal

Anthropogenic plant communities are dominated by plants introduced by man and established or maintained by human disturbance. Ruderal habitats contain assemblages of plants that thrive in waste areas, roadsides, and similar disturbed sites (Holland and Keil 1995). Anthropogenic habitats include human-made structures, features, and/or materials. Around San Antonio Creek, this includes the existing Narlon Bridge structure, an existing approximate 15-foot-wide and 40-foot-long wooden maintenance access bridge on the west side of the Narlon Bridge, and large, old bridge timbers on the banks of the creek on the east side of the Narlon Bridge. Other infrastructure within the Proposed Action Area includes railroad tracks, spur lines, railroad signals, asphalt, and VAFB access roads. These areas are primarily unvegetated, though occasional ruderal species may be present. Anthropogenic habitat comprises a large portion of the Tangair and Rail Garrison staging areas in the Proposed Action Area. The non-native blue gum (*Eucalyptus globulus*) trees present in the Tangair Staging Area are included in this habitat. Most of the blue gum trees on VAFB were planted; however, some groves are expanding through recruitment (WR 2009). The eucalyptus trees within the Tangair Staging Area were trimmed by UPRR for maintenance purposes in 2016 and are resprouting. Ruderal plant species occurring in low abundance include iceplant, perennial veldt grass, and non-native annual grasses. The Rail Garrison Staging Area and Building 1785 are primarily composed of asphalt.

3.2.4.2 Special-status Plant Species and Sensitive Natural Communities

Figure 3-2 depicts the current geographic information system (GIS) data for special-status plant species mapped in and near the Proposed Action Area by California Natural Diversity Database (CNDDB) and USFWS, and Figure 3-3 depicts USFWS-designated critical habitat. One sensitive natural community, central dune scrub, is present in the Proposed Action Area (Table 3-2). No federally listed plant species are present within the Proposed Action Area. There is designated critical habitat for La Graciosa thistle along the UPRR ROW north of the Narlon Bridge (see Figure 3-3). A total of four federally listed plant species are reported from the region, but will not be affected by the project. They are briefly discussed below.

Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) is listed as federally and State endangered. It is known to occur on coastal terraces in coastal scrub, coastal bluff scrub, and grassland habitats. Though this plant does occur on VAFB within 2.9 miles of the Proposed Action Area, it does not occur in the Proposed Action Area according to DNA analysis by Dr. Bruce Baldwin (2009) and confirmed by VAFB personnel (Evans, personal communications, 2019). This species was not detected in the Proposed Action Area during 2011, 2018 or 2019 botanical surveys. Therefore, the project will have no effect on Gaviota tarplant, and it will not be considered further.

Beach layia (*Layia carnosa*) is listed as federally and State endangered. It is known to occur on semi-stabilized sand in coastal strand, dune, and coastal scrub habitats. Comprehensive surveys

for beach layia on VAFB in 2017 documented beach layia in locations approximately 0.33 mile west and southwest of the Narlon Bridge Project Site, north and south of San Antonio Creek, but confirmed that it does not occur within the Proposed Action Area (Schneider and Calloway 2017). This species was not detected in the Proposed Action Area during 2011, 2018 or 2019 botanical surveys. Therefore, the Proposed Action will have no effect on beach layia, and it will not be considered further.

La Graciosa thistle (*Cirsium scariosum* var. *loncholepis*) and Gambel's water cress (*Nasturtium gambelii*) are both listed as federally and State endangered. La Graciosa thistle occurs in coastal marshes and swamps within dunes habitat, and Gambel's water cress occurs in freshwater marshes, streambanks, and lake margins. The closest known occurrences for these species are more than 5 miles from the Proposed Action Area; they are not documented in or near the Proposed Action Area by VAFB staff and were not detected in the Proposed Action Area during 2011, 2018 or 2019 botanical surveys. Although there is designated critical habitat for La Graciosa thistle within the Proposed Action Area along the UPRR ROW north of the Narlon Bridge (Figure 3-3), this species does not occur within the Proposed Action Area. These species will not be affected by the Proposed Action and will not be considered further.

Table 3-3 summarizes general information for the 19 special-status plant species that occur or have potential to occur in the Proposed Action Area, and provides the federal and California State status, global, and state rank; CNPS California Rare Plant Ranks (CRPR) status; the potential to occur; and whether or not the species was detected. The complete list of special-status plant species reported from the region is provided in Appendix L.

TABLE 3-3. POTENTIAL SPECIAL-STATUS PLANT LIST

Common and Scientific Name	Federal/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
red sand-verbena *Abronia maritima*	None/None G4/S3? 4.2	February–November	Coastal dunes; <100m. s CCo, SCo, ChI; Baja, CA.	High. Suitable coastal sand dune habitat is present in the Proposed Action Area.	No
aphanisma *Aphanisma blitoides*	None/None G3G4/S2 1B.2	February–June	Coastal bluff scrub, coastal dunes, coastal scrub, in sand or clay soil; <300 m. s CCo, SCo, ChI; Baja, CA.	Low. Suitable coastal dune habitat is present in the Proposed Action Area.	No
La Purissima manzanita *Arctostaphylos purissima*	None/None G2/S2 1B.1	November–May	Sandstone outcrops and sandy soil in chaparral. <300 m. s CCo, s SCoRO/WTR (w Santa Barbara Co.)	High. Suitable sandy soils are present in the Tangair Staging Area within the Proposed Action Area.	No
sand mesa manzanita *Arctostaphylos rudis*	None/None G2/S2 1B.2	November–February	Sandy soils, chaparral. <380 m. s CCo (Nipomo, Burton Mesa, Pt. Sal, sw SLO, nw SB Counties.	High. Suitable sandy soils are present in the Proposed Action Area.	No
ocean bluff milk-vetch *Astragalus nuttallii* var. *nuttallii*	None/None G4T4/S4 4.2	January–November	Rocks, coastal bluff scrub, coastal dunes; <120 m.	High. Suitable coastal dune habitats are present in the Proposed Action Area.	No
coastal goosefoot *Chenopodium littoreum*	None/None G2/S2 1B.2	April–August	Generally sandy soils, dunes; <40m. s CCo.	Moderate. Suitable sandy dune habitat is present in the Proposed Action Area.	No
Bolander's water-hemlock *Cicuta maculata* var. *bolanderi*	None/None G5T4/S2 2B.1	July–September	Coastal wetlands, marshes and swamps; <200 m. s ScV, CCo, SCo.	High. Suitable coastal wetland habitat is present in the Proposed Action Area. Proposed Action Area is downstream of a known occurrence.	No
surf thistle *Cirsium rhothophilum*	None/Threatened G1/S1 1B.2	April–June	Dunes, bluffs; <20 m. s CCo (s SLO, n SB Counties).	High. Suitable dune habitat is present in the Proposed Action Area.	No

Common and Scientific Name	Federal/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
dune larkspur *Delphinium parryi* ssp. *blochmaniae*	None/None G4/T2 1B.2	April–June	Coastal chaparral, sand. <200 m. s CCo.	High. Suitable sandy habitat is present in the Proposed Action Area and a known occurrence is near the Proposed Action Area.	No
beach spectaclepod *Dithyrea maritima*	None/Threatened G1/S1 1B.1	March–May	Sea shores, sandy soils on dunes near the shore; <50 m s CCo, SCo, Baja, CA.	High. Suitable dune habitat is present in the Proposed Action Area.	No
Blochman's leafy daisy *Erigeron blochmaniae*	None/None G2/S2 1B.2	June–August	Sand dunes and hills; <30 m. s CCo.	High. Suitable sand dune habitat is present in that Proposed Action Area.	No
Kellogg's horkelia *Horkelia cuneata* var. *sericea*	None/None G4T1?/S1? 1B.1	April–September	Old dunes, coastal sand hills; <200 m. CCo.	High. Suitable sand dune habitat is present in the Proposed Action Area.	No
dunedelion *Malacothrix incana*	None/None G3G4/S3S4 4.3	(January) April–October	Sandy coastal dunes; <300 m. CCo, SCo.	High. Suitable coastal dune habitat is present in the Proposed Action Area.	No
southern curly-leaved monardella *Monardella sinuata* ssp. *sinuata*	None/None G3T2/S2 1B.2	April–September	Sandy soils, coastal strand, dune and sagebrush scrub, coastal chaparral and woodland; <300 m. CCo, SCoRO, extirpated SCo.	Moderate. Suitable coastal strand dune habitat is present in the Proposed Action Area.	No
crisp monardella *Monardella undulata* ssp. *crispa*	None/None G3T2/S2 1B.2	April–August (December)	Active dunes; <100 m. s CCo (San Luis Obispo and Santa Barbara Counties).	High. Suitable active dune habitat is near the Proposed Action Area and a known occurrence overlaps the Proposed Action Area.	No
San Luis Obispo monardella *Monardella undulata* ssp. *undulata*	None/None G2/S2 1B.2	May–September	Stabilized dunes, coastal scrub, stabilized sandy soils; <200 m. CCo.	High. Suitable stabilized dunes and coastal scrub habitat is present in the Proposed Action Area.	**Yes**

Common and Scientific Name	Federal/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
California spineflower *Mucronea californica*	None/None G3/S3 4.2	March–July (August)	Sandy soil in coastal scrub, chaparral; <1400 m. CW, SW.	High. Suitable sandy soil and coastal scrub habitat are present in the Proposed Action Area.	**Yes**
black-flowered figwort *Scrophularia atrata*	None/None G2?/S2? 1B.2	March–July	Closed-cone coniferous forest, riparian scrub, dune habitats; in sand, diatomaceous shales, calcareous and other soil types. <400 m. s SCoRO.	High. Suitable dune habitat is present in the Proposed Action Area.	**Yes**
dune (Blochman's) ragwort *Senecio blochmaniae*	None/None G3/S3 4.2	May–October	Sand dunes, coastal floodplains, <100 m.	High. Suitable dune habitat is present in the Proposed Action Area.	**Yes**

California Geographic Subregion Abbreviations:

CCo: Central Coast | ChI: Channel Islands | SLO: San Luis Obispo | CW: Central West

SCo: South Coast | ScV: Sacramento Valley | SB: Santa Barbara | SW: South West

SCoRO: Outer South Coast Ranges | WTR: Western Transverse Ranges

CNPS California Rare Plant Ranks (CRPR; CNPS 2019):

CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere

CRPR 2B: Plants rare, threatened, or endangered in California, but more common elsewhere

CRPR 4: Plants of limited distribution - a watch list

CRPR Threat Ranks:

0.1 - Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 - Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

0.3 - Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Global/State Ranks:

G1/S1 – Critically Imperiled | G3/S3 – Vulnerable | G5/S5 – Secure

G2/S2 – Imperiled | G4/S4 – Apparently Secure

Note:

m = meter

3.2.4.3 Special-status Plant Species Descriptions

This subsection discusses the 19 occurring or potentially occurring non-listed special-status plant species listed in Table 3-3 that could be affected by the Proposed Action. Each plant species' habitat, range restrictions, known occurrences, and Proposed Action Area survey results are provided. Four special-status plant species were documented in the Proposed Action Area: San Luis Obispo monardella (*Monardella undualata* ssp. *undulata*), California spineflower (*Mucronea californica*), black-flowered figwort (*Scrophularia atrata*), and Blochman's ragwort (*Senecio blochmaniae*). One species of *Erigeron* was detected in the Proposed Action Area in 2011. An appropriately timed botanical survey for Blochman's leafy daisy (*Erigeron blochmaniae*) conducted in 2019 did not detect this species.

1. **Red sand-verbena** (*Abronia maritima*) is listed by CNPS as a CRPR 4.2. It occurs in coastal strand and dune communities at low elevations (less than 100 meters). It is a perennial herb with a bloom period that occurs between February and November. The closest known record is approximately 0.3 mile southeast of the Proposed Action Area (RSA680625; CCH 2019). The sandy soil and dune habitat in the Proposed Action Area and the proximity of a known occurrence record make this species highly likely to occur in the Proposed Action Area. Red sand-verbena was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
2. **Aphanisma** (*Aphanisma blitoides*) is listed by CNPS as a CRPR 1B.2. It ranges from Santa Barbara County south to Baja, California. It is known to occur in coastal bluff scrub, coastal dune, and coastal scrub habitats usually on clay or sandy soils up to 300 meters in elevation. It is an annual herb that typically blooms between February and June. The closest known record is approximately 4.3 miles northwest of the Proposed Action Area (CNDDB #7). The central dune scrub habitat in the Proposed Action Area is suitable for this species; however, the distance to a known occurrence makes this species unlikely to occur in the Proposed Action Area. Aphanisma was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
3. **La Purissima manzanita** (*Arctostaphylos purissima*) is listed by CNPS as a CRPR 1B.1 species endemic to Santa Barbara County. It is known to occur in chaparral and coastal scrub habitats on sandy soils and sandstone substrates. It is a shrub that typically blooms between November and May. In 2011, one La Purissama manzanita shrub was detected approximately 300 feet outside of the current northern boundary of the Tangair Staging Area. There is also a record approximately 0.2 mile east of the Proposed Action Area (CNDDB #9). The sandy soils in the Proposed Action Area and proximity of an occurrence record make this species highly likely to occur in the Proposed Action Area. La Purissima manzanita was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
4. **Sand mesa manzanita** (*Arctostaphylos rudis*) is listed by CNPS as CRPR 1B.2. It is endemic to San Luis Obispo County and Santa Barbara County. It is known to occur on sandy soils in maritime chaparral and coastal scrub habitats up to 380 meters in elevation. It is a shrub that typically blooms between November and February. The closest known record is 0.2 mile east of the Tangair Staging Area (CNDDB #1). The sandy soil and dune scrub habitat in the Proposed Action Area are suitable for this species, and the proximity of a known occurrence record makes this species highly likely to occur in the Proposed Action Area. Sand mesa

manzanita was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.

5. **Ocean bluff milk-vetch** (*Astragalus nuttallii* ssp. *nuttallii*) is listed by CNPS as a CRPR 4.2. It occurs from Marin County south to Santa Barbara County and is endemic to California. It is known to occur in coastal bluffs scrub and coastal dune habitats on rocky or sandy areas up to 120 meters in elevation. It is a perennial herb that typically blooms between January and November. The closest known record is approximately 0.1 mile east of the Narlon Station Proposed Action Area (UCSB61393; CCH 2019). The sandy soils and central dune scrub habitat in the Proposed Action Area are suitable for this species and the proximity to a known occurrence record makes this species highly likely to occur in the Proposed Action Area. Ocean bluff milk-vetch was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
6. **Coastal goosefoot** (*Chenopodium littoreum*) is listed by CNPS as a CRPR 1B.2 that occurs in generally sandy soils and dune habitat in low elevations of less than 40 meters. The closest known record is approximately 0.8 mile southwest of the Proposed Action Area (CNDDB #2). The central dune scrub habitat in the Proposed Action Area is suitable for this species, and it has the potential to occur. Coastal goosefoot was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
7. **Bolander's water-hemlock** (*Cicuta maculata* var. *bolanderi*) is listed by CNPS as a CRPR 2B.1 that occurs in coastal wetlands. The closest known record is approximately 1.8 miles east of the Proposed Action Area along a small tributary that flows into San Antonio Creek (CNDDB #17). The stream habitat in the Proposed Action Area is suitable for this species, and the proximity of a known occurrence record makes the species moderately likely to occur in the Proposed Action Area. Bolander's water-hemlock was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
8. **Surf thistle** (*Cirsium rhothophilum*) is listed as threatened species by the California Endangered Species Act and is listed by CNPS as a CRPR 1B.2. It is endemic to southern San Luis Obispo and northern Santa Barbara Counties. It is known to occur in coastal bluff and dune habitats in low elevations. It is a perennial herb that typically blooms between April and June. The closest known record is approximately 0.5 mile west of the Proposed Action Area (CNDDB #8) adjacent to the outlet of San Antonio Creek and the coastal strand to the north and south. The dune habitats in the Proposed Action Area are suitable for this species, and the proximity to a known occurrence record makes this species highly likely to occur in the Proposed Action Area. Surf thistle was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
9. **Dune larkspur** (*Delphinium parryi* ssp. *blochmaniae*) is listed by CNPS as a CRPR 1B.2. It is endemic to San Luis Obispo, Santa Barbara, and Ventura Counties. It is known to occur in dune, coastal scrub, and maritime chaparral habitats up to 200 meters in elevation. It is a perennial herb that typically blooms between April and June. The closest known record is approximately 0.2 mile north of the Proposed Action Area (CNDDB #21). The central dune scrub habitat in the Proposed Action Area is suitable for this species, and the proximity to a known occurrence record makes this species highly likely to occur. Dune larkspur was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.

10. **Beach spectaclepod** (*Dithyrea maritima*) is listed as threatened by the California Endangered Species Act and is listed by CNPS as a CRPR 1B.1. It is known to occur along seashores and coastal sand dunes. The closest known record is approximately 0.6 mile west of the Proposed Action Area (CNDDB #16) in the coastal strand habitat on the north side of the San Antonio Creek outlet. The central dune scrub habitat in the Proposed Action Area is suitable for this species, and the proximity to a known occurrence record makes this species highly likely to occur. Beach spectaclepod was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
11. **Blochman's leafy daisy** (*Erigeron blochmaniae*) is listed by CNPS as a CRPR 1B.2. It is endemic to Santa Barbara and San Luis Obispo Counties. It is known to occur in coastal dune and coastal scrub habitats at low elevations. It is a rhizomatous perennial herb that typically blooms between June and August. The closest known record is within the Proposed Action Area (CNDDB #28). The central dune scrub habitat in the Proposed Action Area is suitable for this species, and the presence of a known occurrence record within the Proposed Action Area makes this species highly likely to occur. The 2011 surveys of the Proposed Action Area detected a specimen of Erigeron that could not be positively identified to the species level. Blochman's leafy daisy was not detected during 2018 or 2019 site surveys.
12. **Kellogg's horkelia** (*Horkelia cuneata* var. *sericea*) is listed by CNPS as a CRPR 1B.1. It is distributed from Marin County south to Santa Barbara County. It is known to occur in sandy or gravelly substrates in coastal scrub, coastal dune, maritime chaparral, and closed-cone coniferous forest habitats up to 200 meters in elevation. It is a perennial herb that typically blooms between April and September. The closest known record is approximately 0.4 mile north of the Proposed Action Area (CNDDB #44). The central dune scrub habitat in the Proposed Action Area and the proximity of a known occurrence record make this species highly likely to occur in the Proposed Action Area. Kellogg's horkelia was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
13. **Dunedelion** (*Malacothrix incana*) is listed by CNPS as a CRPR 4.3 species known from the California central coast and Channel Islands and is endemic to California. It is known to occur in coastal sand dunes and in coastal scrub. It is a perennial herb that typically blooms between April and October. The closest known record is approximately 0.1 mile west of the Proposed Action Area (SBBG127296; CCH 2019). The sand dune habitat in the Proposed Action Area is suitable for this species, and the proximity of a known record makes this species highly likely to occur in the Proposed Action Area. Dunedelion was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
14. **Southern curly-leaved monardella** (*Monardella sinuata* ssp. *sinuata*) is listed by CNPS as a CRPR 1B.2. It is typically found in sandy soils of coastal strand and sagebrush scrub up to 300 meters in elevation. It is an annual herb that typically blooms between April and September. The closest known record is approximately 4.0 miles south of the Proposed Action Area (CNDDB #21). The sandy scrub habitat in the Proposed Action Area is suitable for this species; however, the distance to a known occurrence record makes this species unlikely to occur in the Proposed Action Area. Southern curly-leaved monardella was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.
15. **Crisp monardella** (*Monardella undulata* ssp. *crispa*) is listed by CNPS as a CRPR 1B.2 subspecies endemic to San Luis Obispo and Santa Barbara Counties. It is known to occur in

coastal dune and coastal scrub habitats up to 100 meters in elevation. It is a rhizomatous perennial herb that typically blooms between April and August (but as late as December). The closest known record is within the Proposed Action Area (CNDDB #12). The central dune scrub habitat in the Proposed Action Area is suitable for this species, and it has high potential to occur. Crisp monardella was not detected in the Proposed Action Area during the 2011, 2018, or 2019 surveys.

16. **San Luis Obispo monardella** (*Monardella undulata* ssp. *undulata*) is listed by CNPS as a CRPR 1B.2 subspecies endemic to San Luis Obispo and Santa Barbara Counties. It is known to occur in on sandy substrates in coastal dune and coastal scrub habitats up to 200 meters in elevation. It is a rhizomatous perennial herb that typically blooms between May and September. San Luis Obispo monardella was detected in central dune scrub habitat within the Narlon Bridge Project Site in the Proposed Action Area during the 2011, 2018, and 2019 surveys.
17. **California spineflower** (*Mucronea californica*) is listed by CNPS as a CRPR 4.2. It is endemic to Monterey to San Diego Counties. It is an annual herb that grows in sandy soils in grassland, coastal scrub, dune, woodland, and chaparral habitats up to 1,400 meters in elevation. It typically blooms between March and July (August). California spineflower was detected in central dune scrub habitat within the Narlon Bridge Project Site within the Proposed Action Area during the 2011, 2018, and 2019 surveys.
18. **Black-flowered figwort** (*Scrophularia atrata*) is listed by CNPS as a CRPR 1B.2 species endemic to Santa Barbara and San Luis Obispo Counties. It is known to occur in coast dune, coastal scrub, riparian scrub, chaparral, and closed-cone coniferous forest habitats up to 400 meters in elevation. It is a perennial herb that typically blooms between March and July. The closest known record is within the Proposed Action Area (CNDDB #23). Black-flowered figwort was detected along the margin of the arroyo willow riparian habitat in the Narlon Bridge Project Site within the Proposed Action Area during the 2019 surveys.
19. **Dune ragwort** (*Senecio blochmaniae*) is listed by CNPS as a CRPR 4.2. It is endemic to San Luis Obispo and Santa Barbara Counties. It is known to occur in coastal dune habitat at low elevations up to 100 meters. It is a perennial shrub that typically blooms between May and October. Dune ragwort was detected in central dune scrub habitat within the Narlon Bridge Project Site in the Proposed Action Area during the 2011, 2018, and 2019 surveys.

3.2.5 Wildlife Resources

Coastal, riparian, and aquatic habitats in the Proposed Action Area support numerous terrestrial and aquatic wildlife species. San Antonio Creek and the surrounding riparian habitat provide important habitat and act as a valuable wildlife corridor. A complete list of wildlife species observed in the Proposed Action Area is reported in Appendix K.

Common mammals such as valley pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), and wild pig (*Sus scrofa*) occur in the upland and riparian habitats. Numerous reptile species occur in the upland central dune scrub habitat, including Southern Pacific rattlesnake (*Crotalus oreganus helleri*), ring-necked snake (*Diadophis punctatus vandenburgii*), and San Diego gopher snake (*Pituophis catenifer annectens*). Amphibians including black-bellied slender salamander (*Batrachoseps nigriventris*) and Monterey ensatina (*Ensatina eschscholzii eschscholzii*) were observed in and around the creek. California red-legged frog (CRLF; *Rana*

draytonii), a federally listed species, was not observed, but is known to occur in San Antonio Creek. A variety of fish species are known to occur within San Antonio Creek, including the federally listed tidewater goby (*Eucyclogobius newberryi*) and unarmored threespine stickeleback (*Gasterosteus aculeatus williamsoni*).

Birds are abundant in riparian woodland on VAFB, and many species were observed there and in upland dune scrub habitat. Riparian species such as common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), and black phoebe (*Sayornis nigricans*) are common around San Antonio Creek; and species such as California thrasher (*Toxostoma redivivum*), wrentit (*Chamaea fasciata*), and spotted towhee (*Pipilo erythrophthalmus*) occur in central dune scrub habitat. Two inactive raptor nests were observed on the Narlon Bridge structure in January 2011, but only one raptor nest remained in 2018 and 2019. This raptor nest was occupied in the past by red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*). Federally listed bird species including California least tern (*Sternula antillarum browni*) and Western snowy plover (*Charadrius nivosus*) nest on the beach at the mouth of San Antonio Creek.

3.2.5.1 Special-status Wildlife Species

Figure 3-4 depicts the current GIS data for special-status wildlife species mapped in and near the Proposed Action Area by the CNDDB and USFWS, and Figure 3-3 depicts USFWS-designated critical habitat. Six federally listed wildlife species are known to occur or have high potential to occur in or adjacent to the Proposed Action Area and may be affected by the Proposed Action. Four are listed as federally endangered: El Segundo blue butterfly (*Euphilotes battoides allyni*), tidewater goby, unarmored threespine stickleback, and the California least tern; and two are federally threatened: CRLF and western snowy plover. California least tern and western snowy plover are not known to occur within the Proposed Action Area; however, they occur adjacent to the Proposed Action Area on the beach at the mouth of San Antonio Creek and may be affected by project activities. No Critical Habitat for listed wildlife is present in the Proposed Action Area.

Four other federally listed wildlife species reported from the region will not be affected by the project: least Bell's vireo, southwestern willow flycatcher, southern steelhead, and vernal pool fairy shrimp. They are discussed briefly here.

There is potentially suitable habitat in the arroyo willow riparian habitat around San Antonio Creek for the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and southwest willow flycatcher (*Empidonax traillii extimus*); however, protocol-level surveys conducted on VAFB in 2017 determined that these species are not present within the Proposed Action Area nor on VAFB property (Stanek and Whitfield 2017). There are no nesting records for either species in or near the Proposed Action Area, and none were seen during surveys in 2011 or 2018. Therefore, the project will not affect these two species, and they will not be considered further.

San Antonio Creek was surveyed in 2002 by National Marine Fisheries Service (NMFS) as part of a steelhead trout (*Oncorhynchus mykiss*) distribution study. Steelhead trout was determined to be "absent" from the drainage (NMFS 2003). This watershed is not listed as critical habitat for steelhead in the *Federal Register* (USFWS 2005) and is not included in the 2012 Recovery Plan for this species (NMFS 2012). Thorough fish surveys of San Antonio Creek in 2008 (Ball et al. 2009) did not observe any steelhead. Therefore, the project will not affect steelhead trout, and this species will not be considered further.

Vernal pool fairy shrimp (*Branchinecta lynchi*) is a federally threatened species documented in vernal pools on VAFB, but there are no vernal pools within—or near—the Proposed Action Area. Therefore, it will not be considered further.

There is also suitable habitat for 16 other non-listed special-status wildlife species within the Proposed Action Area. American peregrine falcon (*Falco peregrinus anatum*) is reported from the region and nests near the Proposed Action Area, but there is no suitable nesting habitat within the Proposed Action Area; therefore, it will not be considered further.

Table 3-4 summarizes general information for the 22 special-status wildlife species that occur or have potential to occur in the Proposed Action Area and provides the federal and California State status, global, and state rank; the potential to occur; and whether or not the species was detected.

3.2.5.2 Federally Listed Species Descriptions

A total of six occurring or potentially occurring federally listed special-status wildlife species listed in Table 3-4 could be affected by the Proposed Action. Habitat, range restrictions, known occurrences, and survey results for the Proposed Action Area are described.

1. ***El Segundo Blue Butterfly.*** The ESBB (*Euphilotes battoides allyni*) is listed as an endangered species under the federal ESA; it has no State listing status.

   The ESBB require seacliff buckwheat (*Eriogonum parvifolium*) to complete their lifecycle. The life span of this insect is about 1 year, although some pupae are known to remain in a type of dormancy for 2 or more years (USFWS 1998). The adult butterflies are active from mid-June to early September. The onset of flight is closely synchronized to the beginning of the flowering cycle of seacliff buckwheat. Adults consume seacliff buckwheat pollen and nectar, and mate and lay eggs on seacliff buckwheat flowers. Eggs hatch within 3 to 5 days, and larvae undergo four instars prior to pupation. During the larval ("caterpillar") stage, individuals remain concealed within flower heads and feed primarily on seacliff buckwheat seeds. By late September, the flowerheads have generally grown old and are unproductive, and the larvae have pupated underground or in the leaf litter at the base of the food plants until they emerge as adult butterflies (USFWS 1998; USFWS 2008).

   ESBB are found in dune scrub habitat throughout VAFB. Based on GIS shapefiles provided by VAFB biologists on April 30, 2012, ESBB are present at the north end of the Narlon Bridge and immediate vicinity, and in central dune scrub habitat adjacent to existing unpaved access roads.

2. ***Tidewater Goby.*** The tidewater goby (*Eucyclogobius newberryi*) is listed as a threatened species under the federal ESA; it has no State listing status.

   Tidewater goby are relatively small (usually less than 50 millimeters), with large pectoral fins and pelvic fins that join to form an abdominal disc (USFWS 2011). Males are nearly transparent, and females are generally darker on the body and dorsal and anal fins. Tidewater gobies are found only in California, living in generally brackish water of coastal lagoons, estuaries, marshes, and the lowest reaches of coastal streams. They occur along the coast from the Smith River near the Oregon border to Agua Hedionda Lagoon in San Diego County. Preferred habitat includes salinities of less than 10 parts per thousand, temperatures of 8 to 25 degrees Celsius, and well-oxygenated waters (Moyle 2002). They are not present in areas where steep, rocky substrate occurs without coastal beaches and estuaries. If extirpated from

a site, tidewater gobies can recolonize previously occupied habitats when environmental conditions are restored and individuals repopulate the area, often through natural or human-induced efforts (USFWS 2011).

Tidewater gobies generally live for 1 year, though rare exceptions are noted. Local populations can range from a few to several thousand individuals (USFWS 2011). Reproduction can occur year-round, but generally peaks in April and May (EPA 2010; USFWS 2011). Males dig a burrow 10 to 20 centimeters deep in coarse sand. Females lay 300 to 500 eggs that stick to the burrow wall. The male then guards the nest for several days until the young hatch and become pelagic.

Tidewater goby prey includes aquatic insects and small crustaceans such as mysid shrimp and amphipods. They are in turn eaten by steelhead, staghorn sculpin, and wading or diving birds such as herons or mergansers (EPA 2010). Factors that can adversely affect goby populations include sedimentation, poor habitat management, pollution, breaching lagoon sandbars, and competition with or predation by nonnative fish species (Moyle 2002).

The CNDDB lists tidewater gobies as having occurred in the portion of San Antonio Creek from the mouth to almost 2 miles upstream (CNDDB #57).

3. ***Unarmored Threespine Stickleback.*** The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) is listed as endangered under the federal ESA and endangered under the California Endangered Species Act.

   Unarmored threespine stickleback are relatively small, rarely exceeding 50 millimeters, with no or up to two "plates" on their lateral surface (Moyle 2002). Their name comes from the characteristic set of three rigid spines projecting upward and immediately anterior to the dorsal fin. Colors range from olive to dark green, white to golden ventral surface, and clear fins. Several species of stickleback occur throughout the state. Unarmored threespine stickleback were once abundant but are now rare. Populations are restricted to the upper Santa Clara River and its tributaries in Los Angeles County, San Antonio Creek on VAFB in Santa Barbara County, and the Shay Creek vicinity of San Bernardino County (USFWS 2009a). Stickleback prefer "quiet water" and are found in shallow, weedy pools and backwaters or among emergent plants at stream edges over gravel, sand, and mud, although they can complete their entire lifecycle in either fresh or salt water (Moyle 2002). Favorable habitats are usually shaded by dense and abundant vegetation, and algal mats floating in open reaches are also used (USFWS 2009a).

   Most stickleback live about a year. Females tend to be larger than males. Nests are built among aquatic plants, and spawning typically occurs in April through July (Moyle 2002). Males piece together nests of fine plant debris and algal strands, mate with several females, and defend their territory vigorously (USFWS 2009a). Eggs hatch in about a week, and fry remain in the nest for a few days before eventually dispersing.

   Typical prey includes aquatic insects, crustaceans, and earthworms, though cannibalization of stickleback eggs is common during the breeding season (Moyle 2002). In turn, stickleback are eaten by salmonids and birds, and frequently serve as hosts for intermediate stages of bird tapeworms. Factors that adversely affect unarmored threespine stickleback populations include stream channelization, urbanization, agricultural practices that contribute sediment or

nutrients to streams, oxygen reduction, groundwater removal, invasive vegetation (particularly *Arundo donax*), and pollution, among others (USFWS 2009a).

This species is known to occur in San Antonio Creek (CNDDB #1).

4. ***California Least Tern.*** The California least tern (*Sternula antillarum browni*) is listed as endangered under the federal ESA and endangered under the California Endangered Species Act.

   The California least tern is the smallest of the North American terns found along the Pacific Coast of California at less than 25 centimeters when full grown. It ranges from San Francisco south to Baja, California, with winter migration starting in the autumn (USFWS 2006). Although the route is not clearly defined, fall migrants are fairly common on beaches of Central America (USFWS 2006).

   The California least tern has long, narrow wings that are pale grey and black tipped. It has a black head cap and a forked tail. This species feeds exclusively on small fish caught in estuaries, bays, and near-shore marine waters. Predators include other birds such as gull-billed terns and burrowing owls (USFWS 2009b). Nesting colonies can be found on relatively open beaches that are kept clear of vegetation from natural tidal scouring, often near estuaries (USFWS 2006; USFWS 2009b). A typical nest consists of a simple scrape in sand and shell fragments (USFWS 2006). This species is gregarious and actively forages, nests, roosts, and migrates in colonies. A nesting colony usually consists of about 25 breeding pairs (USFWS 2006).

   This species is known to nest on the beach near the mouth of San Antonio Creek, approximately 0.45 mile west of the Proposed Action Area (CNDDB #8).

5. ***California Red-legged Frog.*** California red-legged frog (*Rana draytonii*) is listed as a threatened species under the federal ESA; it has no State listing status.

   CRLF are the largest frog native to the state. Adult bodies can reach 5 inches in length. Color can be reddish to gray, and the legs may or may not have characteristic red shading. The characteristic identifier of this species is the dorsolateral fold extending from just behind the eye to the joint of the legs, and positioned halfway between the frog's spine and each side.

   Once quite common throughout the state, CRLF lived from sea level to elevations of about 5,200 feet. Today, CRLF live in only 30 percent of their former range, primarily in coastal drainages of central California from Marin County south to northern Baja, California, (USFWS 2002). The most significant threat to CRLF is chytrid fungus (*Batrachochytrium dendrobatidis*) (USFWS 2010). Habitat requirements include aquatic breeding sites mixed with riparian and upland dispersal habitats. CRLF are known to migrate up to a mile across upland areas to find nearby water sources.

   CRLF generally require seasonal pools or streams that hold water until late summer for successful breeding, which occurs from November through April. Eggs are deposited on emergent vegetation such as rushes, cattails, and other vegetation, with masses containing 2,000 to 5,000 eggs floating on the water surface. Eggs hatch in 6 to 14 days depending on water temperature, with tadpoles developing in 20 to 22 days, and terrestrial frogs developing in 11 to 20 weeks (USFWS 2002). Reproduction begins after 2 to 3 years. CRLF can live for 8 to 10 years, but average lifespan is likely less (USFWS 2002).

Larval CRLF are thought to graze on algae. Adult frogs primarily consume invertebrates, but small vertebrates including Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*) represent a significant portion of their diet. Foraging occurs along shorelines and the water surface but can also occur several meters into dense riparian areas (USFWS 2002). Adult and subadult frogs feed primarily at night. Factors adversely affecting CRLF include urbanization, habitat fragmentation and degradation, impoundments, and predation by centrarchid fish and bullfrogs (*R. catesbeiana*).

This species occurs at several locations on VAFB, including along San Antonio Creek at the Proposed Action Area (CNDDB #491).

6. ***Western Snowy Plover.*** The western snowy plover (*Charadrius nivosus*) is listed as threatened under the federal ESA and is not listed under the California Endangered Species Act.

   The western snowy plover is a small shorebird in the family Charadriidae. It is less than 7 inches in length. The western snowy plover is recognized as one of twelve snowy plover subspecies occurring worldwide, and one of two found in North America. The Pacific Coast population of the western snowy plover ranges from southern Washington south to Baja, California, Mexico, with most of the population breeding between San Francisco Bay and southern Baja, California. Western snowy plovers winter in coastal California and Mexico (SRS Technologies 2000).

   Western snowy plovers usually nest in open and flat areas consisting of sandy or saline ground and little to no vegetation or driftwood (USFWS 2001). The majority of the individuals tend to be nesting-site faithful, returning to the same site to breed in subsequent seasons (USFWS 2001). The breeding season covers early March to late September, with the most southerly birds breeding earlier than the northerly (SRS Technologies 2000).

   Western snowy plovers forage on invertebrates found in the wet sand and washed-ashore kelp of the intertidal zone and sandy areas above high tide (SRS Technologies 2000). Some of these invertebrates may include mole crabs (*Emerita analoga*), crabs (*Pachygraspsus crasspie*), and many species of polychaetes, amphipods, flies, beetles, and clams (SRS Technologies 2000).

   This species is known to nest on the beach dunes near the mouth of San Antonio Creek, approximately 0.5 mile west of the Proposed Action Area (CNDDB #50).

TABLE 3-4. SPECIAL-STATUS ANIMAL LIST

Common Name Scientific Name	Federal/ State Status Global/ State Rank CDFW Rank	Nesting/ Breeding Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
American badger *Taxidea taxus*	None/None G5/S3 SSC	February–May	Needs sufficient food, friable soils, and open, uncultivated ground. Preys on burrowing rodents. Digs burrows. Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Moderate. Friable soils and prey are present in Proposed Action Area, though open grassy areas are largely absent.	No
California least tern *Sternula antillarum browni*	Endangered/ Endangered G4T2T3Q/S2 FP	March 15–August 15	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas. Nests along the coast from San Francisco Bay south to northern Baja, California.	Appropriate habitat is not present within the Proposed Action Area; however, this species is known to nest on the beach near the mouth of San Antonio Creek, and could be affected by project activities.	No
California red-legged frog *Rana draytonii*	Threatened/None G2G3/S2S3 SSC	January–September	Requires 11–20 weeks of permanent water for larval development. Must have access to estivation habitat. Lowlands and foothills in or near permanent sources of deep water with dense, shrubby, or emergent riparian vegetation.	High. This species is known to occur in San Antonio Creek.	No
Blainville's horned lizard *Phrynosoma blainvillii*	None/None G3G4/S3S4 SSC	May–September	Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects. Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Moderate. Suitable sandy scrub habitat present within Proposed Action Area.	No
El Segundo blue butterfly	Endangered/None G5T1/S1	June–September	Host plant is seacliff buckwheat (*Eriogonum parvifolium*). Requires areas of high loose sand (e.g., dunes).	High. This species has been documented on seacliff buckwheat within the Proposed Action Area.	No

Common Name Scientific Name	Federal/ State Status Global/ State Rank CDFW Rank	Nesting/ Breeding Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
Euphilotes battoides allyni					
hoary bat *Lasiurus cinereus*	None/None G5/S4 SA	Spring–Fall	Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water. Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	High. This species has been documented at the Narlon Bridge. Suitable dense canopy is present for roosting.	**Yes**
Lompoc grasshopper *Trimerotropis occulens*	None/None G1G2/S1S2 SA	Not available	Known only from Santa Barbara and San Luis Obispo Counties. This species has been found on exposed, weathered shale, on pale gravelly/rocky ground, often on or near roads.	Moderate. This species has been documented on VAFB roads. Potentially suitable gravel habitat is present on the edges of roads and railroad tracks within the Proposed Action Area.	No
monarch – California overwintering population *Danaus plexippus*	None/None G4T2T3/S2S3 SA	Not applicable	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Winter roost sites extend along the coast from northern Mendocino to Baja, California, Mexico.	Low. Although a known overwintering site is located near the Tangair Staging Area, suitable winter roosting habitat is not present within the Proposed Action Area.	No
Morro Bay blue butterfly *Plebejus icarioides moroensis*	None/None G5T2/S2 SA	March-July	Larval foodplant thought to be *Lupinus chamissonis*. Inhabits stabilized dunes and adjacent areas of coastal San Luis Obispo and Northwest Santa Barbara Counties.	Moderate. Suitable stabilized dunes with larval foodplant are present in the Proposed Action Area.	No
Northern California legless lizard *Anniella pulchra*	None/None G3/S3 SSC	May–September	Soil moisture is essential. They prefer soils with a high moisture content. Sandy or loose loamy soils under sparse vegetation.	High. Known to occur in dunes near the Proposed Action Area. Abundant loose sandy soils present within Proposed Action Area.	No

Common Name Scientific Name	Federal/ State Status Global/ State Rank CDFW Rank	Nesting/ Breeding Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
pallid bat *Antrozous pallidus*	None/None G5/S3 SSC	Spring–Summer	Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites. Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Moderate. Potentially suitable habitat is present in the Proposed Action Area.	No
silver-haired bat *Lasionycteris noctivagans*	None/None G5/S3S4 SA	Spring–Fall	Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes, and rarely under rocks. Needs drinking water. Primarily a coastal and montane forest dweller, feeding over streams, ponds, and open brushy areas.	High. Suitable roosting and foraging habitat is present in the Proposed Action Area.	**Yes**
tidewater goby *Eucyclogobius newberryi*	Endangered/None G3/S3 SSC	Year-round	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels. Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River.	High. This species has been documented in San Antonio Creek.	No
Townsend's big-eared bat *Corynorhinus townsendii*	None/None G3G4/S2 SSC	Spring–Summer	Roosts in caves, mines, old buildings, or other cavern-like structures. Roosting sites limiting. Extremely sensitive to human disturbance. Throughout California in a wide variety of habitats. Most common in mesic sites.	Low. Poor quality potential habitat is present within the Proposed Action Area. Unlikely to occur due to the degree of human disturbance in the vicinity.	No
two-striped garter snake *Thamnophis hammondii*	None/None G4/S3S4 SSC	Spring	Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth. Coastal California from vicinity of Salinas to northwest Baja, California. From sea to about 7,000 feet elevation.	High. This species has been documented in San Antonio Creek.	No

Common Name Scientific Name	Federal/ State Status Global/ State Rank CDFW Rank	Nesting/ Breeding Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
unarmored threespine stickleback *Gasterosteus aculeatus williamsoni*	Endangered/Endangered G5T1/S1 FP	April-July	Cool (<24 degrees Celsius), clear water with abundant vegetation. Weedy pools, backwaters, and among emergent vegetation at the stream edge in small Southern California streams.	High. This species has been documented in San Antonio Creek.	No
western pond turtle *Emys marmorata*	None/None G3G4/S3 SSC	April–August	Permanent or semi-permanent streams, ponds, lakes.	Moderate. This species has been documented in San Antonio Creek, over 5 miles upstream from Narlon Bridge.	No
western red bat *Lasiurus blossevillii*	None/None G5/S3 SSC	Spring–Fall	Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging. Roosts primarily in trees, 2 to 40 feet above ground, from sea level up through mixed conifer forests.	Moderate. Potentially suitable habitat is present in trees adjacent to Tangair Staging Area and in riparian habitat along San Antonio Creek.	No
western snowy plover *Charadrius nivosus*	Threatened/None G3T3/S2S3 SSC	March 15–August 15	Needs sandy, gravelly, or friable soils for nesting. Sandy beaches, salt pond levees, and shores of large alkali lakes.	Appropriate habitat is not present within the Proposed Action Area; however, this species is known to nest on the beach near the mouth of San Antonio Creek and could be affected by project activities.	No
yellow warbler* *Setophaga petechia brewsteri*	None/None G5/S3S4 SSC	March 15–August 15	Nests in riparian plant associations, including willows, cottonwoods, etc.	High. Suitable breeding habitat is present in riparian woodland along San Antonio Creek.	No
yellow-breasted chat* *Icteria virens*	None/None G5/S3 SSC (Nesting)	March 1–August 31	Inhabits riparian thickets of willow and brush. Nests within 10 feet of ground.	Low. Suitable breeding habitat is present, but species is rare in northern Santa Barbara County.	No

Common Name Scientific Name	Federal/ State Status Global/ State Rank CDFW Rank	Nesting/ Breeding Period	Habitat Preference	Potential to Occur	Detected during Project Surveys
Yuma myotis *Myotis yumanensis*	None/None G5/S4 SA	Spring–Summer	Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings, or crevices. Optimal habitats are open forests and woodlands with sources of water over which to feed.	Moderate. Suitable foraging habitat is present within the Proposed Action Area, though only low quality roosting habitat is present.	**Yes**

*Not listed in the CNDDB for the search area, but species is a possibility for the location.

Federal and State Status Abbreviations:

FE: Federally Endangered	CE: California Endangered
FT: Federally Threatened	CT: California Threatened
PE: Proposed Federally Endangered	CCE: Candidate for California Endangered
PT: Proposed Federally Threatened	CCT: Candidate for California Threatened

Global/State Ranks:

G1/S1 – Critically Imperiled
G2/S2 – Imperiled
G3/S3 – Vulnerable
G4/S4 – Apparently Secure
G5/S5 – Secure

Q – Element is very rare but there are taxonomic questions associated with it.

Range rank – (e.g., S2S3 means rank is somewhere between S2 and S3)

? – (e.g., S2? Means rank is more certain than S2S3 but less certain that S2)

California Department of Fish and Wildlife Rank:

WL:	Watch List
SSC:	Species of Special Concern
FP:	Fully Protected
SA:	Special Animal

3.2.5.3 Other Special-status Species Descriptions

Sixteen observed or potentially occurring non-listed special-status wildlife species are listed in Table 3-4 that could be affected by the Proposed Action. Habitat, range restrictions, known occurrences, and survey results for the Proposed Action Area are described. Three special status wildlife species were detected in the Proposed Action Area: hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and Yuma myotis (*Myotis yumanensis*).

1. **American badger** (*Taxidea taxus*) is a California Species of Special Concern known from open grassland habitats throughout San Luis Obispo and Santa Barbara Counties and elsewhere in California. Badgers are highly mobile and hunt ground squirrels and other small- to medium-sized prey. This species has been detected next to the Rail Garrison Staging Area (CNDDB #3). Although there is little grassland within the Proposed Action Area, there are friable soils and suitable prey present. No sign of American badger was detected in the Proposed Action Area during site surveys.
2. **Blainville's horned lizard** (*Phrynosoma blainvillii*) is a California Species of Special Concern. Horned lizards are found in dry habitats from coastal dunes to inland deserts. Populations in San Luis Obispo and Santa Barbara Counties are widespread, but the lizards are always uncommon. The closest known occurrence of this species is approximately 0.6 mile east of the Proposed Action Area (CNDDB #573). Appropriate habitat for the Blainville's horned lizard is present in central dune scrub within the Proposed Action Area. Blainville's horned lizard was not detected in the Proposed Action Area during site surveys.
3. **Hoary bat** (*Lasiurus cinereus*) is a Special Animal tracked by CDFW. It is widely distributed throughout most of California, though it is uncommon in southeastern deserts. Hoary bats roost mainly in dense foliage of medium to large deciduous or coniferous trees, typically in trees at the edge of a clearing. Roosting has also been documented in caves, under rock ledges, and in tree hollows. Hoary bats were detected near the Narlon Bridge (CNDDB #188) in 1997 (Pierson et al. 2002), and suitable roosting habitat is present in riparian woodland along San Antonio Creek. Hoary bats were detected in the Proposed Action Area foraging along San Antonio Creek during 2019 bat surveys.
4. **Lompoc grasshopper** (*Trimerotropis occulens*) is a Special Animal tracked by CDFW. It is known only from Santa Barbara and San Luis Obispo Counties. Little is known about its habitat requirements. The only known occurrences outside of the original specimen collections in 1909 and 1938 are a series of records from 2010 and 2011 on and near VAFB. In all instances the grasshoppers were located on exposed, weathered shale in open rocky or gravelly areas. The closest known occurrence is located on the side of Lompoc-Casmalia Road on VAFB approximately 3.9 miles east of the Proposed Action Area (CNDDB #5). Roads and railroad tracks with open gravelly areas are present in the Proposed Action Area. Lompoc grasshopper was not observed in the Proposed Action Area during site surveys, but insect surveys were not conducted, and the species may be present in low numbers.
5. **Monarch butterfly** (*Danaus plexippus*) is a sensitive species that migrates in the fall to wintering locations along the coast of central and Southern California. Winter aggregation sites in California are tracked by CDFW. There are over 100 known wintering sites in Santa Barbara County, and 29 known wintering sites on VAFB. There is an aggregation site approximately 0.15 mile south of the Tangair Staging Area (CNDDB #287) that has been occupied annually since at least 1997 (Xerces 2018). Annual monitoring of this monarch

overwintering site indicates that the monarchs cluster south of the Tangair rail spur and do not cluster in the eucalyptus trees within or adjacent to the Tangair Staging Area. The eucalyptus trees within the staging area do not provide suitable overwintering habitat for monarchs; therefore, there is no suitable monarch clustering habitat within the Proposed Action Area. Monarch butterflies were not observed within the Proposed Action Area during site surveys.

6. **Morro Bay blue butterfly (MBBB)** (*Plebejus icarioides moroensis*) is a Special Animal tracked by CDFW. It is restricted to coastal dune habitats from Nipomo to Morro Bay in San Luis Obispo County. Dune lupine (*Lupinus chamissonis*) is the host plant, and larva are attended by ants. There is one unconfirmed occurrence which has no date or exact location, but is near the Rail Garrison Staging Area (CNDDB #10). Suitable stabilized dune habitat with dune lupine is present within the Proposed Action Area. MBBB was not observed in the Proposed Action Area during site surveys but insect surveys were not conducted, and the species may be present in low numbers.
7. **Northern California legless lizard** (*Anniella pulchra*) is a California Species of Special Concern that occurs from Contra Costa to Santa Barbara County. Northern California legless lizard inhabits friable soils in a variety of habitats from coastal dunes to oak woodlands and chaparral. Adapted to subterranean life, the legless lizard thrives near native coastal shrubs that produce an abundance of leaf litter and have strong root systems. Northern California legless lizard are known to occur in coastal sand dunes and dune terrace within the immediate vicinity of the Proposed Action Area (CNDDB #304, #305, #310). There is suitable habitat for legless lizards in central dune scrub within the Proposed Action Area. Northern California legless lizard was not observed in the Proposed Action Area during site surveys.
8. **Pallid bat** (*Antrozous pallidus*) is a California Species of Special Concern. The pallid bat is a large, long-eared bat that occurs throughout the state and occupies a wide variety of habitats. Although most common in open, dry areas ideal for foraging with rocky outcrops for roosting, pallid bats are also found regularly in oak and pine woodlands where they roost in caves, mines, rock crevices, hollow trees, and buildings. Bridges are also frequently used by pallid bats, often as night roosts between foraging periods (Pierson et al. 1996). The closest reported occurrence of the pallid bat is approximately 1.2 miles east of the Narlon Bridge (CNDDB #379). Although pallid bats are known to roost in bridges, the open deck structure of the Narlon Bridge does not offer suitable protection. There is potential roosting habitat in trees in the riparian corridor of San Antonio Creek. Pallid bats were not detected in the Proposed Action Area during site surveys, nor during 2019 bat surveys.
9. **Silver-haired bat** (*Lasionycteris noctivagans*) is a Special Animal tracked by CDFW. They are a forest-dwelling species that roost almost exclusively in trees, using woodpecker hollows and flaking bark. They forage above the canopy, in clearings, and in riparian corridors along water courses. Silver-haired bat was detected acoustically at three locations on VAFB in 1997 and 1998 (Pierson et al. 2002). The nearest detection was recorded at the intersection of Lompoc-Casmalia Road and San Antonio Creek, located approximately 3.2 miles east of the Proposed Action Area (CNDDB #132). There is potential roosting habitat in trees in the riparian corridor of San Antonio Creek. Silver-haired bats were detected in the Proposed Action Area foraging along San Antonio Creek during 2019 bat surveys.
10. **Townsend's big-eared bat** (*Corynorhinus townsendii*) is a California Species of Special Concern. It is found in most habitats throughout California but prefers mesic habitats. Their

preferred roosting habitat is cave dwellings, but on the Pacific Coast they have an affinity for abandoned buildings, tunnels, and bridges. They are sensitive to human disturbance at roosting sites (Pierson et al. 1996). Townsend's big-eared bat has been documented roosting in abandoned buildings on VAFB less than a mile east of the Proposed Action Area (CNDDB #211). Although this species is known to roost in bridges, the open deck structure of the Narlon Bridge does not offer suitable protection, and is a site subjected to high levels of noise and disturbance from crossing trains. It is therefore unlikely that Townsend's big-eared bat will roost within the Proposed Action Area. This species was not observed in the Proposed Action Area during site surveys, nor during 2019 bat surveys.

11. **Two-striped garter snake** (*Thamnophis hammondii*) is a California Species of Special Concern that occurs along the coast from Monterey County south to San Diego County. Its range extends throughout the Transverse and Peninsular Ranges, including desert localities near Victorville, and also on Catalina Island. Two-striped garter snakes are an aquatic species that feed primarily on fish, amphibians, and their larvae. The two-striped garter snake is reported from San Antonio Creek (CNDDB #26) and could be present within the Proposed Action Area. This species was not observed in the Proposed Action Area during site surveys.
12. **Western pond turtle** (*Emys marmorata*) is a California Species of Special Concern that inhabits ponds, lakes, reservoirs, marshes, brackish lagoons, and slow-moving streams with adequate pools. In areas where surface water dries out during summer months, pond turtles can aestivate in wooded areas. Mating is in the spring; eggs are laid in shallowly dug nests near water during the summer, and hatchlings emerge in the fall or overwinter in the nest. The closest record is approximately 6 miles east of the Proposed Action Area upstream in San Antonio Creek (CNDDB #1009). San Antonio Creek provides suitable habitat for the western pond turtle. This species was not observed in the Proposed Action Area during site surveys.
13. **Western red bat** (*Lasiurus blossevillii*) is a California Species of Special Concern. They roost in trees; and in California, roosting habitat includes forests and woodlands from lowlands up through mixed conifer forests of mountains. Foraging habitat includes grasslands, shrublands, open woodlands and forests, and croplands. Red bats in California appear to be strongly associated with riparian habitats, particularly mature stands of cottonwood/sycamore. Western red bat was detected acoustically at multiple locations on VAFB in 1997 and 1998 (Pierson et al. 2002). The nearest detection was recorded where El Rancho Road crosses San Antonio Creek, located approximately 2.4 miles east of the Narlon Bridge (CNDDB #33). There is potential roosting habitat in trees in the riparian corridor of San Antonio Creek, although there are no cottonwoods or sycamores within the Proposed Action Area. Western red bats were not observed in the Proposed Action Area during site surveys, nor during 2019 bat surveys.
14. **Yellow warbler** (*Setophaga petechia*) is a California Species of Special Concern (nesting locations only). This species winters in Central and South America and migrates to North America during the spring/summer breeding period. Yellow warbler frequents riparian habitats where it nests in sycamores, cottonwoods, willows, alders, ash, and other riparian trees. Yellow warbler has been documented breeding on lower San Antonio Creek (Lehman 2018) and is present in riparian habitat throughout VAFB (eBird 2019). There is suitable breeding habitat in the riparian habitat within the Proposed Action Area. Yellow warbler was not observed in the Proposed Action Area during site surveys.

15. **Yellow-breasted chat** (*Icteria virens*) is a California Species of Special Concern that nests in dense riparian habitat in western North America. It has declined significantly in Santa Barbara County and is now uncommon and local in the northern coastal areas of the county (Lehman 2018). Although yellow-breasted chat has been observed on San Antonio Creek along San Antonio Road (eBird 2019), and was documented as breeding in Barka Slough and along the Santa Ynez River in the 1980s and 1990s (Lehman 2018), there are no records in the CNDDB for nesting yellow-breasted chat in Santa Barbara County. There is suitable breeding habitat within the Proposed Action Area along San Antonio Creek, although yellow-breasted chats are unlikely to be present. Yellow-breasted chat was not observed in the Proposed Action Area during site surveys.
16. **Yuma myotis** (*Myotis yumanensis*) is a Special Animal tracked by CDFW. Yuma myotis is a small bat widely distributed throughout western North America and is the species of bat most commonly associated with human-made structures. It is often associated with permanent water sources. Crevices are preferred roost areas including those found in cliffs, buildings, and bridges, although it will also roost in tree cavities. Yuma myotis was detected at multiple locations on VAFB in 1997 and 1998 (Pierson et al. 2002). The nearest location to the Proposed Action Area was a day roost in a building less than a mile southeast from the Narlon Bridge (CNDDB #179). Although this species is known to roost in bridges, the open deck structure of the Narlon Bridge does not offer suitable protection. There is marginally suitable roosting habitat in the Proposed Action Area in the riparian woodland along San Antonio Creek. Yuma myotis were detected foraging along San Antonio Creek in the Proposed Action Area during 2019 bat surveys.

3.3 Water Resources

The federal CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. The CWA and associated EPA regulations provide the authority and framework for state regulations.

In California, the State Water Resources Control Board (SWRCB) and RWQCB administer the CWA and state regulations. The CWA mandates that point source discharges to surface water or to the ocean are subject to the NPDES permit program (EPA 2019). RWQCB is responsible for management of the NPDES Construction General Permit process for California. The Central Coast RWQCB is the local agency responsible for the VAFB area.

The NPDES Construction General Permit for construction activities ensures that water discharged from a site meets water quality standards at the point of discharge. The NPDES Construction General Permit also reduces and eliminates stormwater and non-stormwater discharges associated with construction activities through BMP controls, site inspections, and monitoring to evaluate the effectiveness of the permit implementation actions.

SWRCB issued Water Quality Order No. 2004-004-DWQ to govern dredged or fill to waters deemed by USACE to be outside of federal jurisdiction (General WDRs; SWRCB 2004). This order requires any discharger of waste (e.g., temporary bridge piles) to file a report of waste discharge. These General WDRs are restricted to dredged or fill discharges of not more than 0.2 acre and 400 linear feet for fill and excavation discharges, and of not more than 50 cy for dredging discharges. These General WDRs do not require compensatory mitigation for temporary impacts, because SWRCB does not anticipate that projects eligible under this order would

ordinarily create temporary impacts of a size, severity, and/or duration that would have a significant adverse impact on beneficial uses.

Fill material placed within wetlands, riparian areas, headwaters, and other waters causes partial or complete loss of the beneficial uses provided by those waters. To reconcile such losses with the "No Net Loss" requirements of EO W-59-93 and the "Antidegradation" requirements of SWRCB Resolution No. 68-16, these General WDRs require mitigation plans to ensure that impacts are mitigated through avoidance and minimization, and that unavoidable loss of beneficial uses is offset with appropriate compensatory mitigation, including creation, restoration, or (in exceptional cases) preservation of other waters of the State. These mitigation requirements are consistent with those adopted by EPA and USACE for regulation of dredged or fill discharges to federal waters under CWA Section 404. A General WDR will be obtained for this project after receipt of comments from the RWQCB. Documentation from RWQCB will be included as Appendix F in the final version of this Environmental Assessment.

Discharge of wastewater (industrial, domestic, drinking water) is regulated by the California Water Code Division 7, Article 4 and California Code of Regulations Title 27, Division 2. Discharge of hazardous substances is not permitted under any circumstances. On VAFB, the 30 CES Environmental Section, Water Resources reviews all requests for discharges of wastewater to grade (Discharge to Grade Program) to protect groundwater quality and comply with State water quality regulations. Wastewater that contains contaminants above certain levels may not be discharged to grade.

EO 11988, Floodplain Management, directs all federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

EO 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies must avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative to such construction and the proposed action includes all feasible measures to minimize harm to wetlands that may result from such use.

Section 404 of the CWA establishes a permit program administered by USACE. Section 404 regulates the discharge of dredged or fill material into waters of the United States (including wetlands). USACE was consulted in February 2019 regarding the bridge replacement project under the Proposed Action. Because the Proposed Action has been designed to avoid impacts to the OHWM of San Antonio Creek, and no disturbance is proposed below the OHWM, USACE determined on February 28, 2019, that a Section 404 permit will not be required. Documentation supporting USACE's determination is included as Appendix G.

3.3.1 Region of Influence

VAFB encompasses portions of two major drainage basins: San Antonio Creek and the Santa Ynez River. Aquifers capable of yielding large quantities of water usable for water supply are generally restricted to the deeper portions of these two waterways (USAF 1998). San Antonio Creek drains a total area of approximately 150 square miles, and the river flows westward, discharging into the Pacific Ocean. The majority of the water flow in the creek is ephemeral. However, in the area of Barka Slough, upwelling of groundwater creates perennial flow

downstream of the Slough. Groundwater from the San Antonio Creek basin supplies water for irrigation, domestic, industrial, and municipal purposes through pumping. The Proposed Action Area is located in lower San Antonio Creek, downstream of the slough, approximately 0.75 mile upstream from where the creek terminates in the Pacific Ocean (see Figures 1-2 and 3-1). The ROI considered in this EA for water resources is the San Antonio Creek drainage basin from the site of the Narlon Bridge, downstream to the Pacific Ocean.

3.3.2 Surface Water and Floodplains

The major freshwater resources of the VAFB region include six streams, comprising two major and four minor drainages. The major drainages are San Antonio Creek and the Santa Ynez River. San Antonio Creek is the only drainage within the Proposed Action Area.

Monthly stream flow on VAFB generally corresponds to trends in precipitation, although minor increases in precipitation are not always reflected in the flows. Generally, peak rainfall occurs between November and April. Average annual precipitation is approximately 14 inches per year (NOAA 2019).

The Federal Emergency Management Agency (FEMA) flood zone rating for the Proposed Action Area is Zone D (FEMA 2019), which indicates that the area is located within a community or county that is not mapped on any published Flood Insurance Rate Map but may have "possible but undetermined flood hazards." The Proposed Action is subject to EOs 11988, *Floodplain Management*, and 13690, *Federal Flood Risk Management Standard*, requirements and objectives because its intended location is in a floodplain. The Air Force requested advance public comment in compliance with EO 11988 to determine if there were any public concerns regarding the project's potential impacts or comments on potential project alternatives. The Proposed Action will occur within the 100-year floodplain for San Antonio Creek, which is prone to flooding during significant storm events. However, there is no practicable alternative for relocating the Proposed Action outside the floodplain, since the new bridge is needed to cross the creek at this location.

3.3.3 Groundwater

The Proposed Action Area overlies the San Antonio Creek Valley Aquifer (USGS 2019). Groundwater is present in alluvium, dune sand, terrace deposits, and the Orcutt, Paso Robles, and Careaga Formations. Groundwater quality for this aquifer is generally good, with total dissolved solids concentrations between 335 to 570 milligrams per liter (CDWR 2004).

3.4 Cultural Resources

This section begins with a summary of the area of potential effects (APE), followed by a discussion of the regional cultural setting and then describes known cultural resources and previously completed cultural resources studies near the project.

3.4.1 Area of Potential Effects

The APE for this project is defined under 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The APE was delineated by UPRR and VAFB in consultation with SHPO and the Advisory Council on Historic Preservation. The APE for the

Proposed Action consists of the maximum footprint of disturbance associated with the Narlon Bridge Project Site, Tangair Staging Area, Narlon Station Staging Area, Rail Garrison Staging Area, Watt Road access improvements, and the Building 1785 parking area. The APE also includes the entirety of any cultural resources that are located within the APE.

An Area of Direct Impacts was established by VAFB within the APE that includes the footprint for all foreseeable project-related ground disturbing activities. Graveled and paved roads were not included in the Area of Direct Impacts. Where archaeological sites do not intersect the Area of Direct Impacts, the APE and Area of Direct Impacts are the same.

3.4.2 Region of Influence

The prehistory of California's central coast spans the entire Holocene era and may extend back to late Pleistocene times. Excavations on VAFB reveal occupations dating back 11,000 years (Lebow et al. 2014). These early occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Greenwood 1972; Moratto 1984; Erlandson 1994; Glassow 1996). Human population density was low throughout the early and middle Holocene era (Lebow et al. 2007). Cultural complexity appears to have increased around 3,000 to 2,500 years ago (King 1990). At VAFB, that interval also marks the beginning of increasing human population densities and appears to mark the shift from a foraging to a collecting land use strategy (Lebow et al. 2007). Population densities reached their peak around 600 to 800 years ago, corresponding to the full emergence of Chumash cultural complexity (Arnold 1992).

People living in the VAFB area prior to historic contact are grouped with the Purisima Chumash (Landberg 1965; Greenwood 1978; King 1984), one of several linguistically related members of the Chumash culture. In the Santa Barbara Channel area, the Chumash people lived in large, densely populated villages and had a culture that "was as elaborate as that of any hunter-gatherer society on earth" (Moratto 1984). Relatively little is known about the Chumash in the Vandenberg region. Explorers noted that villages were smaller and lacked the formal structure found in the channel area (Greenwood 1978). About five ethnohistoric villages are identified by King (1984) on VAFB, along with another five villages in the general vicinity. Diseases introduced by early Euroamerican explorers, beginning with the maritime voyages of Cabrillo in A.D. 1542–1543, substantially affected Chumash populations more than 200 years before Spanish occupation began (Erlandson and Bartoy 1995; Erlandson and Bartoy 1996; Preston 1996). Drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in 1769.

VAFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods. The Mission Period began with the early Spanish explorers and continued until 1820. Mission La Purísima encompassed the Vandenberg area. Farming and ranching were the primary economic activities at the mission. The Rancho Period began in 1820 and continued until 1845. Following secularization in 1834, the Alta California government granted former mission lands to Mexican citizens as ranchos. Cattle ranching was the primary economic activity during this period. The Bear Flag Revolt and the Mexican War marked the beginning of the Anglo-Mexican Period (1845–1880). Cattle ranching continued to flourish during the early part of this period, but severe droughts during the 1860s decimated cattle herds. The combination of drought and change in government from Mexican to the United States caused substantial changes in land ownership. Sheep ranching and grain farming replaced the old rancho

system. Increased population densities characterize the Americanization Period (1880–1915). Beginning in the late 1890s, the railroad provided a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching and farming continued during the early part of the period of Regional Culture (1915–1945), until property was condemned for Camp Cooke (Palmer 1999).

The Suburban Period (1945–1965) began with the end of World War II. In 1956, the army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed the Cooke Air Force Base. Construction of missile launch complexes began in 1957; and in 1958, the Base had its first missile launch, the Thor, and was renamed VAFB (Palmer 1999). The Base played a very important role in the Cold War, with every ballistic missile in the United States arsenal ground- and flight-tested at VAFB and thousands of military personnel receiving training under operational conditions. In addition, the Base was the only place where military satellites could be safely launched into polar orbit and thus proved critical to the military space program during the Cold War (Nowlan et al. 1996).

In 1865, the Southern Pacific Railroad (SPRR) was formed to build a rail connection between San Francisco and San Diego. In October 1886, the SPRR continued work on its segment between San Francisco and Los Angeles, and the line reached San Miguel and then Templeton in San Luis Obispo County. In August 1887, the rail line reached Santa Barbara and Santa Margarita. The coastal line was eventually completed in 1898 when the SPRR Coast Route extended from San Francisco to Los Angeles (Ryan and Breschini 2010). In 1996, the SPRR was acquired by UPRR.

3.4.3 Cultural Resources Investigations

A cultural resources literature review was conducted for the APE and up to a 0.5-mile-radius search area. Investigations encompassing the APE were completed in 2012 and 2013 by CH2M Hill, in 2019 by Applied Earthworks, and in 2019 by the Center for the Environmental Management of Military Lands. The entirety of the APE has been surveyed as a result of these investigations.

3.4.4 Cultural Resources Sites

Based on the literature search results and previously conducted investigations, 45 previously recorded or known cultural resources were identified within the 0.5-mile-radius search area. Of these, five archaeological sites and three built environment resources are located within the APE. The five archaeological sites include two prehistoric sites (CA-SBA-707 and -708) and three historic archaeological sites (CA-SBA-1709H, -2165H, and -3733H). The two prehistoric sites and CA-SBA-2165H have been determined eligible or, for the purposes of this project only, are assumed eligible for listing in the NRHP. The built environment sites include the existing Narlon Bridge, railroad alignment, and P-42-041019, Rail Transfer Facility, which is a contributing element to the Cold War-era Peacekeeper Rail Garrison Complex Historic District. The bridge and railroad alignment have been determined not eligible for listing in the NRHP, and the Peacekeeper Rail Garrison Complex Historic District has been determined eligible for listing in the NRHP.

3.5 Socioeconomics

Socioeconomic resources include the population, income, employment, and housing conditions of a community or ROI. VAFB is approximately 155 square miles in area and is the largest community near Lompoc, Santa Maria, and Guadalupe.

The total population of Santa Barbara County, based on a 2017 estimate, is approximately 448,150 (U.S. Census Bureau 2019). VAFB supports a population greater than 18,000 (military, family members, contractors, and civilian employees) (Department of the Air Force 2011).

The economy of VAFB generally consists of Base administration, contractors, and individuals, both military and civilian. Personnel on VAFB make purchases from private sector firms located in the region of Santa Barbara and San Luis Obispo Counties. VAFB directly contributes more than $500 million each year to the economies of Santa Barbara County and California through its hiring and purchasing (VAFB 2007).

UPRR operates spur lines on North and South VAFB off the main line to provide local freight delivery. Additionally, freight (long-haul loads) rail traffic uses the rail two times per week, plus local haulers use the rail two times per week. Each freight train provides the equivalent of approximately 250 commercial truck trips per train (Javier Sanchez, personal communication, 2019).

3.6 Geology and Earth Resources

Vandenberg AFB is in the southwestern portion of the Santa Maria physiographic district, a wedge-shaped region between the Santa Ynez Mountains to the south, the San Rafael Mountains to the northeast, and the Pacific Ocean to the west. The southern end of VAFB extends into the Santa Ynez Mountains. The northern end of the Base reaches the Casmalia Hills. Other prominent geomorphic features on base include the Purisima Hills, San Antonio Terrace, Burton Mesa, and Lompoc Terrace. Substantial perennial streams on VAFB include the Santa Ynez River, Shuman Creek, San Antonio Creek, and Cañada Honda Creek.

Geology on VAFB has been described in depth by Johnson (1984) and Morgan et al. (1991). The primary geologic unit underlying VAFB is the Franciscan Assemblage of upper Jurassic age (Dibblee 1950). This unit is a heterogeneous melange of metamorphosed sedimentary and igneous rocks that include graywacke, shale mixed with chert, metavolcanic and metaplutonic rocks, ultramafic rocks, limestone, and conglomerate (Dibblee 1989; Morgan et al. 1991).

The northern end of the Narlon Bridge is on the San Antonio Terrace, an uplifted marine terrace that contains a substantial dune field. Johnson (1984) notes that "the Vandenberg-Santa Maria area is the site of the most extensive late Quaternary dune systems on the west coast of North America." As explained by Johnson, most of the north–south-trending California coastline in the region is mountainous. These mountains block the low-elevation winds created during formation of the inversion layers, forcing the coastal winds to flow north–south, parallel to the coast. The central portion of VAFB lacks mountains; thus, the wind blows onshore to create and sustain the dunes. Johnson (1984) developed a dune chronology for the Vandenberg area that includes Modern Dunes, which are typically nearshore and active; Intermediate Dunes that display fresh dunal morphology and are less than 2,000 years old; Old Dunes that have subdued dunal morphology and date between the early and the mid- to late Holocene; Older Dunes that are late

Pleistocene in age and perhaps began forming around 125,000 years ago; and Ancient Dunes, which are presumed to be reworked Orcutt sands and predate 125,000 years ago.

3.6.1 Soils

Soils on VAFB are characterized by coastal sand dunes and alluvium (sediments that have been eroded, reshaped by water, and redeposited in a non-marine setting). Four dominant soil types are found on VAFB: The Tangair-Narlon association, Marina-Oceano association, Chamise-Arnold-Crow Hill association, and the Concepcion-Botella association (VAFB 2007). Within the Proposed Action Area, the following soil types occur: Dune land, Marsh, Sandy alluvial land (wet), Marina sand, and Tangair sand (see Figure 3-5). The dominant soil type is Dune land, which underlies the Narlon Bridge Project Site north and south of San Antonio Creek, the Rail Garrison Staging Area, and the southern part of the Narlon Station Staging Area. Marsh soil type underlies the San Antonio Creek corridor that runs through the Narlon Bridge Project Site. Sandy alluvial land is found in the northern portion of the Narlon Station Staging Area, and Tangair sand underlies the Tangair Staging Area and portions of Watt Road. Marina sand underlies portions of Watt Road and Building 1785.

3.6.2 Geologic Resources

VAFB is underlain predominantly by marine sedimentary rocks of Late Mesozoic age (140 to 70 million years before the present) and Cenozoic age (70 million years to the present). Four structural regions occur throughout VAFB: the Santa Ynez Range, the Lompoc lowland, the Los Alamos syncline, and the San Rafael Mountain uplift (VAFB 2007). Geologic resources near the Narlon Bridge consist of Miocene Marine Rocks and Quaternary Sand deposits.

3.6.3 Faulting and Seismicity

Faults are numerous in Santa Barbara County, with a major earthquake occurring in the region about every 15 to 20 years. One fault, the westerly extension of the Big Pine fault, traverses the central portion of VAFB. Two additional faults are located near the Proposed Action Area: the Lompoc Terrace fault to the south and the Lion's Head fault to the north (Santa Barbara County, Planning and Development 2015).

3.6.4 Geological Hazards

Santa Barbara County, where the Proposed Action Area is located, is a seismically active area. The primary geologic hazard on VAFB is strong, seismically induced ground shaking, which could induce soil liquefication. The areas most prone to liquefaction on base are near San Antonio Creek and the Santa Ynez River. The potential for liquefaction on VAFB, despite these areas, is low (USAF 1987). There are currently no known locations on VAFB where liquefication has occurred.

3.7 Hazardous Materials, Solid Waste Management, and Human Health and Safety

3.7.1 Hazardous Materials

Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERLA), as amended by the Superfund Amendments and Reauthorization Act (42 United State Code [USC] 9601-9675), Toxic Substances Control Act (15 USC 2601-2671), the Solid Waste Disposal Act as amended by Resource Conservation and Recovery Act (RCRA; 42 USC 6901-6992), and as defined in State laws and regulations.

Federal and state OSHA regulations govern protection of personnel in the workplace. All construction activities, facility operation, and maintenance on VAFB are subject to federal OSHA regulations. In general, hazardous materials and waste include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health (to workers), welfare, or the environment, when released into the environment.

3.7.1.1 Hazardous Materials Management

Hazardous material use on VAFB is regulated by a Hazardous Materials Management Plan (USAF 2015), and emergency response procedures for hazardous materials spills are established in the VAFB Hazardous Materials Emergency Response Plan (USAF 2014). Per the Hazardous Materials Management Plan, VAFB requires that all hazardous materials be obtained through the HAZMART, a Base function that centrally manages the procurement of hazardous materials. Specifically, the HAZMART approves the use of hazardous materials only after it reviews the composition of the commodity and how it is to be used to ensure compliance with environmental, safety, and occupational health regulations and policies.

Hazardous materials potentially used during construction of the Proposed Action include hydraulic fluids, fuel petroleum, diesel, oil, oxygen and acetylene, and lubricants in equipment and vehicles; solvents for paint abatement or equipment cleaning; and compressed gases for welding or cutting equipment. Hazardous materials will be transported to the site either by rail or by vehicle, via VAFB access roads, and will be stored and managed in secured areas within the Proposed Action staging areas. Fuel trucks will transport fuel to an onsite tank.

3.7.1.2 Hazardous Waste Management

Management of hazardous waste at VAFB complies with RCRA Subtitle C (40 CFR 240-299) and with California Hazardous Waste Control Laws as administered by the California Environmental Protection Agency DTSC, under CC) Title 22, Division 4.5. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The VAFB Hazardous Waste Management Plan (USAF 2015) outlines hazardous waste management procedures.

3.7.1.3 Installation Restoration Program

The federal Installation Restoration Program (IRP) was implemented at Department of Defense facilities to identify, characterize, and restore hazardous substance release sites. There are currently 136 IRP sites throughout VAFB. In addition, several areas on VAFB were used as

training ranges and have the potential to contain UXO. Within VAFB, there are also identified Areas of Concern, where potential hazardous material releases are suspected; and Areas of Interest, defined as areas with the potential for use and/or presence of a hazardous substance. The Proposed Action Area does not overlie with any IRP, UXO, Area of Concern, or Area of Interest sites on VAFB (VAFB 2007).

3.7.1.4 Hazardous Materials and Waste Transport

The Department of Transportation regulates the transport of hazardous materials and waste. Anyone transporting hazardous materials or waste must obtain EPA identification numbers as transporters. The EPA has incorporated Department of Transportation statutes (49 USC) into its regulatory scheme and has added other requirements such as record keeping and cleanup of spills. Transporters of hazardous materials and waste at VAFB are regulated by the aforementioned laws and are Department of Transportation-certified transporters. VAFB follows the California Department of Transportation requirements for traveling with hazardous materials on State Route (SR) 1, which runs through part of the eastern edge of VAFB, and SR 246, which physically divides the Base into North and South VAFB.

3.7.2 Solid Waste Management

In 1989, the California Integrated Waste Management Act (Assembly Bill 939) mandated a 50 percent reduction of the quantity of solid waste disposed of in California landfills from a 1990 baseline. The 50 percent reduction was to be accomplished by January 1, 2000. The most recent Air Force mandate regarding solid waste diversion came from Headquarters Air Force Space Command in 2008, requiring a 50 percent diversion rate goal for all solid waste generated at Air Force Space Command installations (USAF 2015).

The Pollution Prevention Act of 1990 focused the national approach to environmental protection toward pollution prevention. Implementation of the Air Force Environmental Management System (EMS) carries pollution prevention a step further toward mission sustainability principles. The pollution prevention program is defined in detail in the VAFB Pollution Prevention Management Plan, 30 SW Plan 32-7001 and is aimed at achieving 30 SW EMS objectives and targets, through documented practices, procedures, and operational requirements. VAFB implements EMS and its associated pollution prevention program elements by following the pollution prevention hierarchy:

- Reduce (source reduction to prevent the creation of wastes);
- Reuse (keep item or material for its intended purpose);
- Recycle (use item or material for some other beneficial purpose);
- Disposal (in an environmentally compliant manner, only as a last resort).

The State of California passed Senate Bill 1374, amending the PRC, Section 42912, which addresses the issue of construction and demolition debris, diversion requirements, and the development of a model ordinance to be implemented by local jurisdictions (i.e., Santa Barbara County). . . . In August 2010, the DoD issued its updated Strategic Sustainability and Performance Plan (SSPP), which was followed up by Headquarters Air Force releasing its SSPP Implementation Plan in October 2011. The established diversion goals of the SSPP are 60 percent diversion, by weight, for construction and demolition debris by 2015. AFI 32-7042 requires installations to strive to divert as much solid waste as economically feasible and the VAFB Integrated Solid Waste

Management Guide (USAF 2018) requires source segregation of recyclable materials to the greatest extent possible. The ROI of potential impacts to solid waste management as a result of the Proposed Action is VAFB.

3.7.3 Human Health and Safety

Hazards associated with some past and present mission activities and operations on VAFB can constrain locations where projects can be sited to ensure the health and safety of workers. The following hazard zones have been established on VAFB to protect workers from various hazards:

- **Toxic hazard zones** are areas established downwind of launch site operations to protect workers from exposure to toxic vapors emitted during the transfer or loading of liquid propellants or maintenance of launch systems. These zones can extend 20,000 or more feet from a launch site.
- **Missile/Space Launch Vehicle Flight Hazard Zones and Explosive Safety Zones** are established under the flight path of missile or space launch vehicle launches to protect personnel from debris fall-out under the launch trajectory. Explosive safety zones are established from 75 to 5,000 ft around launch sites and buildings where rocket propellants are stored to protect personnel from potential explosive hazards. Both of these hazard zones must be evacuated before any launch.
- **Radiofrequency Radiation Hazard Areas** are established around transmitters on VAFB that can present radiation hazards to people and potentially detonate electroexplosive devices. The size of the hazard areas vary, depending on the transmitter power and antenna reception.
- **Airfield Clear Zones, Lateral Clear Zones (LCZs) and Accident Potential Zones (APZs)** are established around the VAFB airfield runway and contain restrictions on certain land uses. Clear zones and LCZs are areas where the accident potential is so high that land use restrictions prohibit reasonable use of the land. Clear zones occur at both ends of the runway, and LCZs extend 1,000 ft from both sides of the centerline along the length of the runway. The ground surface within the LCZ must be graded to certain requirements and kept clear of fixed or mobile objects, except for necessary navigational aids and meteorological equipment. There are two APZs, APZs I and II, which are less critical than clear zones but still possess significant potential for accidents. Acceptable uses within APZ I areas include industrial or manufacturing, communication and utilities transportation, wholesale trade, open space, recreation, and agriculture, but not uses that concentrate people in small areas. Acceptable uses within APZ II areas include low business services and commercial retail trade uses of low intensity or scale of operation, but not high-density operations.
- **Air Installation Compatible Use Zones (AICUZs)** are areas where certain land uses are restricted due to the combination of the potential for accidents and noise and the need for clearance of obstacles.
- **UXO Closures Areas** are areas on VAFB that were used as ordnance training ranges and have the potential to contain UXO. Any proposed work in these areas must be coordinated with the Weapons Safety and Explosive Ordnance Disposal (EOD) offices. Depending on the area, escorts may or may not be required.

The affected environment for Human Health and Safety is the regulatory environment for health and safety issues established to minimize or eliminate potential risk to the general public and personnel involved in the Proposed Action. The Proposed Action will involve construction and demolition activities where workers may potentially be exposed to conditions that could adversely impact their health and safety. The ROI of these potential impacts is the Proposed Action Area and surrounding vicinity.

- Hazardous materials, primarily petroleum, oil, and lubricants (POLs), will be used for operating heavy equipment under the Proposed Action. The potential exists for unexpected releases of these POLs, which may generate hazardous waste.
- The construction contractor will transport hazardous material used in or resulting from the Proposed Action. A permitted hazardous waste hauler will transport hazardous waste. The transport route of these materials is discussed in Section 3.9, Transportation.

Because of the above conditions, the potential exists for persons participating in the construction activities to become exposed to hazardous materials and hazardous waste. In addition to these more obvious risks to human health and safety, the following, more mundane, physical features, which have the potential to be present near the Proposed Action, also have the potential to adversely impact the health and safety of the site workers:

- Physical hazards include traffic in the roads, holes and ditches, uneven terrain, sharp or protruding objects, slippery soils or mud, and unstable ground.
- Biological hazards, include vegetation (i.e., poison oak and stinging nettle), animals (insects, spiders, and snakes), and disease vectors (ticks and rodents).

3.8 Land Use

3.8.1 Regional Setting

VAFB covers approximately 99,099 acres in western Santa Barbara County and is divided into North VAFB and South VAFB by the Santa Ynez River and Highway 246, a public thoroughfare. Much of VAFB is open space set aside for security and safety buffer zones. VAFB accommodates agricultural leases for grazing as a major land use on base. At present, 23,500 acres of rangeland on South Base are permitted for grazing activities, supporting a maximum of 800 head of cattle, and 1,104 acres are dryland farmed. All grazing land and farmland at VAFB is used by the U.S. Department of Justice, Bureau of Prisons, and U.S. Penitentiary in Lompoc for livestock grazing and 1,104 acres for dryland farming (VAFB 2007).

Facilities used for space launches, missile tests, and telemetry and tracking are scattered throughout the Base. The urbanized cantonment area is on North VAFB, which includes various administrative, training, industrial, commercial, and residential land uses. North VAFB also has missile test launch sites, space launch sites, and tracking facilities. South VAFB supports space launch sites, telemetry, and tracking facilities. All of these facilities support the primary mission of VAFB. The 30th Civil Engineer Squadron, Comprehensive Planning manages development and land use at VAFB. The primary document that outlines development goals and constraints is the VAFB General Plan (VAFB 2007). Land use areas on both North and South VAFB include

recreational use of beaches by the public and/or military. Immediately east of these recreational beach areas is open land set aside for security and safety buffer zones.

UPRR passes through VAFB near the coast. It serves as the main line for Los Angeles to San Francisco coastal rail transportation, providing freight service to cities along the coast. Spur lines on North and South VAFB operate off the main line to provide local freight delivery. Amtrak passenger service from Seattle to San Diego share these UPRR lines. The Surf Amtrak Station is located adjacent to Surf Beach, at the west end of SR 246.

Amtrak runs six trains per day across the Narlon Bridge. Freight (long-haul loads) uses the rail two times per week, plus local haulers use the rail two times per week. Each freight train provides the equivalent of approximately 250 commercial truck trips per train (Javier Sanchez, personal communication, 2019). Between San Luis Obispo and Santa Barbara, Amtrak runs Coast Starlight (one north and one southbound), and Pacific Surfliner (two per day north and southbound). The Coast Starlight runs from Seattle through Portland, Sacramento, to Los Angeles. The Pacific Surfliner provides more than 2,000 seats taking people from San Luis Obispo to San Diego in 5 hours 45 minutes. Due to the limited transportation options, Pacific Surfliner trains are extremely busy, with demand exceeding available seating capacity (Amtrak 2019).

3.8.2 Project Area Setting

The ROI consists of the Proposed Action Areas and the immediate areas, and associated VAFB roads for the purpose of the EA (see Figure 1-2). The area surrounding the Narlon Bridge Action Area is undeveloped natural habitat dominated by dune scrub vegetation on stabilized dunes located on either side of the San Antonio Creek riparian zone that runs from east to west toward the Pacific Ocean. An unimproved access road extends west toward the ocean from Watt Road, and another parallels the railroad ROW from Tangair Road north to a staging area used by VAFB personnel within the Narlon Bridge Project Site. The Narlon Bridge Project Site is in the lower end of the San Antonio Creek watershed. The Rail Garrison Staging Area is VAFB property located on improved roads and adjacent to a spur line built in the 1970s and 1980s (Lebow and Smallwood 2019). Access to this area will be from El Rancho Road to Umbra Road. The Narlon Station Staging Area north of Rail Garrison, on the east side of the main line railroad track, is surrounded by open space dominated by dune scrub vegetation. Access to this area is from Umbra Road to an unimproved access road to the railroad ROW. The Tangair Staging Area is on UPRR property, south of Tangair Road, adjacent to a double-track and a short rail spur. Access is from an unimproved road off of Tangair Road. This area is adjacent to the Tangair overpass bridge over UPRR's ROW, and is surrounded by Tangair Road to the north, eucalyptus trees to the east and south, and dune scrub and chaparral vegetation on the west side of the ROW.

3.8.3 Coastal Zone Management

Federal activity in or affecting a coastal zone must conform to the CZMA. The California Coastal Zone Management Program was formed through the California Coastal Act (CCA) of 1972. The CCA also established the California Coastal Commission (CCC), which reviews federally authorized projects for consistency with the California Coastal Zone Management Program. Part of the Proposed Action will occur on VAFB, which is wholly owned and operated by the Department of Defense and therefore is excluded from the coastal zone per Section 304 of the

CZMA. However, a significant part of the Proposed Action (replacement of the Narlon Bridge itself) will occur on private (UPRR) property, which is subject to the CZMA. The CCC therefore directed UPRR to obtain a Coastal Consistency Certification.

The federal office of CCC reviewed and concurred with UPRR's Coastal Consistency Certification on May 9, 2019. CCC found that the impacts on coastal resources from not carrying out the project will be more significant and adverse than impacts stemming from the project's location within environmentally sensitive habitat areas (ESHA), which will be addressed by the avoidance, minimization, and mitigation measures incorporated into the project. The actual impacts to ESHA will be temporary in nature, and the non-resource dependent use that is proposed in ESHA is necessary to continue providing rail service that has been in operation in this location for approximately 125 years. CCC, therefore, concluded that the project will, on balance, be most protective of significant coastal resources, consistent with CCA Section 30007.5. As such, it is consistent with CCA Chapter 3 as a whole, and CCC, therefore, concurred with the Consistency Certification (Appendix E).

3.9 Transportation

3.9.1 Region of Influence

The circulation system near VAFB consists of regional highways and arterial streets (i.e., major road used for through traffic). Regional access to VAFB is provided by a network of freeways, including Highway 101, Highway 1, SR 135, and SR 246. Primary access to VAFB is through three gates: Santa Maria Gate (Main Gate), Solvang Gate, and South Gate. Primary access to the project site will be from the Lompoc Gate (Inspection Gate) via Santa Lucia Canyon Road. Roadways in the immediate project vicinity include Umbra Road, El Rancho Road, Cross Road, 13th Street, California Boulevard, Santa Lucia Canyon Road, Washington Avenue, and unnamed access roads (see Figure 3-6).

3.9.2 Project Traffic and Haul Routes

UPRR will utilize VAFB roads to and from Narlon Bridge to transport construction crews and equipment. This includes paved roads from VAFB gates (primarily the Lompoc Gate) to the project site and unpaved roads around Narlon Bridge. Primary ingress and egress to the work area will be from 13th Street to Watt Road on the east side of the bridge. Construction traffic will travel one-way east to west through the Narlon Bridge Project Site, loop around and cross over the temporary at-grade crossing to the south of the bridge, and rejoin Watt Road.

The haul route to an offbase landfill from the Proposed Action Area will depend on which landfill is the end destination. If waste is to be transported to the Santa Maria Landfill, trucks will travel south on 13th Street, then east on California Avenue, exit via the Santa Maria Gate, then take US 1 North to Santa Maria. If waste is taken to the Lompoc City Landfill, trucks will travel south on 13th Street, exit via the Solvang Gate, turn east on SR 246, then take SR 246 east, go south on South Bailey Avenue, go east on West Olive Avenue and then south on Avalon Street.

Vehicle traffic on VAFB roads will primarily be comprised of delivery trucks and worker passenger vehicles. There will be an average of 15 truck trips per day with a maximum of 25

truck trips per day, and the number of trucks will decrease after the first initial months of materials delivery. See Appendix N for data and assumptions about vehicle traffic volume.

3.10 Public Utilities

Communication lines are located within the UPRR ROW near the Proposed Action. At the crossing of San Antonio Creek, the communication lines are enclosed within conduit under the creek and floodplain on the east side of the railroad ROW (see Figure 2-1). Outside of the bore under the creek, fiber is carried on the east and west sides of the ROW at variable distances from the centerline of the tracks. Two poles support empty sleeves that hang over San Antonio Creek that remain from a temporary fiber relocation.

4 ENVIRONMENTAL CONSEQUENCES

This section evaluates the potential impacts of the Proposed Action and the No Action Alternative. Potential impacts were evaluated by comparing changes to the existing condition from the Proposed Action and the No Action Alternative. The subsection for each environmental resource or issue assesses the anticipated direct and indirect impacts, and considers short- and long- term project effects and cumulative impacts.

4.1 Air Quality

Potential air quality and climate change impacts due to the Proposed Action were evaluated on the basis of their direct and indirect emissions. Adverse air quality and climate change impacts may occur if implementation of the Proposed Action directly or indirectly results in the following:

- Expose people to localized (as opposed to regional) air pollutant concentrations that violate NAAQS or CAAQS
- Cause a net increase in a pollutant or pollutant precursor emission that exceeds relevant emission significance thresholds (such as the numerical values of major source thresholds for nonattainment pollutants)

To determine the operational air quality impacts, emission from the project are compared to the federal Major Source threshold of 100 tons per year of criteria air pollutants in Title 40, Code of Federal Regulations, Part 70 – Federal Operating Permit Program. As noted above, the Proposed Action is not expected to result in operational air emissions; therefore, the project will not be subject to the Federal Operating Permit Program.

4.1.1 Proposed Action

Implementing the Proposed Action may result in temporary, short-term construction emissions of criteria pollutants and GHGs. Construction-related impacts will be local (i.e., confined to the construction site area) and limited to the duration of the construction activities (up to 12 months). Fossil fuel-powered equipment and vehicles will create combustion emissions for the bridge replacement construction. Fugitive dust emissions will occur from ground-disturbing activities (i.e., grading and cut/fill activities), operating equipment on exposed soil, and vehicle travel on paved and unpaved roads.

4.1.1.1 Criteria Pollutant Emissions and Air Quality Impacts

Given the project's location within Santa Barbara County, methodology from SBCAPCD's CEQA guidance (SBCAPCD 2017) was used to estimate criteria pollutant emissions and air quality impacts, rather than the Air Force-recommended ACAM. Accordingly, off-road construction-equipment exhaust emissions and fugitive dust emissions were estimated by use of emission factors from the *California Emissions Estimator Model (CalEEMod) User's Guide* (BREEZE

software 2017).[2] On- and off-road vehicle exhaust emissions were estimated using emission factors from EMFAC2014.[3] Because the majority of construction activities will occur in 2020, construction emissions were estimated assuming model year 2020 emission factors for construction equipment and vehicles. Construction emissions were estimated assuming that each piece of equipment and each vehicle could operate concurrently on each working day, regardless of the expected construction phasing, to represent a worst-case emissions scenario. Appendix N includes data and assumptions used to calculate proposed construction emissions.

Table 4-1 summarizes the emissions estimated for the Proposed Action. On the basis of these results, construction emissions of the Proposed Action are planned to be below the level that SBCAPCD considers to result in an adverse impact for each of the criteria pollutants. In addition, construction activities will comply with SBCAPCD Rule 345 regarding fugitive dust control.

SBCAPCD has developed plans to achieve and/or maintain compliance with the federal and State air quality standards. SBCAPCD's Rule 345, Control of Fugitive Dust from Construction and Demolition Activities, establishes limitations on the generation of fugitive dust emissions from construction and demolition sites. This project will be consistent with this rule through implementation of the BMPs provided in Section 2.2.11. Additionally, UPRR will require its construction contractor to use State-registered engines or engines certified to meet the most stringent California emissions standards available to the extent feasible.

The Proposed Action will not affect operation of the existing railroad or create new mobile or stationary sources to increase emissions during long-term bridge operation. Therefore, the Proposed Action will not result in emission increases of criteria pollutants during long-term operation.

TABLE 4-1. SUMMARY OF CRITERIA POLLUTANT CONSTRUCTION EMISSIONS

Project Emissions	VOC	CO	NO2	SO2	PM10 [a]	PM2.5 [a]
Average Daily Emissions (lbs/day)	11.9	88.1	120	0.19	61.4	12.5
Total Emissions (tons) [b]	1.21	9.07	12.2	0.02	7.04	1.36
SBCAPCD Adverse Impact Threshold (tons/year) [c]	25	25	25	25	25	25
Exceeds Threshold (Y/N)?	N	N	N	N	N	N

[a] PM_{10} and $PM_{2.5}$ emissions represent both exhaust and fugitive dust emissions, even though SBCAPCD's significance thresholds are specific to exhaust. The fugitive dust emissions also account for BMPs to control fugitive dust, based on percent reductions published by the South Coast Air Quality Management District (SCAQMD 2007).

[b] The total emissions assume a project duration of up to 12 months.

[c] In the absence of construction-specific quantitative significance thresholds, a threshold of 25 tons/year was used for all pollutants, as recommended in Section 5.2 of the SBCAPCD's *Scope and Content of Air Quality Sections in Environmental Documents* (SBCAPCD 2017). Even this threshold is conservative since the project is not constructing a stationary source that would require an Authority to Construct permit.

Notes:

lbs/day = pounds per day, tons/year = tons per year

[2] Portions of EPA's *AP-42* were also used (EPA, 2006 and 2011), as directed by the CalEEMod User's Guide.

[3] Available for download at https://ww3.arb.ca.gov/msei/categories.htm#emfac2014.

4.1.1.2 GHG Emissions and Climate Change Impacts

GHG emissions were calculated with the same methodology as the criteria pollutants. Only CO_2 emission factors were available for all types of construction equipment used for this project. Because emissions of methane and nitrous oxide from combustion sources are expected to be much lower than emissions of CO_2, contributing in the range of 2 to 4 percent of the total CO_2e emissions, the CO_2 emissions were conservatively increased by 5 percent to calculate CO_2e emissions. Long-term operation of the Proposed Action will not result in additional direct or indirect GHG emissions.

SBCAPCD has investigated several control strategies and mitigation measures to reduce emissions and decrease ambient concentrations of harmful pollutants, to help protect public health by reducing exposure to air pollutants that pose the greatest health risk, and to reduce GHG emissions to protect the climate. The BMPs described in Section 2.2.11 shall help minimize the project's GHG emissions, thereby aligning with the SBCAPCD's climate protection strategies.

As shown in Table 4-2, the Proposed Action may increase regional emissions of GHGs during the construction phase, but at levels much lower than the SBCAPCD threshold. Therefore, no adverse impacts to climate change will occur from the Proposed Action.

TABLE 4-2. SUMMARY OF GHG CONSTRUCTION EMISSIONS

Project Emissions	CO_2	CO_2e [a]
Average Daily Emissions (lbs/day)	18,146	19,053
Total Emissions (metric tons) [b]	1,687	1,771
SBCAPCD Adverse Impact Threshold (metric tons/year) [c]	N/A	10,000
Exceeds Threshold (Y/N)?	N/A	N

[a] CO_2 emissions were conservatively increased by 5 percent to calculate CO_2e emissions, accounting for the potential methane and nitrous oxide emissions associated with construction activities.

[b] The total emissions assume a project duration of up to 12 months.

[c] The SBCAPCD's significance threshold is only applicable to the operation of stationary sources, and does not apply to construction (SBCAPCD 2017). However, it is listed here for comparison purposes only, as a general indication of magnitude.

Note:

N/A = not available (i.e., no significance threshold exists)

4.1.2 No Action Alternative

Under the No Action Alternative, the replacement of the Narlon Bridge, access bridge, road improvements, and staging areas at VAFB would not occur. However, should the existing bridge fail, air quality near the Action Area could be adversely affected by dust and chemical pollutants before and during emergency cleanup operations. If rail transport is not available between San Luis Obispo and Santa Barbara due to bridge failure or outage, surface road transport would add more than 1,000 commercial trucks per week and 7,000 cars per week, equating to about 32,000 vehicle trips per month (see Section 2.3). Alternative rail travel would route trains via Sacramento, through the Central Valley, across the Tehachapi Range to Barstow, to connect to Los Angeles. This would adversely affect air quality and GHG throughout the region.

4.2 Biological Resources, Wetlands, and Waters of the U.S.

Adverse impacts to biological resources would occur if implementation of the Proposed Action resulted in permanent loss of sensitive or rare vegetation communities, including wetlands; significant impacts to rare, threatened, or endangered species; and/or permanent loss or alteration of wildlife corridors.

Potential adverse impacts to threatened and endangered species were addressed during consultation with USFWS under section 7 of the federal ESA (see Section 1.4). Potential adverse impacts were identified and a BO was issued that listed Avoidance and Minimization Measures. These measures are incorporated into the BMPs listed in Section 2.2.11 and shall be implemented.

4.2.1 Proposed Action

The following potential impacts to biological resources, wetlands, and waters to the U.S. may occur as a result of the Proposed Action:

- Decline of water quality in San Antonio Creek due to erosion, sedimentation, or contamination from project-related activities
- Temporary loss of habitat, including wetlands, due to mowing and/or grading for laydowns, work areas, and road improvements
- Loss of individuals within the Proposed Action Area due to mowing, grading, other soil-disturbing activities, or vehicle strikes
- Loss of individuals within San Antonio Creek (inside or outside the Proposed Action Area) due to erosion, sedimentation, or water contamination
- Disturbance of breeding, roosting, or foraging activities due to project-related noise, night lighting, or increased human activity
- Abandonment of breeding, roosting, and/or foraging habitat due to project-related noise, night lighting, or increased human activity

4.2.1.1 Wetlands and Waters of the U.S.

No net loss of wetlands is proposed due to project activities. Approximately 2.39 acres of State wetlands and 0.15 acre of waters of the U.S. may be subject to temporary impacts lasting up to 1 year.

State wetlands within the Proposed Action Area consist of the 2.39 acres of arroyo willow riparian vegetation outside the OHWM of San Antonio Creek within the Narlon Bridge Project Site. The entirety of this area may be temporarily affected by project activities. Riparian habitat will be mowed to facilitate personnel and equipment movement within the work area, except for riparian vegetation on the streambanks of San Antonio Creek. In mowed areas, root systems of native trees and plants will be left in place to facilitate re-sprouting, and crane mats will be used to prevent soil compaction. Riparian vegetation shall be left undisturbed along San Antonio Creek channel banks in all areas. Riparian habitat will be restored according to the Vegetation Restoration and Monitoring Plan (see Section 2.2.8 and Appendix I). Restoration and revegetation of riparian areas will reduce potential wetland impacts to less than significant.

The 319 linear feet of San Antonio Creek below the OHWM (0.15 acre) is classified as waters of the U.S. There will be no ground disturbance or project activities of any kind below the OHWM. See Section 4.3.1 for discussion of potential impacts to San Antonio Creek as well as measures to reduce impacts to less than significant.

4.2.1.2 Vegetation Resources

Vegetation types identified in the Proposed Action Area include arroyo willow riparian and central dune scrub (see Section 3.2.4 for discussion). Temporary impacts to native vegetation within the Proposed Action Area will occur due to project activities and will last up to 1 year (see Section 2.2). No permanent impacts to vegetation are expected. Estimated temporary impact acreages to native vegetation types are summarized in Table 4-3.

The UPRR ROW under the Narlon Bridge is a historical disturbance zone, and central dune scrub and riparian habitat within the ROW has been manipulated and managed for over 100 years and will continue to be maintained and disturbed regularly (see Section 3.2.4). Therefore, a distinction is made between this managed habitat and the habitat elsewhere on UPRR or VAFB property when discussing vegetation impacts. Approximately 3.95 acres of managed habitat within the UPRR ROW will be temporarily disturbed. The entirety of the managed UPRR ROW may be mowed in advance of project activities, and up to 2,900 square feet graded or leveled for timber mats to protect buried fiber and timber mats under temporary shoring towers, which will be removed upon project completion (see Sections 2.2.4 and 2.2.5).

TABLE 4-3. PROPOSED HABITAT IMPACTS WITHIN THE PROPOSED ACTION AREA

Habitat	Permanent Impacts	Temporary Impacts (acres) [a]
Arroyo Willow Riparian	0	1.84
Central Dune Scrub	0	11.55
Managed Vegetation (Riparian)	0 [b]	0.70
Managed Vegetation (Central Dune Scrub)	0 [b]	3.25
Total	**0**	**17.34**

[a] 6.67 acres of anthropogenic habitat (roads, railroad tracks, pavement, etc.) within the Proposed Action Area is not included in this table.

[b] If footing repair is necessary, up to 0.005 acre within the managed ROW will be permanently affected.

A total of up to 1.84 acres of arroyo willow riparian will be temporarily affected, not including 0.7 acre of heavily disturbed riparian within the managed UPRR ROW under the bridge. Riparian habitat within the Narlon Bridge Project Site will be mowed to facilitate personnel and equipment movement within the work area. In mowed areas, root systems of native trees and plants will be left in place to facilitate re-sprouting, and crane mats will be used to prevent soil compaction.

A total of up to 11.55 acres of central dune scrub may be temporarily affected, not including 3.25 acres of heavily disturbed central scrub within the managed UPRR ROW under the bridge. Dune scrub within the Narlon Bridge Project Site will be mowed and/or graded to create staging areas. If the Narlon Station Staging Area and Rail Garrison Staging Area are used, dune scrub within these areas will be mowed, but not graded. Dune scrub on the shoulders of certain curves on Watt Road may be mowed and/or graded to allow passage of large equipment. In mowed areas, root

systems of native trees and plants will be left in place to facilitate re-sprouting. No impacts to native vegetation will occur within the Tangair Staging Area, as this area is composed of hard-packed dirt and a few re-sprouting eucalyptus trees within the UPRR ROW.

No permanent habitat impacts are anticipated. In the unlikely event foundation reinforcement is necessary during construction, less than 0.005 acre within the disturbed UPRR ROW under the Narlon Bridge will be permanently affected. The 2013 BO issued by USFWS approved up to 0.005 acre of permanent riparian habitat impacts (see Appendix C). The area within the UPRR ROW under the bridge is highly managed, as discussed above. Therefore, minor permanent impacts to disturbed habitat in this zone will not require additional mitigation.

After project completion, site restoration will proceed according to the Vegetation Restoration and Monitoring Plan (see Section 2.2.8 and Appendix I). Riparian habitat on VAFB will be restored, and riparian habitat within the managed UPRR ROW will be revegetated. Graded dune scrub areas will be restored, and mowed dune scrub habitat will be allowed to regenerate and will be monitored and revegetated as necessary. Restored and revegetated areas will be monitored for 5 years to ensure performance standards are met. In addition to restoration/revegetation within the Proposed Action Area, non-native plant cover within central dune scrub will be reduced elsewhere on VAFB according to the Additional Mitigation Plan (Appendix J). Implementation of restoration and monitoring and non-native plant cover reduction will reduce potential impacts to native vegetation to less than significant levels.

Special-status plant species occur within the Proposed Action Area and may be affected by project activities. See Section 4.2.1.4 for further discussion of potential impacts to special-status plants.

4.2.1.3 Wildlife Resources

Temporary loss of habitat within the Proposed Action Area during project activities may result in impacts to wildlife foraging and breeding activities and/or movement through the riparian corridor. Wildlife may be disturbed by construction activities due to increased noise, human activity, and night lighting within the Proposed Action Area. Potential impacts due to construction disturbances and alteration of wildlife corridors are discussed below.

Construction Disturbances

Implementation of the Proposed Action will result in increased noise levels from construction and demolition activities and increased human activity in and around the Proposed Action Area, especially at the Narlon Bridge Project Site. Vegetation removal and the presence of biological monitors should prevent birds from nesting within the Proposed Action Area, but birds nesting adjacent to the Proposed Action Area may be affected by these disturbances, which could lead to nest abandonment. Preconstruction surveys will be conducted to locate any active nests, and nests will be buffered from project activities. Impacts of construction disturbances to other wildlife within the Proposed Action Area will be avoided by excluding wildlife from the Proposed Action Area and safely relocating any wildlife found within work areas. Measures listed in Section 2.2.11, that include preconstruction surveys, excluding, and safely relocating wildlife, will prevent significant impacts to native wildlife from construction-related disturbances.

Wildlife Corridor

Wildlife movement through the riparian corridor along San Antonio Creek is expected to be temporarily affected due to mowing of riparian habitat and the installation of exclusion fencing around the Proposed Action Area. Impacts to wildlife may include decreased fitness, injury, or death of individuals if they are forced out of the riparian corridor into less suitable habitat, or are unable to get around the Proposed Action Area. These temporary impacts will be offset in the long term by habitat restoration of the riparian corridor within the Proposed Action Area, including the reduction of non-native plant species.

4.2.1.4 Special-status Species

Several special-status species occur or have the potential to occur within the Proposed Action Area and may be affected by project activities. Vegetation mowing, grading, earth moving, vehicle and equipment movement, and other construction activities have the potential to result in impacts to sensitive plants; federally listed bird, fish, amphibian, and insect species; and other special-status wildlife. Potential impacts to specific species are discussed below. Avoidance, prevention, and minimization measures are discussed below and in more detail in Section 2.2.11. By adopting all mitigation measures put forth in the 2013 BO (Appendix C) as well as all measures proposed by CCC (Appendix E), the Proposed Action will not have significant impacts on federally listed species or other special-status species.

Special-status Plants

Four non-federally listed special-status plant species were detected within the Proposed Action Area: San Luis Obispo monardella, California spineflower, black-flowered figwort, and Blochman's ragwort. These species may be affected by mowing and grading activities within the Proposed Action Area and could be affected by loss of potential habitat or degradation of potential habitat due to the presence of invasive weeds following disturbance. Potential impacts to these species can be mitigated by collecting seed and replanting these species in restoration areas after construction. If present, San Luis Obispo monardella, California spineflower, black-flowered figwort, and Blochman's ragwort will be counted and mapped prior to construction, and seed may be collected from within and adjacent to the Proposed Action Area. Seed may be planted in appropriate habitat during site restoration activities according to the Vegetation Restoration and Monitoring Plan (Appendix I).

Nineteen other special-status plants have potential to occur within the Proposed Action Area but were not detected during botanical surveys (see Sections 3.2.4.2 and 3.2.4.3). These species may be affected by temporary loss of potential habitat or degradation of potential habitat due to the presence of invasive weeds following disturbance. Potential loss and degradation of habitat can be avoided by restoring or revegetating disturbed habitat within the Proposed Action Area according to the Vegetation Restoration and Monitoring Plan (Appendix I) and by reducing non-native plant cover in central dune scrub elsewhere on VAFB according to the Additional Mitigation Plan (Appendix J).

Special-status Fish

Tidewater goby and unarmored threespine stickleback are known to occur in San Antonio Creek and may be affected by project activities within the Narlon Bridge Project Site. Impacts may occur to sensitive fish species due to sedimentation or contamination. Ground-disturbing activities

during staging area excavation, grading for temporary shoring support platforms, or bridge construction could result in sediment entering San Antonio Creek and could adversely affect fish health. Sediment could also adversely affect burrows with tidewater goby eggs during their spring and summer reproductive period. Contamination of the waterway could occur from vehicular leaks, improper vehicle or equipment maintenance, or spills. Measures may be implemented to minimize adverse effects to these species and their habitat, including erosion controls. Environmental BMPs listed in Section 2.2.11 and the measures identified in the 2013 BO (Appendix C) may minimize impacts to these species.

California Red-legged Frog

CRLF are known to occur in San Antonio Creek and may be affected by project activities within the Narlon Bridge Project Site. Impacts could occur due to vehicle strikes, vegetation mowing, construction activities, or during capture and relocation. Noise generated during construction operations has the potential to disturb CRLF near the creek. CRLF may also be affected by sedimentation, contamination, or night lighting. During construction, sediment could enter the waterway and adversely affect egg masses and juvenile or CRLF. Contamination of the waterway could occur from vehicular leaks or improper equipment or vehicle maintenance. Night lighting during bridge changeout work may also affect CRLF and alter their foraging behavior or make them more visible to (and vulnerable to) predators. However, frogs may actually accrue benefits from night lighting due to increased ability to detect predators and increased calling behaviors (Tuttle and Ryan 1982; Baker and Richardson 2006). Because the lighting will be constant during the changeout periods, frogs will acclimate to the new conditions and experience less than significant overall impacts.

Measures may be implemented to minimize adverse effects to CRLF and their habitat, including exclusion fencing to prevent CRLF from entering the work area, allowing only qualified biologists to capture and relocate frogs, and erosion controls. Environmental BMPs listed in Section 2.2.11 and the measures identified in the 2013 BO (Appendix C) may minimize impacts to CRLF.

Special-status Reptiles

Four special-status reptiles may occur within the Proposed Action Area and may be affected by project activities. Blainville's horned lizard and northern legless lizard occur in central dune scrub and may occur throughout the Proposed Action Area. Two-striped garter snake and western pond turtle are aquatic species likely to be found only within the Narlon Bridge Project Site along San Antonio Creek. Impacts to all four species could occur due to vehicle strikes, vegetation mowing or grading activities, construction, or capture and relocation. Two-striped garter snake and western pond turtle may be affected by sedimentation or contamination. During construction, sediment could enter the waterway and adversely affect the health of these species. Contamination of the waterway could occur from vehicular leaks, improper equipment or vehicle maintenance, or spills. Blainville's horned lizard and northern legless lizard may be affected by temporary loss of central dune scrub habitat.

Impacts to aquatic special-status reptile species may be minimized by exclusion fencing along San Antonio Creek to prevent them from entering the work area, and erosion controls. Impacts to terrestrial special-status reptiles may be minimized by conducting preconstruction surveys within work areas prior to vegetation mowing and grading activities. If any sensitive reptiles are found within the Proposed Action Area, they may be captured and relocated only by qualified biologists

to an appropriate offsite location. Environmental BMPs listed in Section 2.2.11 may minimize impacts to sensitive reptiles.

Special-status Birds

Western snowy plover and California least tern both nest on open beaches with little to no vegetation and are known to nest on the beach to the west of the Narlon Bridge. Appropriate nesting habitat to support these species is not present within the Proposed Action Area; however, noise and night lighting from bridge replacement could affect birds nesting on the beach at the mouth of San Antonio Creek. Noise may be comparable to sound levels of crashing waves at high tide and, therefore, may not affect plover and tern habitat. Large dunes (approximately 100 feet in elevation gain above the beach) are present between the bridge site and the potential nesting habitat on the open beach. This natural barrier and the distance of the project from the beach (over 3,000 feet) may result in negligible noise effects to western snowy plover and California least tern. Night lighting during bridge changeout operations could affect these species if they are nesting on the beach west of the bridge. Night lighting may face down and inland to prevent light pollution and protect sensitive coastal bird habitat. Environmental BMPs listed in Section 2.2.11 and the measures identified in the 2013 BO (Appendix C) may avoid or minimize impacts to western snowy plover and California least tern.

Yellow warbler and yellow-breasted chat are non-listed special-status bird species that could occur in riparian habitat along San Antonio Creek within the Narlon Bridge Project Site. Vegetation mowing may result in temporary loss of potential foraging and nesting habitat; however, due to the abundance of suitable adjacent riparian habitat, this impact may be less than significant. Mowing may occur prior to nesting season, avoiding impacts to nesting birds within the Proposed Action Area. However, birds nesting adjacent to the Proposed Action Area may be disturbed by noise, night lighting, or other human activity, which could potentially lead to nest abandonment. Measures listed in Section 2.2.11, including preconstruction surveys and measures to reduce noise impacts to nesting birds, may minimize impacts to special-status bird species.

Special-status Mammals

Six special-status bat species could occur within the Narlon Bridge Project Site and may be affected by vegetation removal and/or bridge replacement activities. Five species (hoary bat, pallid bat, silver-haired bat, western red bat, and Yuma myotis) could potentially roost in the riparian woodland surrounding San Antonio Creek. Three species (pallid bat, Townsend's big-eared bat and Yuma myotis) could potentially roost on the Narlon Bridge structure, but were not observed roosting there during site surveys. The Narlon Bridge does not provide suitable day roost or maternity roost habitat because of the open bridge structure, but could be used as a temporary night roost by several species. The bridge may be replaced with an identical bridge structure, and there may be no permanent loss of potential roosting habitat. All six bat species could forage or roost along the riparian corridor. Vegetation mowing may result in temporary loss of potential foraging and roosting habitat; however, due to the abundance of suitable adjacent riparian habitat, this impact may be less than significant. Vegetation mowing may occur outside of breeding season and may not impact maternity roosts. Bats may be disturbed during vegetation mowing and/or bridge removal, though direct physical harm to individuals is unlikely because the bats may flush readily due to noise or vibration. Bats may be at increased risk of predation if they flush during the day, though the number of individuals potentially affected may be small and may not

significantly affect bat populations. The project is not expected to significantly impact special-status bat species.

American badgers may be present in open areas at the edges of the Proposed Action Area. Vegetation mowing may result in temporary loss of potential foraging habitat; however, due to the low amount of suitable foraging habitat within the Proposed Action Area and the abundance of suitable foraging habitat elsewhere nearby, this impact may be less than significant. Badgers may be affected if a den is located near or within areas slated for mowing and/or ground disturbance. Measures listed in Section 2.2.11, including preconstruction surveys and den buffers, may minimize impacts to American badger.

Special-status Insects

ESBB is assumed to be present within all areas that contain its host plant seacliff buckwheat. Proposed construction activities may occur during the ESBB larval and pupal stages and during the flight season of mid-June to September. ESBB could be affected by mowing and grading activities that may remove buckwheat plants and ESBB larvae. Other effects include a potential increase in dust produced from construction vehicles using unpaved access roads. Dust could cover buckwheat flowers and make them unpalatable to ESBB.

Measures may be implemented to minimize impacts to ESBB. A water truck and/or non-toxic dust palliative may be used to control dust on dirt access roads to minimize dust impacts to buckwheat. In addition, minimization measures may include conducting preconstruction vegetation removal after larvae have fallen into the soil for the pupal stage of its life cycle, and replanting seacliff buckwheat to replace and enhance habitat for ESBB. The environmental BMPs listed in 2.2.11 and the measures identified in the 2013 BO (Appendix C) may minimize the potential of temporary construction activities to substantially reduce the numbers or distribution of populations of this species.

MBBB may be present in areas of central dune scrub where its host plant dune lupine occurs. MBBB may be affected by vegetation mowing that may remove dune lupine and MBBB larvae. Impacts to MBBB larvae may be avoided by conducting vegetation removal after larvae are pupating. Impacts due to temporary loss of host plants may be minimized by replanting dune lupine in restoration areas. Dune lupine is included in the central dune scrub seed mix that may be planted according to the Vegetation Restoration and Monitoring Plan (Appendix I). This measure may minimize the potential of project activities to significantly affect the MBBB population on VAFB.

A monarch butterfly overwintering site is located approximately 0.15 mile south of the Tangair Staging Area. The eucalyptus trees planned for removal within the Tangair Staging Area do not provide suitable overwintering habitat for monarchs, as this species requires dense groves of trees that provide shelter from prevailing winds. The project activities planned for the Tangair Staging Area, including spoils storage and/or materials staging, may not generate enough noise to disturb monarchs clustering approximately 800 feet to the south. Construction activities may increase after monarch butterflies have left the overwintering site in February and are expected to be finishing up by the time monarchs return in October and November. The project is not expected to significantly affect monarch butterflies.

Lompoc grasshoppers may be present in open gravelly areas along roads and railroad tracks within the Proposed Action Area. Vegetation removal along Watt Road or along the UPRR ROW may,

therefore, not result in significant loss of habitat for this species. Lompoc grasshoppers may be affected by dust generated by increased construction traffic, but a water truck and/or non-toxic dust palliative may be used to control dust on dirt access roads. The project is not expected to significantly affect Lompoc grasshopper.

4.2.2 No Action Alternative

Impacts on biological resources from not carrying out the project would be more significant and adverse than impacts stemming from the project's location within environmentally sensitive habitat, which would be addressed by the avoidance, minimization, and mitigation measures incorporated into the project. Should the bridge fail, the adverse effect on protected animals, plants, and their habitat would be significant, with direct and indirect impacts caused by materials and chemical contaminants, direct loss of habitat, and cleanup operations with a scale much larger than the Proposed Action Area.

4.3 Water Resources

Adverse impacts to water resources may occur if the Proposed Action caused erosion; reduced surface water quality to creeks, rivers, streams, or the ocean; or reduced surface or groundwater quality or quantity.

4.3.1 Proposed Action

The Proposed Action may require a NPDES Construction General Permit as required by Section 402 of the CWA because the total disturbed area of the Proposed Action may occur in or near a riverbed and be greater than 1 acre. The RWQCB will issue a General WDR for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction, Order No. 2004-0004-DWQ for permitting discharge, as discussed in Section 3.3 The General WDR will be issued to UPRR after receipt of comments from the RWQCB and included as Appendix F in the final version of this Environmental Assessment.

The Proposed Action does not require a Section 404 of the CWA permit. USACE was consulted in February 2019 regarding the bridge replacement project under the Proposed Action. Because the Proposed Action has been designed to avoid impacts to the OHWM of San Antonio Creek, and there may be no disturbance below the OHWM, USACE determined on February 28, 2019, that a Section 404 permit may not be required. Documentation supporting USACE's determination is included as Appendix G.

4.3.1.1 Surface Water and Floodplains

Construction activities may result in vegetation removal and temporary soil disturbance, although no ground disturbance may occur at or below the OHWM of San Antonio Creek. UPRR's construction contractor may prepare a SWPPP before project implementation, which may require implementation of standard erosion control measures that may prevent or minimize dispersion of soils to surface waters. Measures to minimize the potential for direct impacts to San Antonio Creek include avoiding construction activities and vegetation removal within waters of the U.S., daily heavy equipment maintenance, and monitoring of the entire project area by qualified persons (trained employees as well as qualified biologists) during construction. Implementation of these

measures, along with the BMPs for the proposed action included in Section 2.2.11, may minimize impacts to surface waters.

The Proposed Action may occur within the 100-year floodplain for San Antonio Creek, which is prone to flooding during significant storm events. However, there is no practicable alternative for relocating the Proposed Action outside the floodplain, since the new bridge is needed to cross the creek at this location and cannot be realigned or designed in a manner that will span the creek outside the 100-year floodplain. The Proposed Action may reuse the existing bridge footings, which have a demonstrated capability to withstand previous significant storm events. The Proposed Action may also replace the existing bridge in-kind and may not include expanded construction areas that may cause new impacts to the floodplain during major storm events. The project design is based on ensuring bridge integrity during a major storm event and minimizing environmental impacts. Therefore, the Proposed Action may not cause new adverse impacts to the floodplain during 100-year flood or storm events.

4.3.1.2 Groundwater

Groundwater is not expected to be encountered since the Proposed Action will reuse the existing bridge footings and construction activities are planned for the existing water channel. No diversion or dewatering is expected to occur as part of the project construction. If excavations below the water table are necessary for footing repair, a dewatering plan shall be prepared and approved by the RWQCB and 30 CES Environmental Section, Water Resources prior to construction. If the underground fiber optic cables are damaged during construction, a new conduit may be bored under San Antonio Creek, and the avoidance and minimization measures listed in the Fiber Optic Contingency Plan (Appendix H), including a dewatering plan and a frac-out plan, may be implemented. Therefore, adverse impacts to the groundwater resources may not occur from the Proposed Action.

4.3.2 No Action Alternative

Under the No Action Alternative, replacement of the Narlon Bridge would not occur; therefore, no impacts on water resources would occur. However, if the existing Narlon Bridge were to fail, rail car debris and contents and a large amount of metal and other materials would likely be released into San Antonio Creek, requiring emergency retrieval and proper disposal. A large influx of waste could be deposited onto VAFB infrastructure without the benefits of planning. Additionally, retrieval of all materials would be unlikely. Therefore, if the existing Narlon Bridge were to collapse, it would likely have a significant effect on the surface waters of San Antonio Creek.

4.4 Cultural Resources

Adverse effects to historic properties would occur if implementation of the Proposed Action resulted in any of the following: disturbance or loss of value or data that qualify a site for listing in the NRHP; substantial disturbance or loss of data from newly discovered properties or features prior to their recordation, evaluation, and possible treatment; or substantial changes to the natural environment or access to it such that the practice of traditional cultural or religious activities would be restricted. VAFB requires archaeological monitoring during construction through or adjacent to any known site, regardless of a site's NRHP eligibility. Archaeological monitoring is also

typically required in areas where buried sites are possible, based on the VAFB Integrated Cultural Resources Management Plan.

4.4.1 Proposed Action

Five archaeological sites (CA-SBA-707, CA-SBA-708, CA-SBA-1709H, CA-SBA-2165H, and CA-SBA-3733H) were identified within the APE (Lebow and Smallwood 2019). Two of the sites (CA-SBA-707 and CA-SBA-708) are prehistoric sites; the remaining three are historic archaeological sites associated with railroad resources. Additionally, P-42-041019 (which consists of the Rail Transfer Facility) has been determined eligible for listing in the NRHP as a contributing element to the Cold War-era Peacekeeper Rail Garrison Complex Historic District. The Air Force consulted with the SHPO on determinations of eligibility and on potential adverse project effects to eligible resources. In a letter dated July 25, 2019 (OHP reference #USAF_2013_0617_001), the SHPO agreed that the Proposed Action would have no adverse effect upon historic properties provided certain avoidance and monitoring measures are implemented, as described below and in Section 2.2.11.7.

Within the Area of Direct Impact of the Narlon Bridge Project Site, one NRHP-eligible archaeological site (CA-SBA-708) is located in the west part of the northern bridge abutment, and one NRHP-eligible archaeological site (CA-SBA-707) is located at the southern bridge abutment. Additionally, one NRHP-eligible archaeological site (CA-SBA-2165H) is within the Area of Direct Impact of the Narlon Station Staging Area. The archaeological investigation demonstrated that there are no archaeological deposits that contribute to the eligibility of any of the significant archaeological sites in the Area of Direct Impacts of Narlon Bridge Project Site and the Narlon Station Staging Area. To prevent vehicles and equipment from inadvertently encroaching upon areas where archaeological deposits exist that do contribute to the eligibility of the sites, UPRR may install barriers and signage (consisting of exclusionary fencing), and mark the location of these barriers on the construction plans.

The Rail Garrison Staging Area may be established within the boundary of a contributing element to an NRHP-eligible Cold War-Era Historic District. Because there will be no ground disturbance or alterations to its built environment features, and vehicles will drive on existing paved and concrete surfaces designed for that purpose, there will be no adverse effect to the resource and no protective measures are needed.

If ground-disturbing activities result in a discovery of human remains or other cultural resources during construction, work in that area will be halted, the VAFB archaeologist will be notified of the discovery, and the Air Force will re-open the Section 106 process with the SHPO. Work will resume after reaching agreement on an acceptable resolution. Project construction outside the discovery location will continue while the Air Force, the SHPO, and the Tribe seek agreement on an acceptable resolution.

4.4.2 No Action Alternative

Under the No Action Alternative, the Narlon Bridge would not be replaced, and ground disturbance due to project-related activities would not occur. However, bridge maintenance would eventually no longer suffice to keep the deteriorating Narlon Bridge structure safe for use. There is a chance that the bridge could collapse, which could cause significant ground disturbance due

to the work that would be required to remove the remains of the collapsed bridge, which could cause an impact to known archaeological resources in the APE.

4.5 Socioeconomics

4.5.1 Proposed Action

Implementation of the Proposed Action will have a short-term beneficial impact on socioeconomic resources. There will be minor, short-term economic benefits to local convenience businesses from construction workers purchasing meals, fuel, and other commodities near VAFB. Given the supply of construction labor in the region, it is anticipated that construction workers will commute to the work site and will not require temporary housing. The impacts to socioeconomic conditions from temporary employment will be beneficial but minor compared with the Base or the county economy.

Additionally, during the changeout periods, rail and freight operations will be routed around VAFB, scheduled to avoid the changeout periods, or routed through alternate railway paths; therefore, there will be no change to the socioeconomic conditions for VAFB or Santa Barbara County.

The Proposed Action will not result in a long-term change in socioeconomic conditions because operation of the Narlon Bridge is not anticipated to increase growth in the region.

4.5.2 No Action Alternative

Selection of the No Action Alternative would have a potentially significant effect due to the end of rail traffic circulation across VAFB. Goods and services could not be moved from San Luis Obispo County to Santa Barbara County across the rail, and vice versa. This would impact the efficiency and economic output of the agricultural industry in northwestern Santa Barbara County, which is the main economic influencer in the area, and result in increases in truck traffic for freight and goods transportation. Amtrak operations that span this part of California's coastline would cease, with trains terminating at Surf Station, unable to connect with points north.

4.6 Geology and Earth Resources

Adverse impacts to geological and earth resources would occur if implementation of the Proposed Action resulted in significant soil erosion or exposure of people or structures to strong seismic activity including ground shaking or soil liquefication.

4.6.1 Proposed Action

Implementation of the Proposed Action will involve vegetation removal in areas to be graded. Excavating, filling, and grading during laydown preparation will disturb soil. These activities will increase the potential for erosion as well as the potential for more surface water runoff in areas of bare dirt. The Proposed Action will be required to meet SWRCB requirements for a NPDES Construction General Permit (see Section 3.3, Water Resources). UPRR's construction contractor will prepare an SWPPP before project implementation, which will require implementation of standard erosion control measures. Exposed soil areas, including staging areas and areas graded

for temporary shoring support platforms, will be re-vegetated with an appropriate seed mix and sufficient mulch to prevent erosion according to the Vegetation Restoration and Monitoring Plan (Appendix I). In addition, no vegetation removal will occur at or below the OHWM of San Antonio Creek. Proposed BMPs listed in Section 2.2.11 will be implemented to reduce impacts to soils to a less than significant level.

The Proposed Action does not include development of any new structures other than replacement of an existing structure. The original concrete pedestals will be reused, and no drilling of any kind is planned. However, if the underground communication lines are damaged during construction, a new conduit will be bored under San Antonio Creek. Based on a review of the documentation available on the geological characteristics and seismic activity of the region, this will not result in significant impacts to seismicity due to the Proposed Action.

4.6.2 No Action Alternative

Under the No Action Alternative, the Narlon Bridge would not be replaced, and soil disturbance due to project-related activities would not occur. However, bridge maintenance would eventually no longer suffice to keep the deteriorating Narlon Bridge structure safe for use. If the bridge collapsed, it could cause significant disruption of soils near the bridge as well as remove vegetation from in and around San Antonio Creek. This could result in increased soil erosion into the creek. There would then be additional soil disturbance due to the work that would be required to remove the remains of the collapsed bridge.

4.7 Hazardous Materials, Solid Waste Management, and Human Health and Safety

4.7.1 Hazardous Materials and Waste Management

4.7.1.1 Proposed Action

Proposed construction activities will require the use of hazardous materials. Compliance with all applicable federal, State, and local rules and regulations will govern all activities associated with the Proposed Action, which will minimize the potential for adverse effects. Specifically, hazardous materials and waste will be regulated by the procedures outlined in the VAFB Hazardous Materials Management Plan, VAFB Hazardous Waste Management Plan, and Hazardous Materials Emergency Response Plan. UPRR will coordinate with VAFB regarding transport, storage, management, and use of hazardous materials for work on VAFB land. All hazardous materials required to operate and maintain construction equipment will be properly used per manufacturers' specifications.

With regulation of hazardous wastes and materials per the above plans, as well as the BMPs described in Section 2.2.11, no adverse impact from hazardous materials or wastes is anticipated under the Proposed Action. The Proposed Action Area does not overlay any IRP, UXO, Area of Concern, and Area of Interest sites; therefore, no impact will occur.

4.7.1.2 No Action Alternative

Under the No Action Alternative, the proposed replacement of the Narlon Bridge would not occur. The No Action Alternative would create no additional hazardous materials or waste on VAFB than

baseline current baseline conditions. Therefore, no significant impacts to hazardous materials or waste management would occur in the foreseeable future. However, if the existing Narlon Bridge were to fail, hazardous materials may be released unabated into the San Antonio Creek, potentially causing a significant impact on biological resources and human health and safety.

4.7.2 Solid Waste Management

4.7.2.1 Proposed Action

Activities at the Narlon Bridge project area will involve excavation and removal of existing steel bridge supports and rail, wood decking, and the old bridge abutments. The generation of construction and demolition debris during implementation of the Proposed Action has the potential to adversely affect waste diversion rates on VAFB. Wastes generated during construction and demolition will be disposed of offbase by the contractor. However, to the greatest extent practicable, the contractor will segregate all waste generated during the Proposed Action and manage the wastes separately. To the extent practicable, recyclable construction and demolition waste (e.g., steel rail and support assemblies) will be transported to a recycler. All soils excavation for crane pads, staging areas, and access roads will be reused onsite. Concrete debris will be transported offbase for recycling or proper disposal. Treated wood waste (e.g., ties, bridge timbers, etc.) will be disposed of in an offsite permitted solid waste landfill in California and will not be recycled. All cleared and grubbed material will be disposed of off property unless otherwise directed by UPRR, and shall comply with federal, State, and local regulations. Documentation that material has been disposed of at a certified recycle or landfill shall be submitted by the contractor to UPRR for all material disposed offsite.

Noncompliance with applicable regulatory requirements or disposal of quantities of solid waste that will cause the Proposed Action not to meet mandated diversion rates will be considered an adverse impact. Debris will be segregated to facilitate subsequent pollution prevention options. Pollution prevention options will be exercised in the following order: reuse of materials, recycling of materials, and then regulatory compliant disposal.

Compliance with all applicable federal, State, and local regulations, rules and requirements, and applicable VAFB plans will govern all actions associated with implementing the Proposed Action; therefore, no significant effects to solid waste management are anticipated.

4.7.2.2 No Action Alternative

Under the No Action Alternative, the proposed replacement of the Narlon Bridge would not occur. Because no solid waste would be generated, there would be no significant impact to solid waste management. However, if the existing Narlon Bridge were to fail, a large amount of ballast, metal, and other materials would likely be released into San Antonio Creek, requiring emergency retrieval and proper disposal and a large influx of waste onto VAFB infrastructure without the benefits of planning. Additionally, retrieval of all materials would be unlikely. Therefore, if the existing Narlon Bridge were to collapse, it would likely have a significant effect on solid waste management on VAFB.

4.7.3 Human Health and Safety

4.7.3.1 Proposed Action

Construction sites, in general, can be dangerous to workers and the public. All applicable OSHA requirements and Air Force regulations will be implemented during construction of the Proposed Action. A health and safety plan will be implemented, and a formally trained individual will be the safety officer and the main point of contact for all job site safety issues. Impacts from potential health risks to construction personnel and the public are not be anticipated because work will be done by an experienced, licensed contractor, and the work will follow an approved health and safety plan. Therefore, adverse impacts associated with environmental health risks should not occur.

Biological hazards, including vegetation (i.e., poison oak and stinging nettle), animals (i.e., insects, spiders, and snakes), disease vectors (i.e., ticks and rodents), and physical hazards (i.e., holes and ditches, uneven terrain, sharp or protruding objects, unstable ground) exist within the project area, and have the potential to adversely affect the health and safety of construction and maintenance personnel. Adherence to federal OSHA regulations will minimize the exposure of workers to these hazards.

4.7.3.2 No Action Alternative

Under the No Action Alternative, the proposed replacement of the Narlon Bridge would not occur. Therefore, there would be no health and safety impacts resulting from project activities. However, if the existing Narlon Bridge were to fail with a loaded train, human life could be lost. Additionally, the resulting emergency cleanup would be potentially hazardous to human health and safety due to the large amount of metal and debris, as well as potentially harmful chemicals, that would require removal and disposal.

4.8 Land Use

Adverse impacts to land use may occur if implementation of the Proposed Action conflicted with requirements of land use plans or the policies of the California Coastal Act, or resulted in land uses within the Proposed Action Area that were incompatible with or adversely affected adjacent land uses.

4.8.1 Proposed Action

The construction of a new railroad bridge over San Antonio Creek, demolition of the existing Narlon Bridge, and implementation of restoration and additional mitigation will not result in a land conversion or cause a decrease in the use of land.

Rail traffic will continue on the existing bridge during the construction of the new bridge. Replacement operations will occur in one to several changeout periods wherein passenger rail traffic will be routed around VAFB, and freight will be scheduled to avoid the changeout periods or routed through alternate railway paths. No restrictions to VAFB surface street travel are anticipated.

Equipment and materials transportation on VAFB roads is not expected to interfere with VAFB operations. Amtrak passenger service out of Surf Station may be interrupted during changeout curfews. A small amount of open space on VAFB will be used for staging and changeout

operations, but these areas will be restored after construction has been completed, and there will be no net loss of open space.

No significant impacts to land use will occur as a result of the Proposed Action.

4.8.2 Coastal Zone Management

CCC's federal office conducted an analysis of the Proposed Action to determine whether there will be adverse impacts to the coastal zone, as defined by the CZMA and CCA. The CCC determined that there will be no significant impacts to the coastal zone as a result of the Proposed Action and concurred with UPRR's Consistency Certification. CCC's certification (Appendix E) is based on the proposed BMPs, incorporated into the Proposed Action, and based on the long-term benefits of the new bridge and associated mitigation measures.

4.8.3 No Action Alternative

Under the No Action Alternative, the proposed replacement of the UPRR Narlon Bridge would not occur, and no changes to land use would result. However, if the bridge were to collapse, rail traffic would be forcibly diverted to other rail routes and result in an interruption of essential rail transportation up and down the California Coast. A bridge collapse would result in emergency debris removal and a fast-tracked bridge reconstruction project involving intensive construction activities. Such an action could affect the open space areas outside of the Proposed Action Area to accommodate construction staging areas and emergency activities.

4.9 Transportation

Adverse impacts to transportation would occur if implementation of the Proposed Action resulted in roadways no longer being able to serve traffic demands due to degradation of those roadways; or traffic shifting to a roadway incompatible with that increase in traffic.

4.9.1 Proposed Action

Implementation of the Proposed Action will temporarily affect the roadway network on VAFB through the delivery of materials and commute of construction workers during site construction. Construction traffic will enter and exit VAFB primarily through the Lompoc Gate, which could result in traffic congestion at that gate, especially during peak traffic hours. Increased vehicle and equipment traffic on unpaved roads, especially those within the Proposed Action Area, could cause these roads to degrade or become damaged and unable to carry traffic.

Unpaved access roads within the Proposed Action Area will be reinforced with geogrid and road base where necessary, and these road improvements will be left in place after construction is completed (see Section 2.2.4 and Section 2.2.6). This will reduce impacts to roads and road carrying capacity to less than significant levels.

To reduce traffic impacts during periods of high traffic volume, construction traffic may be able to enter from the north via the Titan Gate. A separate security checkpoint may also be set up for construction traffic at the Lompoc Gate to avoid congestion at the VAFB security checkpoint. UPRR could also transport construction materials to the project site via rail. Heavy construction vehicles will be kept onsite for the duration of their use. Project personnel will carpool to reduce

the number of vehicles traveling on base. These measures, as well as those described in Section 2.2.11, should ensure that anticipated traffic volumes during construction will be within the capacity of the surrounding roadways. Because the increase in traffic volume will be temporary, no long-term impacts to the regional transportation network, or VAFB roads, are anticipated. Impacts to transportation resources are anticipated to be minimal.

4.9.2 No Action Alternative

Under the No Action Alternative, the proposed replacement of the Narlon Bridge would not occur. Therefore, there would be no effect on existing transportation. However, if the bridge were to collapse, rail traffic would be forcibly diverted to other rail routes and result in an interruption of essential rail transportation up and down the California Coast. A bridge collapse would result in a large volume of emergency vehicle and equipment traffic on VAFB. Additionally, there would be increased vehicle and equipment traffic on VAFB to deal with debris removal and a fast-tracked bridge reconstruction project involving intensive construction activities. Such an action could affect local traffic conditions and cause adverse effects on local transportation routes. If rail transport is not available between San Luis Obispo and Santa Barbara due to bridge failure or outage, surface road transport would add more than 1,000 commercial trucks per week and 7,000 cars per week, equating to about 32,000 vehicle trips per month (see Section 2.3). This would cause increased traffic congestion on all major highways and roadways in the area. Alternative rail travel would route trains via Sacramento, through the Central Valley, across the Tehachapi Range to Barstow, to connect to Los Angeles, resulting in increased rail traffic and potential schedule conflicts on these routes.

4.10 Public Utilities

4.10.1 Proposed Action

Conduit with communication cables east of the UPRR ROW will be accurately located by fiber optics carriers and mapped by UPRR's contractor. Temporary bridge pile locations will be designed to avoid impacts to buried communication cables and will prevent temporary bridge piles from affecting communication cables during construction; therefore, interruption in utility service is not anticipated with implementation. No impact is proposed to existing utilities.

As a contingency (see Fiber Optic Contingency Plan in Appendix H), fiber optics carriers will string temporary cables across the riparian zone on the east side of the Narlon Bridge Project Site. Fiber will be placed on the ground and protected under access road crossings, and hung on temporary poles across the creek. Cables will be conveyed to the nearest hand-holes (pulling vaults) north and south of the bridge. Part of the contingency plan will also include the option of implementing a directional bore under the creek to replace conduit, if damaged during construction operations. If a direction bore is planned, a dewatering plan and a frac-out plan will be prepared and approved by VAFB environmental staff prior to implementation of this contingency plan.

4.10.2 No Action Alternative

Under the No Action Alternative, the proposed replacement of the Narlon Bridge would not occur, and there would be no construction impacts to utilities. However, there could be adverse effects on buried conduit and fiber optic communication systems if the bridge should fail. Emergency

cleanup operations could damage fiber cables buried at various depths within the Proposed Action Area.

4.11 Cumulative Impacts

There are no feasible alternatives that will achieve the objectives of the project without violating CCA Chapter 3 policies. The impacts to coastal resources, the regional transportation network, and VAFB operations from not carrying out the Proposed Action would be more significant and adverse than impacts stemming from the Proposed Action's location within sensitive habitats, which will be addressed by the avoidance, minimization, and mitigation measures incorporated into the project. Impacts to sensitive habitats and resources caused by implementation of the Proposed Action will be temporary, and the non-resource dependent use proposed is necessary to continue providing rail service that has been in operation in this location for approximately 125 years. The Proposed Action will, on balance, be most protective of significant coastal resources.

4.11.1 Past, Present, and Reasonably Foreseeable Future Actions in the Region of Influence

Launch operations are scheduled to occur during the Proposed Action, and bridge construction will be coordinated with VAFB CE to avoid conflict. The 13th Street Bridge was replaced in 2017 and will provide access to the Proposed Action Area. Table 4-4 summarizes federal projects on VAFB and their status in the NEPA process. There are no conflicts or significant cumulative effects caused by past or present projects, or those actions scheduled for the reasonably foreseeable future.

TABLE 4-4. FEDERAL PROJECTS OF VAFB RELEVANT TO THE NARLON BRIDGE PROJECT

Federal Projects	Status
North Base	
13th Street Bridge Replacement	NEPA complete. Action completed in 2017.
San Antonio Creek Bridge Repair	NEPA complete.
D1 Powerline Replacement	NEPA underway.
Marshalia Golf Course	NEPA underway.
National Reconnaissance Office (NRO) Western Processing Facility Construction	NEPA underway.
South Base	
Falcon 9 and Falcon 9 Heavy Launch Vehicle Programs from Space Launch Complex (SLC) 4 East	NEPA complete. Actions ongoing.
Boost-back and Landing of the Falcon 9 First Stage at SLC-4 West and Offshore	NEPA complete. Actions ongoing.
Atlas V System from SLC-3E	NEPA complete. Actions ongoing.
South VAFB Wastewater Treatment Plant	NEPA underway.
Installation of Cabins at Wall Beach	NEPA underway.
SLC-2 Deactivation	NEPA beginning.

4.11.2 Proposed Action

Replacement of the bridge will maintain vital commercial rail transport and continued public travel on Amtrak's Pacific Surfliner and Coast Starlight rail lines. The Proposed Action will benefit VAFB operations and commercial launch operation by allowing materials and equipment to be delivered safely by rail.

The replacement bridge will be built on the existing concrete bridge footings, which will enable the project to avoid permanent effects on wetlands, environmentally sensitive habitat, and water quality, although it will cause temporary effects during construction, for up to 1 year.

Adverse effects on environmentally sensitive habitat, wetlands, water quality, and cultural resources will be avoided where feasible, and otherwise minimized; and temporary impacts on environmentally sensitive habitat area will be mitigated. Adverse effects on VAFB resources will be minimized and timed to avoid direct conflict with VAFB operations.

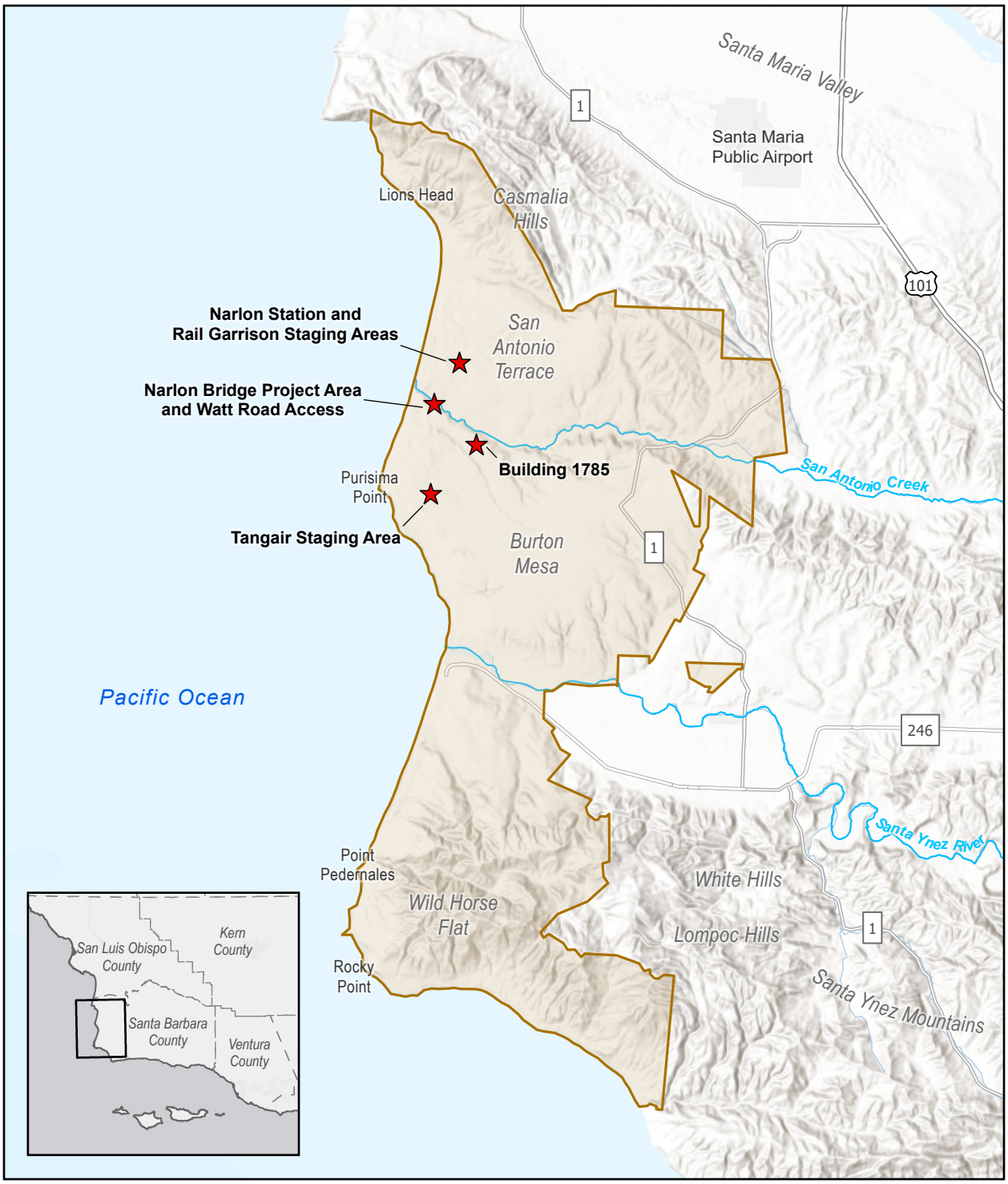
4.11.3 No Action Alternative

The No Action Alternative would itself involve more extensive adverse effects on coastal resources than the Proposed Action.

5 FIGURES

- Figure 1-1. Regional Location of VAFB
- Figure 1-2. Proposed Action Area and Access
- Figure 2-1. Site View Plans and Grading Limits
- Figure 2-2. Bridge Replacement Cross-Section (Looking West)
- Figure 2-3. Bridge Replacement Cross-Section (Looking East)
- Figure 2-4. Narlon Bridge Project Site
- Figure 3-1. Habitat Types and Wetlands and Waters of the U.S.
- Figure 3-2. CNDDB/CNPS Rare Plants
- Figure 3-3. Designated Critical Habitat
- Figure 3-4. CNDDB Rare Animals
- Figure 3-5. Soils Map
- Figure 3-6. Access Roads and Gates

Figure 1-1. Regional Location



Legend

★ Proposed Action Area

Vandenberg Air Force Base

N

0 1 2 3 4 5 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.57552°W 34.7151°N
Santa Barbara County

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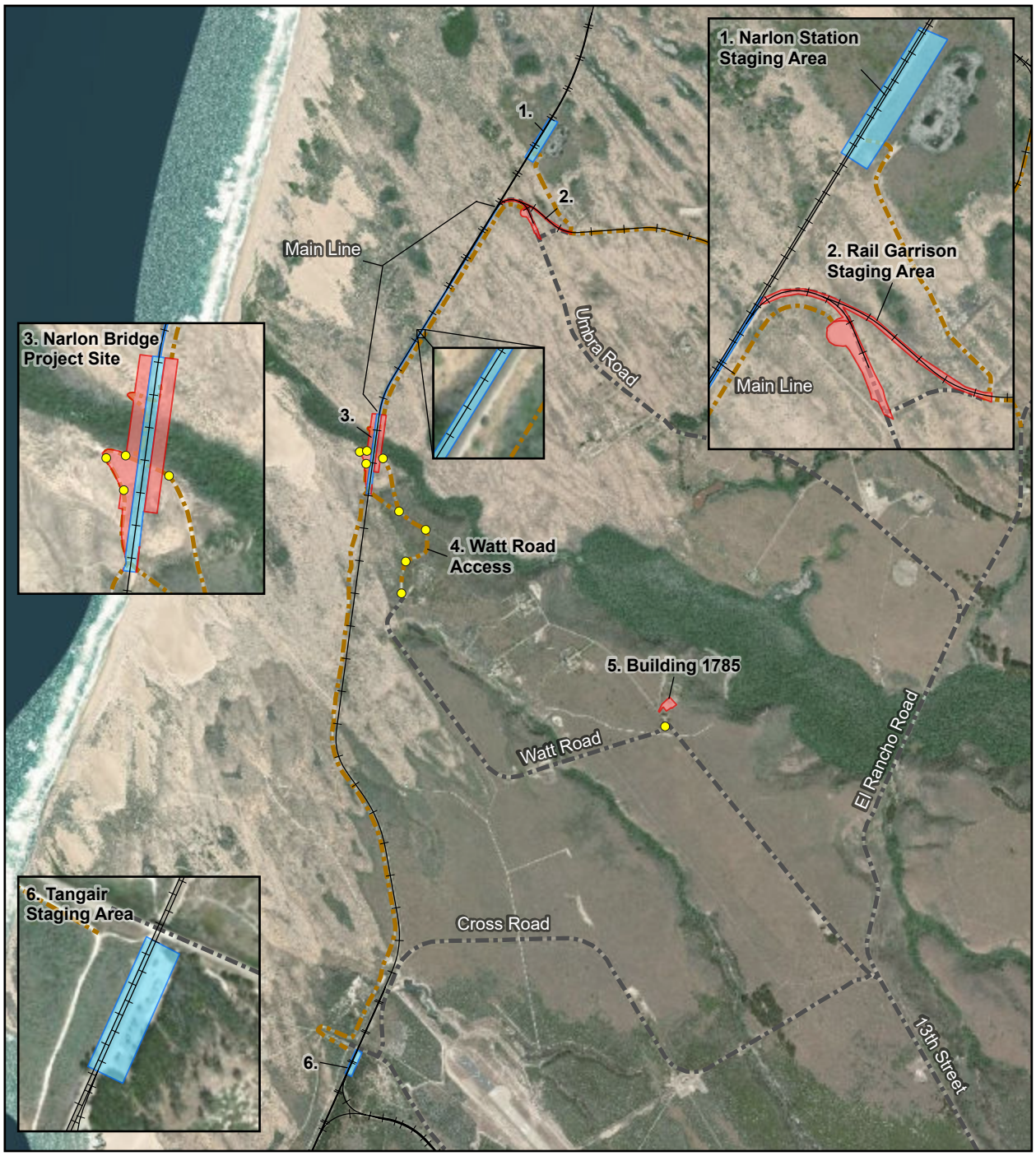
Map Updated:
October 10, 2019 10:32 AM by MMP

Figure 1-2. Proposed Action Areas and Access



Legend

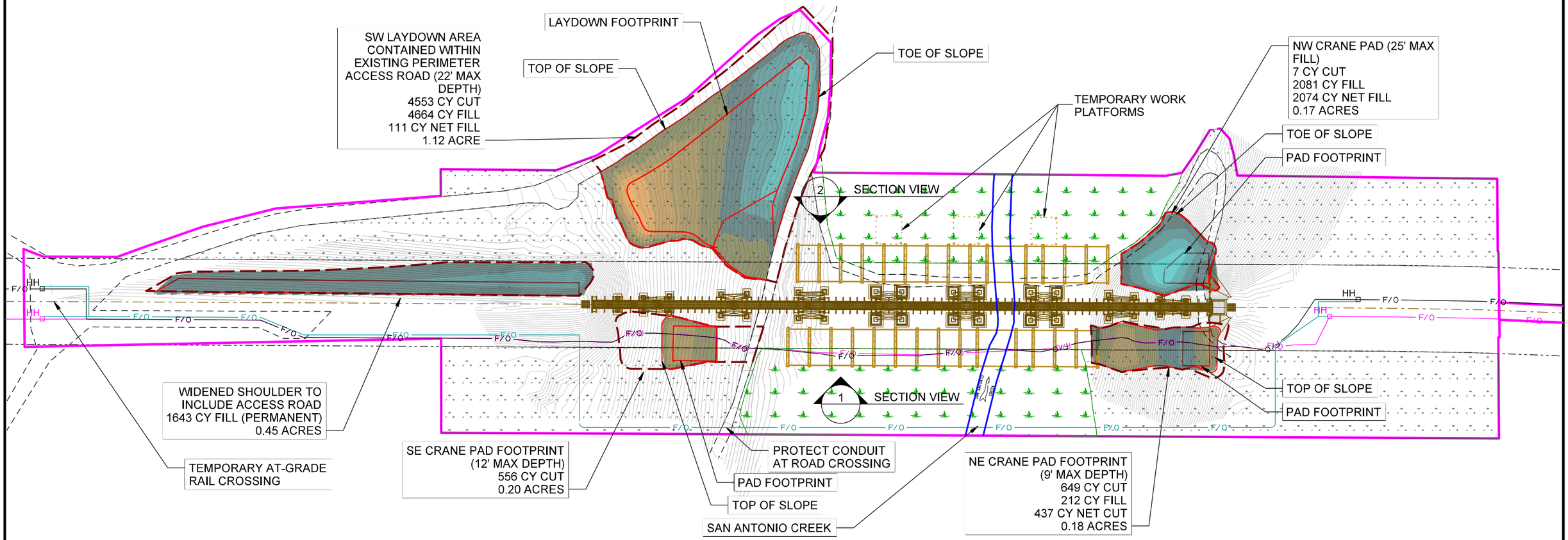
- UPRR Property (12.8 acres)
- VAFB Property (11.3 acres)
- Mowing At Curves For Vehicle Access
- Union Pacific Railroad
- Roads
  - Existing Paved
  - Existing Unpaved

N

0 0.25 0.5 0.75 1 Mile

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.6005°W 34.78238°N
Santa Barbara County, California

Figure 2-1. Site View Plans and Grading Limits



LEGEND

- CENTRAL DUNE SCRUB HABITAT BOUNDARY
- ARROYO WILLOW RIPARIAN HABITAT BOUNDARY
- EXISTING CONTOURS
- ACTION AREA
- WATERS OF THE UNITED STATES
- UNION PACIFIC RIGHT OF WAY
- UNION PACIFIC TRACK AND STRUCTURES
- UNPAVED ACCESS ROADS
- GRADING ENVELOPE
- CONTRACTOR SAMPLE CONTOURS (SEE SECTIONS FOR DETAILS)
- TEMPORARY ACCESS BRIDGE

FIBER LEGEND

UP(FORMER AT&T), SPRINT, MCI, CENTURY LINK (QWEST)
NEW AT&T, CENTURY LINK (LEVEL 3)
TEMPORARY FIBER RELOCATION

NOTE: TEMPORARY FIBER RELOCATION WILL INCLUDE DUCTS FOR EACH CARRIER

GRADING ELEVATION LEGEND

- 20.00' FILL
- 15.00' FILL
- 10.00' FILL
- 5.00' FILL
- 0.00'
- 5.00' CUT
- 10.00' CUT
- 15.00' CUT
- 20.00' CUT

100 0 100 200
SCALE IN FEET

BR 291.33 SANTA BARBARA SUB

TEMPORARY CONSTRUCTION IMPACTS EXHIBIT
PLAN VIEW

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Figure 6 - Temporary Impacts
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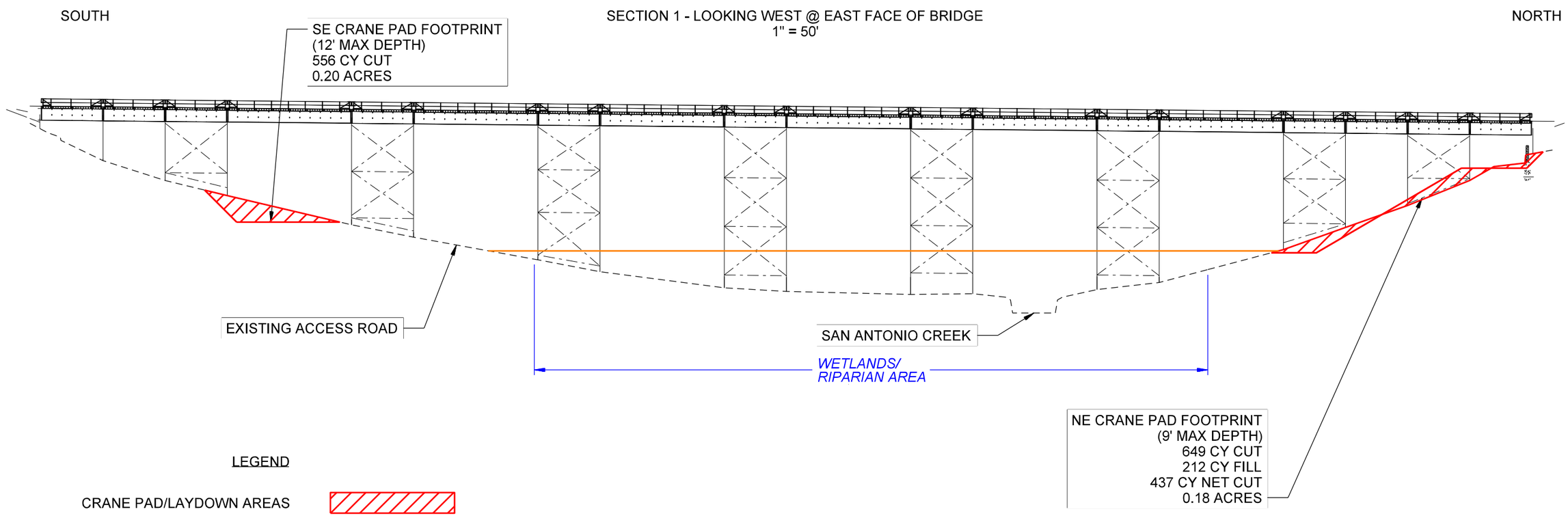
Figure 2-2. Bridge Replacement Cross-Section (Looking West)



BR 291.33 SANTA BARBARA SUB

TEMPORARY CONSTRUCTION
IMPACTS EXHIBIT
SECTION VIEW 1

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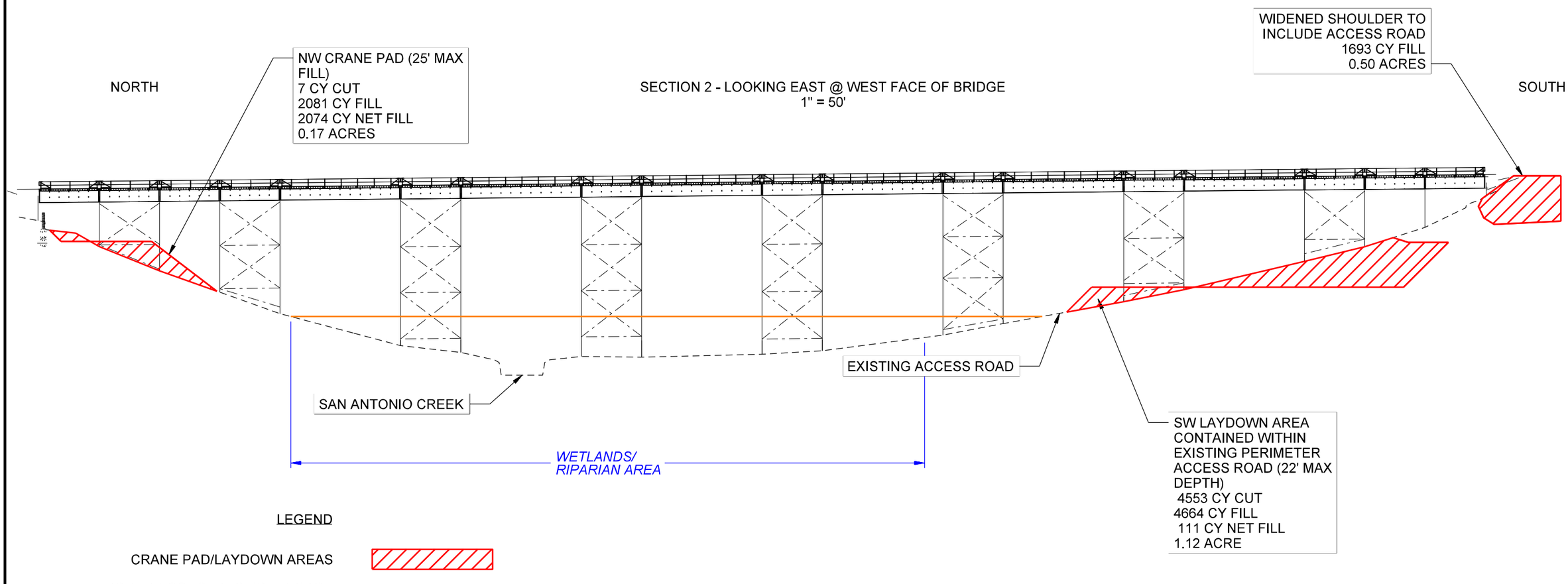
Section Impacts
2/4/2019 10:46:00 AM

Figure 2-3. Bridge Replacement Cross-Section (Looking East)



HDR	BR 291.33 SANTA BARBARA SUB
	TEMPORARY CONSTRUCTION IMPACTS EXHIBIT SECTION VIEW 2

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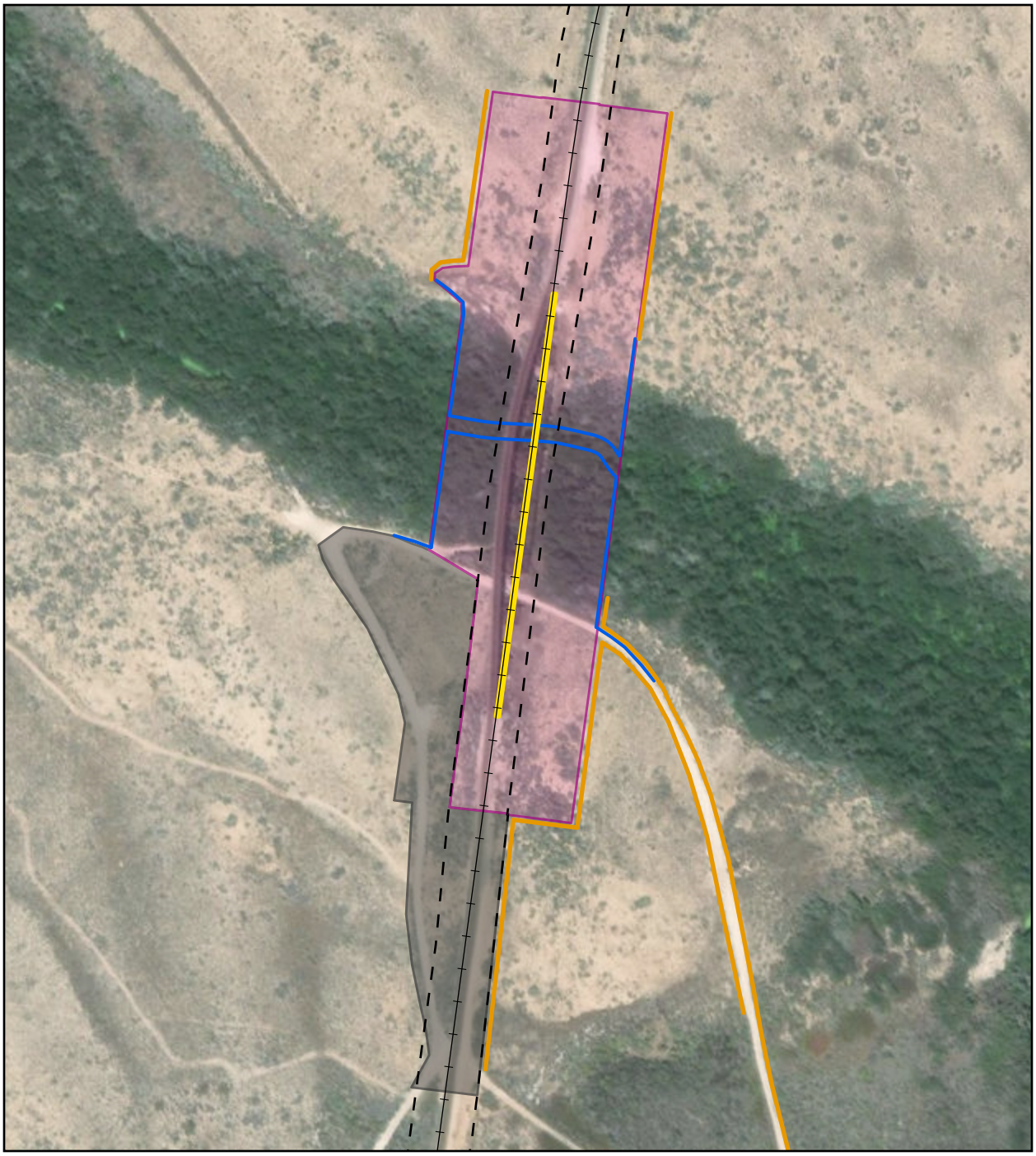
Section Impacts
2/4/2019 10:46:17 AM

Figure 2-4. Narlon Bridge Project Site



Legend

- Exclusionary Fence (T-posts and Rope)
- Frog Protection Fence (ERTECH)
- Narlon Bridge
- Union Pacific Railroad
- UPRR Right of Way
- Active Work Area (7.6 acres)
- Staging Area (2.9 acres)

N

0 100 200 300 400 Feet

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.61097°W 34.78954°N
Santa Barbara County, California

ALTHOUSE AND MEADE, INC.
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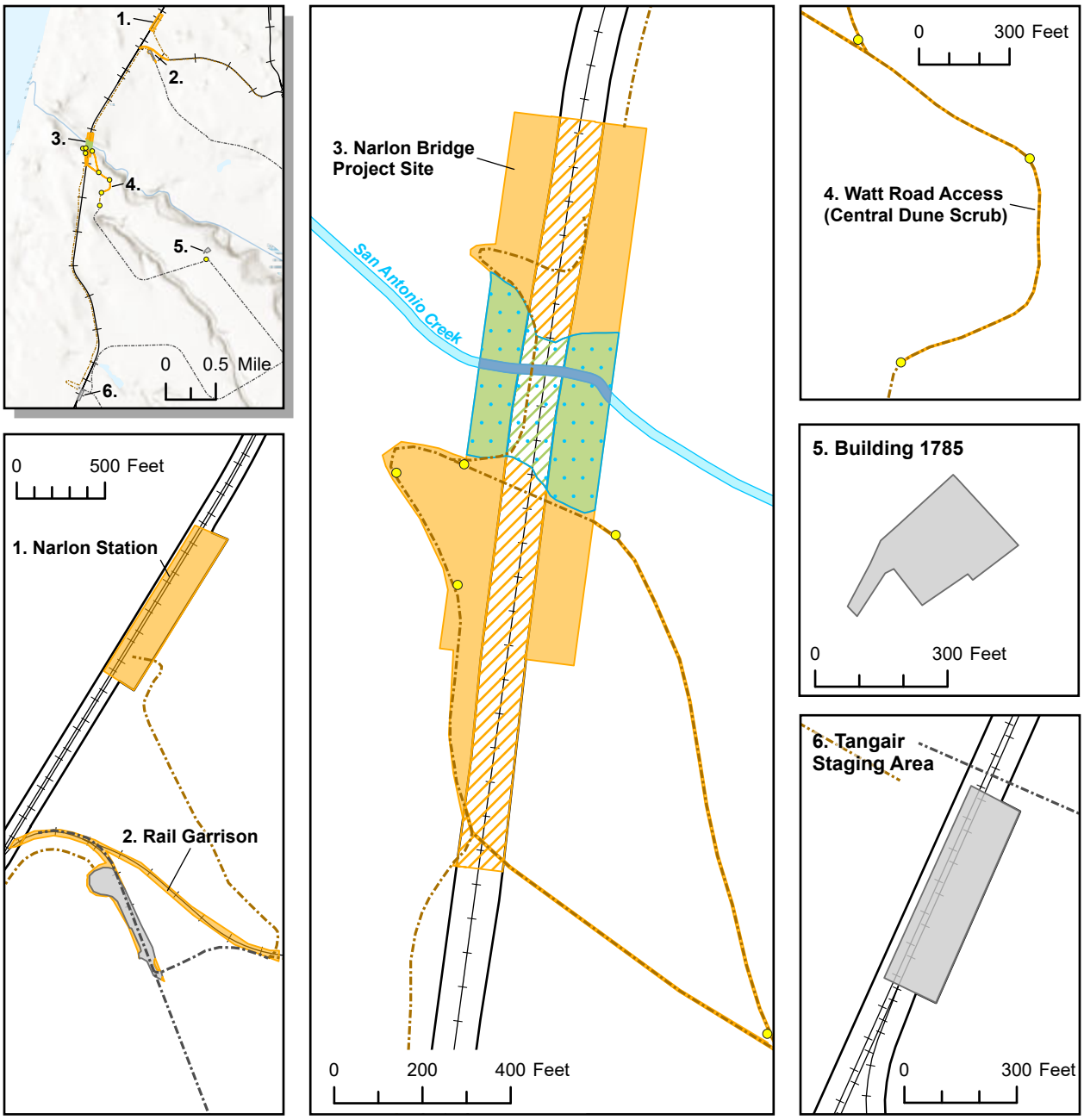
Map Updated:
June 28, 2019 03:50 PM by MMP

Figure 3-1. Habitat Types and Jurisdictional Wetlands and Waters



Legend

Habitat Types

- Arroyo Willow Riparian (1.84 acres)
- Central Dune Scrub (11.55 acres)
- Managed Vegetation - Central Dune Scrub (3.25 acres)
- Managed Vegetation - Riparian (0.70 acres)
- Unvegetated (4.45 acres)

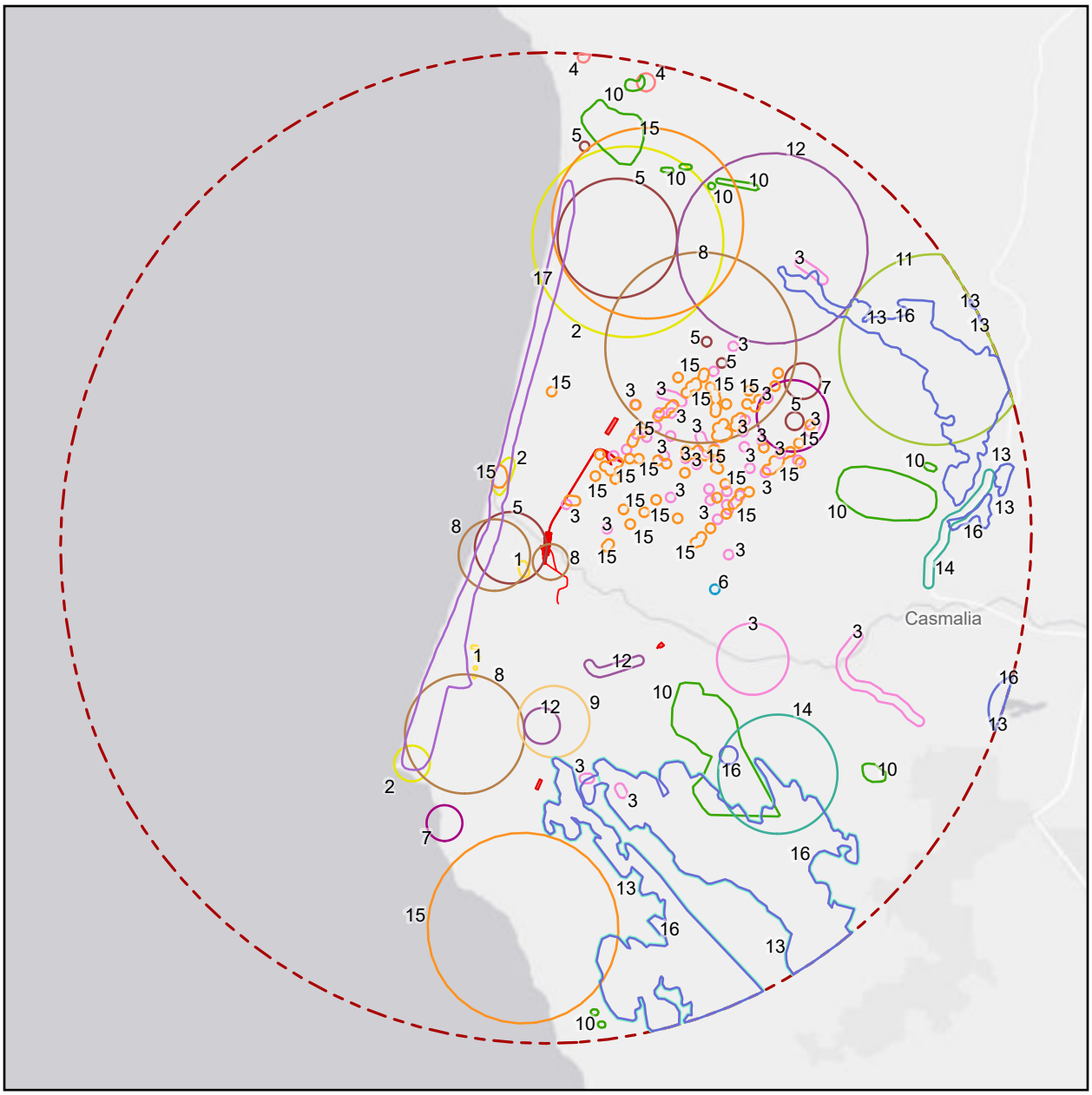
- Mowing At Curves For Vehicle Access
- State Wetland
- Federal Perennial Stream (0.15 acre, 319 feet)
- UPRR Right of Way

- Railroad
- Existing Paved Road
- Existing Unpaved Road

N

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.61089°W 34.78904°N
Santa Barbara County, California

Figure 3-2. California Natural Diversity Database Plant Records



Label	Common Name
1	Beach layia
2	Beach spectaclepod
3	Black-flowered figwort
4	Blochman's dudleya
5	Blochman's leafy daisy
6	Bolander's water-hemlock
7	Coastal goosefoot
8	Crisp monardella
9	Dune larkspur
10	Gaviota tarplant
11	Hoover's bent grass
12	Kellogg's horkelia
13	La Purisima manzanita
14	Mesa horkelia
15	San Luis Obispo monardella
16	Sand mesa manzanita
17	Surf thistle

Legend

5-Mile Radius from Narlon Bridge Project Site

Proposed Action Area

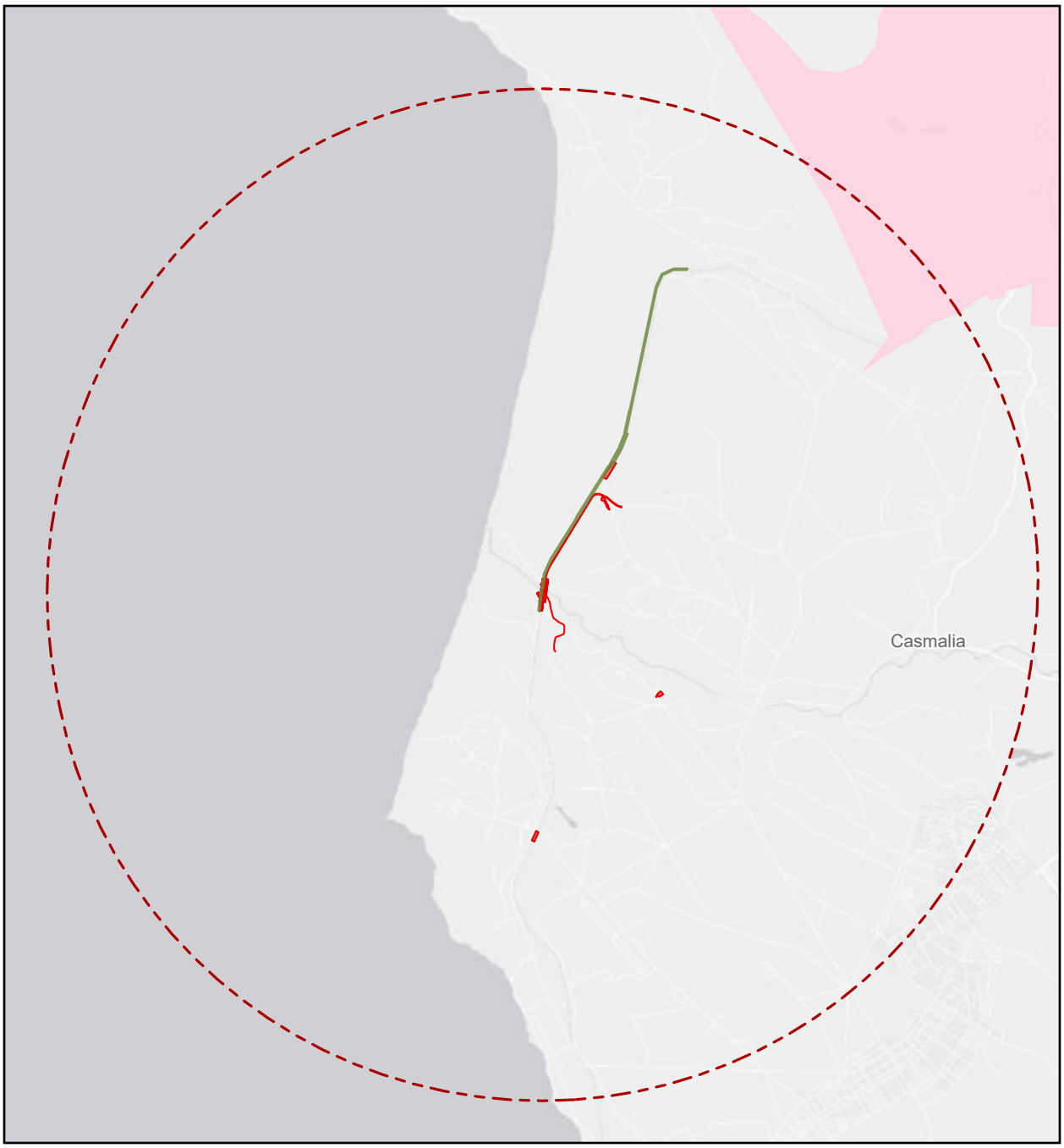
N

0 0.5 1 1.5 2 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.61111°W 34.78946°N
Santa Barbara County

CNDDB GIS Data Last Updated: March 2019

Figure 3-3. United States Fish and Wildlife Service Critical Habitat



Legend

- 5-Mile Radius from Narlon Bridge Project Site
- California red-legged frog
- La Graciosa thistle
- Proposed Action Area

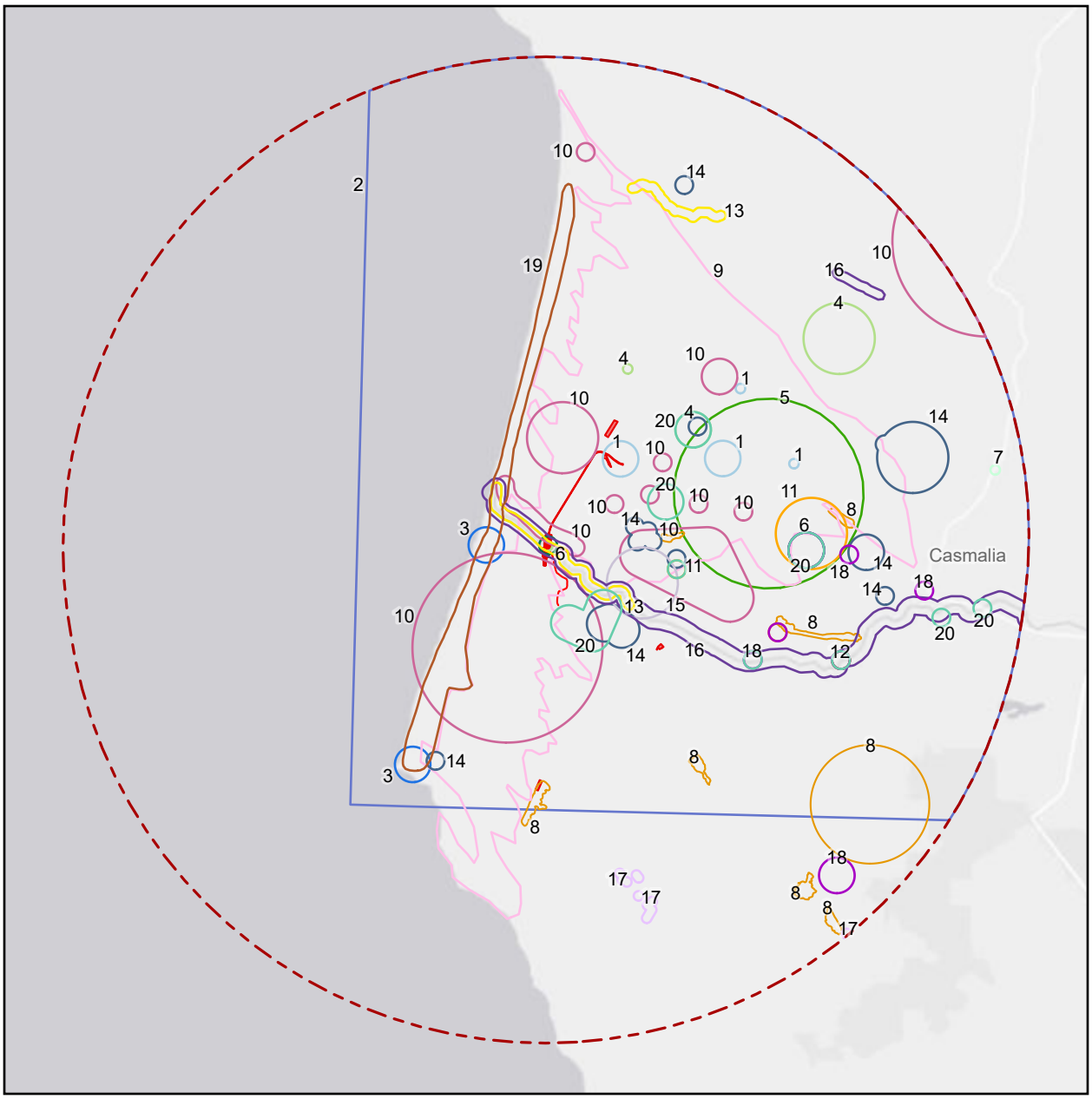
N

0 0.5 1 1.5 2 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.6131°W 34.79243°N
Santa Barbara County

USFWS Critical Habitat Data Last Updated: December 2018

Figure 3-4. California Natural Diversity Database Animal Records



Label	Common Name	Label	Common Name
1	American badger	16	Unarmored threespine stickleback
2	American peregrine falcon	17	Vernal pool fairy shrimp
3	California least tern	18	Western red bat
4	California red-legged frog	19	Western snowy plover
5	Coast horned lizard	20	Yuma myotis
6	Hoary bat		
7	Lompoc grasshopper		
8	Monarch - California overwintering population		
9	Morro Bay blue butterfly		
10	Northern California legless lizard		
11	Pallid bat		
12	Silver-haired bat		
13	Tidewater goby		
14	Townsend's big-eared bat		
15	Two-striped gartersnake		

Legend

5-Mile Radius from Narlon Bridge Project Site

Proposed Action Area

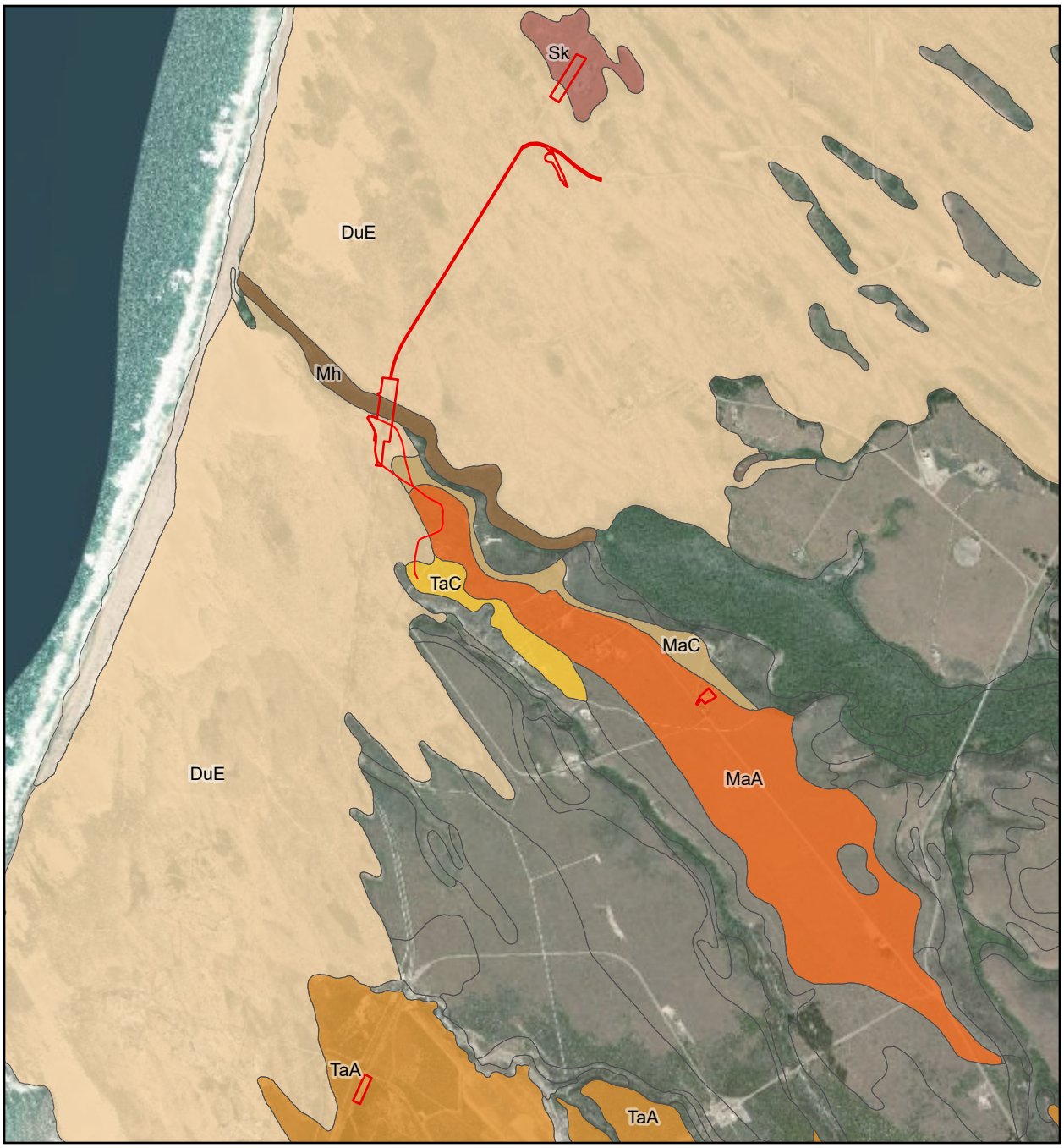
N

0 0.5 1 1.5 2 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.61111°W 34.78946°N
Santa Barbara County

CNDDB GIS Data Last Updated: March 2019

Figure 3-5. United States Department of Agriculture Soil Survey



Legend

- Proposed Action Area
- USDA Soil Survey

Soil Types within Action Areas

- DuE - Dune Land
- MaA - Marina Sand, 0-2 Percent Slopes
- MaC- Marina Sand, 2-9 Percent Slopes
- Mh - Marsh
- Sk - Sandy Alluvial Land, Wet
- TaA - Tangair Sand, 0-2 Percent Slopes
- TaC - Tangair Sand, 2-9 Percent Slopes

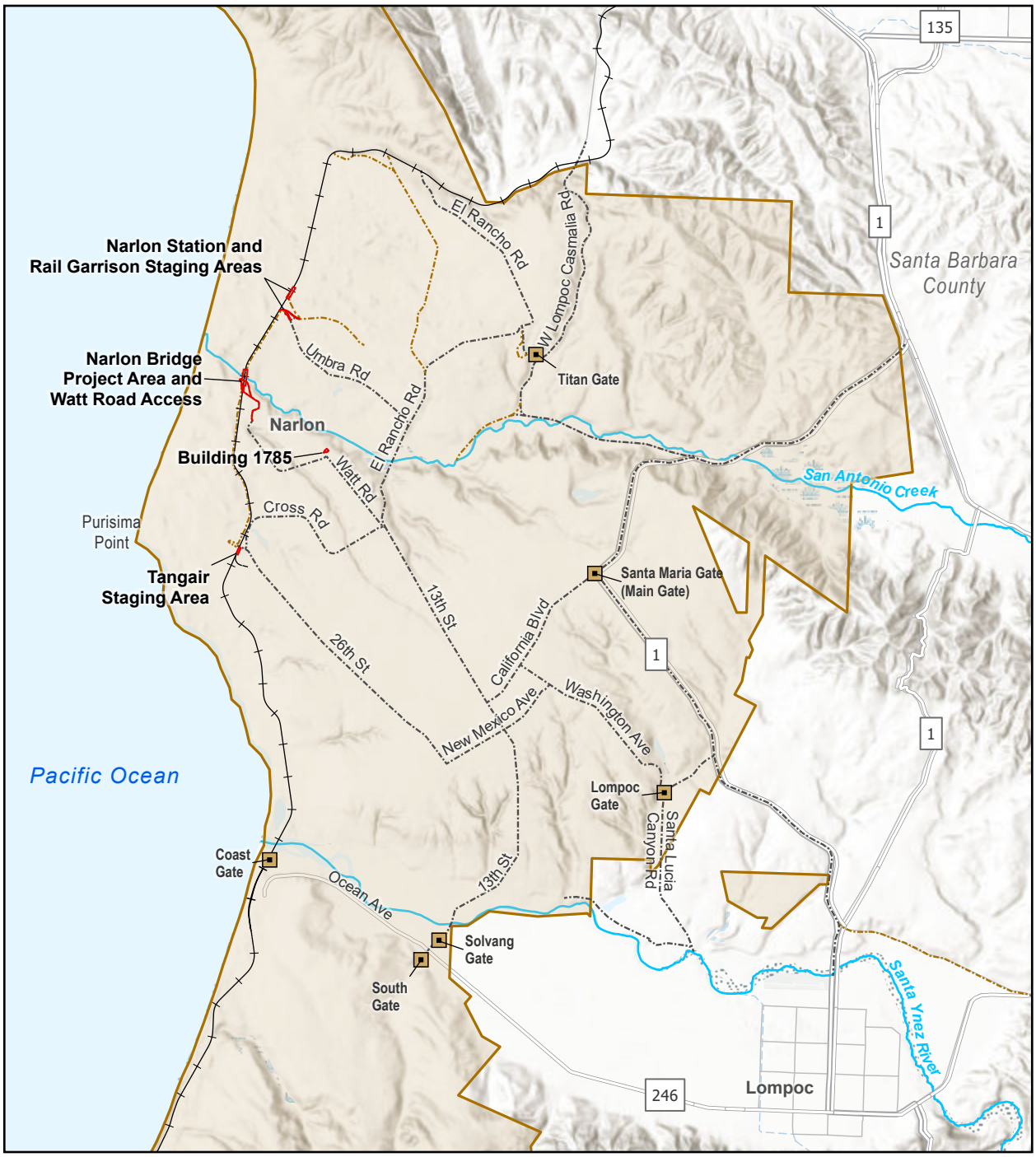
N

0 0.25 0.5 0.75 1 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.60116°W 34.7815°N
Santa Barbara County

Source: USDA NRCS Soil Survey

Figure 3-6. Access and Transportation Routes



Legend

- Proposed Action Area
- Vandenberg Air Force Base
- Gate
- Union Pacific Railroad
- Existing Paved Road
- Existing Unpaved Road

N

0 1 2 3 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.53997°W 34.74932°N
Santa Barbara County

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
June 12, 2019 03:09 PM by MMP

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9 APPENDICES

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APPENDIX A. BIOLOGICAL ASSESSMENT

Biological Assessment

for the

Union Pacific Railroad (UPRR) SBAR 291.33 Narlon Bridge Replacement Project

Narlon Bridge over San Antonio Creek, Santa Barbara County, California

Prepared for

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1.0 Introduction

This Biological Assessment (BA) provides information regarding plant and wildlife species currently listed, candidate, or proposed for listing under the federal Endangered Species Act (ESA) that occur or could occur on lands associated with a proposed bridge replacement project (Project) over San Antonio Creek at Union Pacific Railroad Mile Post 291.33 on the Santa Barbara Subdivision, Santa Barbara County, California. The bridge, built in 1896, is also known as the Narlon Bridge (SBAR 291.33). On behalf of Union Pacific Railroad Company (UPRR or Applicant), Althouse and Meade, Inc. conducted botanical and wildlife surveys specific to this project from January 2011 through August 2011. Data from previous biological field surveys at the site conducted by Althouse and Meade, Inc. since 2004 are also included.

The Project would be constructed entirely on UPRR property. However, access and staging would require use of adjacent property owned by Vandenberg Air Force Base (VAFB). Therefore, UPRR will need an access agreement from VAFB for the Project.

Vandenberg Air Force Base (VAFB) is the federal Lead Agency that owns property proposed to be temporarily impacted during bridge replacement operations adjacent to UPRR property. VAFB plans to initiate consultation with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act.

The Project site is situated in an area that is known to support threatened and endangered plants and wildlife. Provided herein is a review of the known federally listed species reported from the region, in-depth descriptions of those federally listed species with potential to be affected by the Project, a brief review of anticipated potential impacts, and recommended measures to minimize or avoid potential impacts to listed species.

The project has been designed to avoid impacts to San Antonio Creek and no USACE permit is required for the project (per USACE letter dated August 13, 2012). Additionally, dust control measures, such as routine watering of disturbed areas and application of a non-toxic dust palliative, will occur to minimize impacts of dust generated by the project. UPRR has contacted USFWS to discuss possible biological impacts associated with the project. This Biological Assessment has been prepared for the expected initiation of Section 7 consultation with the USFWS by VAFB.

1.1 Purpose Statement

The purpose of this report is to provide federal agencies with information regarding federally listed species that could potentially be affected by the Project. This information is intended to support VAFB with the initiation of a section 7 consultation with the USFWS for the Project.

1.2 Species Considered in this Document

The Project (described and defined in Section 2.0) could potentially affect six species listed under the federal Endangered Species Act (ESA). The Action Area (defined in Section 3.0) does not include any designated or proposed critical habitat for federally listed species. Therefore this BA does not include specific analyses regarding federally-

designated critical habitat. Species potentially affected are listed alphabetically by genus, below:

1. **Western Snowy Plover** (*Charadrius nivosus*): ESA Threatened
2. **Tidewater Goby** (*Eucyclogobius newberryi)*: ESA Endangered
3. **El Segundo Blue Butterfly** (*Euphilotes battoides allyni*): ESA Endangered
4. **Unarmored Threespine Stickleback** (*Gasterosteus aculeatus williamsoni*): ESA Endangered
5. **California Red-legged Frog** (*Rana draytonii*): ESA Threatened
6. **California Least Tern** (*Sternula antillarum browni*): ESA Endangered

The Action Area is defined and described in Section 3.0. Section 4.0 lists all federally listed species reported from the region, and an analysis regarding those with potential to occur in the Action Area. Section 5.0 provides detailed discussions of the six federally listed species that occur or could occur in the Action Area, as listed above. Section 6.0 provides a brief summary of potential impacts to listed species. Avoidance and Minimization Measures are provided in Section 7.0.

Appendix A contains tables of plants and animals detected in the vicinity of Narlon Bridge during field surveys dating back to 2004.

Appendix B provides a summary of federally-listed species reported from the region that were not detected within or near the Action Area and for which the Project would have "No Effect" for ESA purposes.

1.3 Summary of Effects Determinations

Based on the analysis contained in this BA, the Project is likely to adversely affect El Segundo Blue Butterfly, Tidewater Goby, Unarmored Threespine Stickleback, California Red-legged Frog, Western Snowy Plover, and California Least Tern.

El Segundo Blue Butterfly is known to occur within the Action Area, and the butterfly's larval host plant, coast buckwheat *(Eriogonum parvifolium)*, is present in dune scrub habitat surrounding the Project. Removal of this species' host plant and ground disturbance activities under the bridge is likely to adversely affect the El Segundo Blue Butterfly. Measures designed to minimize these effects have been incorporated into the Project to ensure that the Project would not appreciably reduce the numbers or distribution of populations of this species.

Tidewater goby and unarmored threespine stickleback are known to occur in San Antonio Creek. No work is proposed within San Antonio Creek. Measures would be implemented to minimize indirect adverse effects to these species and their habitat, however, ground disturbance under the bridge and work near channel banks during access bridge installation are likely to adversely affect tidewater goby and unarmored threespine stickleback.

California red-legged frog is reported from San Antonio Creek within the Action Area (CNDDB #491). Measures would be implemented to minimize effects to these species and their habitat, however work conducted near channel banks during installation of the access bridges and ground disturbance in the vicinity of the larger railroad bridge are likely to adversely affect California red-legged frog.

The Project is likely to adversely affect the Western snowy plover and California least tern during construction. The Western snowy plover and California least tern are listed bird species that nest on open beaches with little to no vegetation. The Action Area does not have appropriate nesting habitat to support these species, however, they have been known to nest on open beach and foredune habitat west of the Narlon Bridge Action Area. Noise and night lighting effects from bridge replacement could possibly affect these birds if they are found to be nesting nearby. Noise effects in plover and tern habitat are not anticipated to be louder than the sound of crashing waves at high tide. Large dunes, with approximately 100 feet of elevation gain above the beach, are present between the bridge site and the potential nesting habitat on the open beach. Due to this natural barrier and the distance of the project from the beach (over 3,500 feet), noise effects to Western snowy plover and California least tern are anticipated to be very minimal and would constitute an insignificant effect. However, night lighting during bridge change-out operations is likely to adversely affect these federally listed birds if they are found to be nesting on the beach west of the bridge.

TABLE 1. SUMMARY OF EFFECTS DETERMINATIONS.

Species	Listing Status	Effects Determination
California Least Tern	ESA Endangered	Likely to Adversely Affect
Western Snowy Plover	ESA Threatened	Likely to Adversely Affect
California Red-legged Frog	ESA Threatened	Likely to Adversely Affect
El Segundo Blue Butterfly	ESA Endangered	Likely to Adversely Affect
Tidewater Goby	ESA Endangered	Likely to Adversely Affect
Unarmored Threespine Stickleback	ESA Endangered	Likely to Adversely Affect

2.0 Project Information

Union Pacific Railroad (UPRR) proposes to replace the existing Narlon Bridge and an existing access bridge with a new railroad bridge and access bridge. The Narlon Bridge was built in 1896 and requires replacement to maintain UPRR safety standards, Federal Railroad Administration (FRA) standards and uninterrupted service. The existing bridge poses a safety risk to the continued use of the rail for interstate commerce purposes if not replaced. The access bridge also requires replacement because it is not structurally capable of supporting construction and maintenance equipment. Both the Narlon Bridge and access bridge are entirely within the UPRR right of way (ROW), which is 50 feet

from the centerline on either side of the tracks. The project requires a Form 813 approval from Vandenberg Air Force Base (VAFB) for use of VAFB property for construction equipment operation and site access.

2.1 Location of Project

The Narlon Bridge Replacement Project is located on Vandenberg Air Force Base along the northwestern Santa Barbara County coast, approximately 15 miles southwest of Santa Maria, California. The existing bridge crosses San Antonio Creek within the Casmalia United States Geological Survey (USGS) 7.5 minute quadrangle. The bridge elevation is approximately 88 feet above mean sea level, with San Antonio Creek at approximately 25 feet above mean sea level at this location (Figure 1, Section 11.0). A map of the Action Areas is included as Figure 2 in Section 11.0.

2.2 Project Description

The Project would remove an antiquated and deteriorating steel bridge crossing San Antonio Creek at UPRR Mile Post (MP) 291.33, Santa Barbara Subdivision. The existing bridge was built in 1896. Over time, the steel supports have corroded and deteriorated, rendering the bridge in need of replacement. An old access bridge would be replaced with a structure that can support heavy equipment for bridge construction.

2.2.1 Narlon Bridge Replacement

UPRR plans to construct a new bridge to replace the 720-foot-long open-deck Narlon Bridge. The new bridge will be approximately 760 feet in length and span San Antonio Creek. The approximately 16-foot wide bridge deck will be supported by eleven (11) new concrete columns anchored by drilled footings ranging in diameter from 4-feet to 9-feet cast-in-place concrete. The largest span between support columns will be approximately 180-feet. Approximately 6.3 acres of the project area is located with VAFB property, and 2.8 acres within UPRR property (Figure 4).

2.2.2 Access Bridge Replacement

The project also includes replacement of an existing approximately 15-foot wide and 40-foot long access bridge ("access bridge"). The access bridge is located on the west side of the existing Narlon Bridge and will be replaced using H-piles to allow safe crossing of a 300-ton crane and other construction equipment across San Antonio Creek. The new access bridge will temporarily be approximately 35-feet wide and 40-feet long and comprised of two segments that are side-by-side (a 20-foot segment and a 15-foot segment). The 20-foot segment will be removed upon completion of construction and the temporary abutments restored to pre-existing conditions. The remaining 15-foot wide by 40-foot long segment will remain in place for permanent operations and maintenance use by UPRR.

2.2.3 Construction Staging Areas

Staging areas are proposed for materials, a temporary concrete batch plant, and spoils storage area. One approximately 0.6-acre staging area will be located southwest of the Narlon Bridge outside of UPRR ROW in an area used by VAFB for maintenance activities ("Bridge Staging Area"). A second staging area approximately 10.8 acres in

size will be located approximately 1.25 miles northwest of the Narlon Bridge within UPRR ROW ("Narlon Station Staging Area").

Concrete will be mixed at one of two proposed locations for a batch plant. The actual location of the batch plant will be determined at the time of construction but both locations are being included for consideration in the Form 813 and other agency approvals (e.g. Section 7 consultation) approval process. The first location is the approximately 0.6-acre Rail Garrison site (rail spur and paved parking lot) located approximately 1 mile northwest of the Narlon Bridge and outside of UPRR ROW, off of Umbra Road. The Rail Garrison Site may also be used for rebar and rail assembly and storage. The second location is the Tangair Staging Area, a 6.5-acre area located within the UPRR ROW near Tangair Road approximately 2.4 miles south of the Narlon Bridge. Concrete would be delivered to the project site on existing VAFB access roads by truck. An on-site batch plant will minimize impacts to the VAFB Santa Lucia gate and improve efficiency of concrete delivery for the project. Raw materials for concrete will be brought in by rail and stored on existing paved areas.

Dirt spoils from the installation of the new bridge footings will be temporarily stock piled within the Tangair Staging Area. Excess soil will be removed by rail as work trains become available.

All work will occur within the UPRR ROW with the following exceptions:

- UPRR requires access on VAFB roads to and from Narlon Bridge for construction crews and equipment. This includes paved roads from VAFB gates to the project site and unpaved roads around Narlon Bridge. No new roads will be created for the project. Existing dirt road for the access bridge will be maintained by adding road base or soil binders. During construction operations a water truck and/or non-toxic dust palliative or soil binder will be used to control dust on dirt access roads. Dust palliatives will be approved by VAFB natural resources and public works departments, and will be applied in a manner that protects water quality in San Antonio Creek. Dust palliatives will only be used outside of the riparian zone; water will be used within the riparian zone. No grading or cut will occur that may disturb potential cultural sites under the roadway.
- UPRR owns a 100-feet ROW (50-feet from centerline of the track) at Narlon Bridge. UPRR needs to access an additional 100 feet upstream and downstream of Narlon Bridge on VAFB property in order to allow for crane movement. The extent of temporary construction disturbance is anticipated to be less than the maximum allotted 300-foot width at some points. Impacts to San Antonio Creek riparian zone will be minimized to the extent possible, but will include cutting and trimming of riparian vegetation at or near ground level and placing crane mats over work areas.
- A temporary construction access bridge on the east side of the Narlon Bridge is proposed to minimize impacts to San Antonio Creek (see Section 2.3.4).
- UPRR needs to utilize a staging area near the bridge ("Bridge Staging Area") as depicted on Figure 4 immediately southwest of Narlon Bridge.

- UPRR proposes to set up a batch mixing plant at the Rail Garrison or Tangair site as described above to minimize traffic impacts by concrete trucks to VAFB entrance gates.
- UPRR needs to utilize existing roads between the Narlon Bridge and the Tangair Road site to remove spoils from the project site.

VAFB roads will be maintained by UPRR during construction and returned to pre-project condition (with exception of roads improved with road base, which will be left in place). After the new bridge is complete, the old bridge segments will be cut into pieces and hauled away by railcar to a facility authorized to accept scrap material. The existing footings will be abandoned in place so that additional ground disturbance will not occur from removal.

2.2.4 Temporary Construction Access Bridge

The project also includes a temporary construction access bridge to enable construction equipment to cross San Antonio Creek to the east of the Narlon Bridge. The bridge would be approximately 35-feet wide by 50-feet long. Approximately 15 to 20 feet of the bridge would be constructed on VAFB property within the proposed Action Area. Approximately 600 cubic yards of fill (300 c.y. on each side of the creek and out of the creek, and above the ordinary high water mark) would be placed to provide temporary abutments and ramps for the bridge. The bridge would span approximately 50 feet and rest on the temporary abutments. The bridge would be capable of supporting a 300-ton crane, made of steel and designed to American Association of State Highway and Transportation Officials (AASHTO –US) bridge design codes. Upon completion of construction, the bridge would be removed by rail car and the fill for the abutments would be re-contoured to match the existing grade or transported offsite by railcar.

2.2.5 Ground Disturbance

Ground disturbance will be limited to the area within the UPRR ROW and the construction areas described above, primarily under the existing bridge or in the proposed facility staging area. Concrete footings will be drilled into the area below the existing bridge to support the new bridge. No work will occur within the OHWM of San Antonio Creek.

Existing roads will not be widened for the project. Layers of road base or soil binders will be added to avoid compaction and protect cultural resources as needed. As previously mentioned, a small laydown area will be needed near the southwest end of the bridge in the approximate location where VAFB road maintenance crews have likely staged road materials in the past. This area is approximately 0.6 acre.

No additional ground disturbance will occur during final demolition. Existing bridge footings will be cut off and abandoned in place. Steel piles will be removed from the 34 brick and stone footings (various heights, less than 6 feet tall) that will remain in place.

2.2.6 Site Restoration

Staging areas will be returned to their pre-project conditions. For example, areas graded for crane pads will be re-contoured to pre-project contours. Disturbed areas will be stabilized and permanently vegetated. Disturbed areas will be restored with native vegetation.

2.2.7 Construction Equipment

Equipment for the Project is projected to include, but not limited to:

- 2 – 300-ton cranes
- 1 – 150-ton crane
- 2 – front end loaders
- 4 – dump trucks
- 10 – construction worker vehicles per day
- 6 to 20 – concrete trucks
- 1 – water truck (for dust control)

2.2.8 Construction Phases

Phase 1 – Install Environmental Protection Measures, Access, and Laydown Areas

- Exclusionary fencing for California red-legged frog (CRLF) will be installed by biological monitors.
- UPRR will protect cultural sites, as needed, by covering them with road base or fill.
- Roads will be improved through the addition of road base or soil binders. Appropriate Minimization Measures for stormwater and water quality protection will be installed near San Antonio Creek.
- The existing access bridge west of the Narlon Bridge will be removed and replaced with a new bridge to allow safe passage of large equipment over San Antonio Creek. The temporary construction access bridge will be installed.

Phase 2 – Construct New Bridge

- Cranes and equipment to construct the new railroad bridge will be mobilized and brought onsite via rail and existing roads.
- The contractor will drill footings for the concrete columns.
- A concrete batch mixing plant will be set up at the Rail Garrison paved area or at the Tangair railroad right-of-way.
- Dust control measures, such as routine watering of disturbed areas and application of a non-toxic dust palliative, will occur to minimize impacts of dust generated by the project.
- After drilling is complete, concrete columns will be poured in place to support the new railroad bridge. Spoils will be hauled via truck to the UPRR stock pile area near Tangair road and later hauled out by rail.
- The contractor will remove the existing spans and cut them into smaller pieces on site so that these pieces can be loaded into rail cars to be hauled away.
- As the existing spans are taken out (which will happen in several different curfews), new spans will be installed in their place on the new substructure system to allow for train passage.
- Night work may be necessary during drilling and bridge change-out operations.

Phase 3 – Remove Old Bridge

- The existing Narlon Bridge will be cut into segments and loaded onto rail cars for shipment to a facility authorized to accept scrap material. The existing bridge footings will be abandoned in place so that no additional ground disturbance will occur from removal.
- All temporary structures and materials will be removed following construction and disposed of off-site and outside waters of the U.S.

2.2.9 Project Schedule

The total duration of construction is approximately two years. Vegetation removal (mowing/pruning to less than 4 inches) is scheduled first. Access roads and laydown areas would be prepared, followed by staging and site preparation (e.g. crane pad, access bridges). Drilled shafts, pier construction and bridge replacement would follow. Site restoration would be implemented immediately following construction.

3.0 Action Area

The Action Area (i.e., all areas that could be affected directly or indirectly by Project implementation) evaluated in this BA comprises the following four areas. (1) Narlon Bridge site that includes Union Pacific Railroad's property in the vicinity of the bridge (50 feet from centerline of tracks for approximately 1,230 linear feet) and VAFB property 100-feet east and west of Narlon Bridge, and extending beyond 150 feet southwest of the bridge. The total Action Area on VAFB near the bridge would be approximately 6.3 acres.; (2) Tangair staging and spoils pile lay-down area and possibly a concrete batch plant south of Tangair Road on UPRR property, along approximately 950 linear feet of track where the ROW is approximately 300 feet wide; (3) a laydown site north of Umbra Road on UPRR property, along approximately 2400 linear feet of track where the ROW is over 100 feet wide; (4) Rail Garrison equipment staging area and possibly a concrete batch plant located at the terminus of Umbra Road on an existing 0.5 acre asphalt cul-de-sac (Figure 2, Section 11.0). Access roads are displayed on Figure 3.

3.1 Environmental Baseline

The Narlon Bridge spans San Antonio Creek near the Pacific Ocean and is located on private property (owned by UPRR) surrounded by VAFB. Arroyo willow riparian habitat is present under the bridge along the banks of San Antonio Creek. In the upland areas under the bridge the habitat consist of disturbed grassy and bare areas interspersed with dune scrub habitat. A VAFB dirt road passes from east to west under the bridge south of the riparian zone. UPRR has maintained a small access road parallel to the railroad track that allows maintenance workers to cross San Antonio Creek by foot or small vehicle. The Action Area includes a previously disturbed area on VAFB property adjacent to the southern end of the bridge which consists of ruderal habitat dominated by veldt grass with some dune scrub habitat sparsely scattered throughout. The Action Area also includes a spoils pile lay-down area and possibly a concrete batch plant located south of Tangair Road consisting of ruderal and dune scrub habitat. An equipment staging area

and possibly a concrete batch plant would be located on an asphalt cul-de-sac called the Rail Garrison site located north of the bridge.

3.2 Habitat Type Descriptions

3.2.1 Arroyo Willow Riparian

San Antonio Creek is a perennial stream which flows through VAFB to the Pacific Ocean. Narlon Bridge spans San Antonio Creek approximately 1.2 miles upstream of its confluence with the ocean. Habitat along San Antonio Creek is also known as Central Coast Arroyo Willow Riparian Forest and Scrub. Arroyo willow (*Salix lasiolepis*) is the dominant canopy species along San Antonio Creek near the bridge. Understory vegetation includes poison oak (*Toxicodendron diversilobum*), blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). San Antonio Creek is perennial at this location. Vegetation within the railroad's ROW is maintained approximately every other year.

3.2.2 Central Dune Scrub

Central Dune Scrub habitat occurs in upland areas under the bridge near the north and south abutments as well as in the proposed staging area southwest of the bridge, portions of the staging area northeast of Umbra Road, and at the Tangair Road site. Dune scrub habitat occurs on a partially stabilized dune system which supports a greater diversity of plants than typical pioneer dune communities. Sub-shrubs and shrubs are dominant, with areas of bare sand and a variety of herbaceous species. The dominant native shrubs are bush lupine (*Lupinus arboreus*), mock heather (*Ericameria ericoides*), coast buckwheat (*Eriogonum parvifolium*), and deerweed (*Lotus scoparius*). Common herbaceous species include California poppy (*Eschscholzia californica*), suncups (*Camissonia* ssp.), and many others. Manzanita *(Arctostaphylos purissima)* are also present in dune scrub habitat at the Tangair Road staging area. Veldt grass (*Ehrharta calycina*) and iceplant (*Carpobrotus edulis*) are common invasive species in the upland areas near the bridge.

3.2.3 Anthropogenic and ruderal

Anthropogenic plant communities are dominated by plants introduced by man and established or maintained by human disturbance. Ruderal habitats contain assemblages of plants that thrive in waste areas, roadsides and similar disturbed sites (Holland and Keil 1995). Anthropogenic habitat includes features or material made by humans such as the existing Narlon bridge structure, adjacent access bridge, railroad, and VAFB access roads, and a large portion of the Tangair Road and Rail Garrison staging areas. Ruderal habitat includes a portion of the proposed staging laydown area immediately southwest of the Narlon Bridge, as it is a previously disturbed area with bare gravel and dominated by introduced veldt grass. Eucalyptus trees *(Eucalyptus globulus*), present in the eastern portion of the Tangair Road site, are an anthropogenic component of a disturbed environment designated as "non-native tree" habitat by Vandenberg Air Force Base natural resources managers (VAFB 2012).

4.0 Federally Listed Species

This BA includes detailed information regarding federally listed species that occur or could occur within the Action Area. Information presented here is based on a records

review of federally listed species reported from the USGS quadrangles that are within 5 miles of the Project. Records that were reviewed came from the California Natural Diversity Database (CNDDB), the U.S. Fish and Wildlife Service (USFWS), and the California Native Plant Society (CNPS) On-line Inventory of Rare and Endangered Plants of California. The designated search area encompasses approximately 136 square miles (87,220 acres) of land, and is consistent with typical search area requirements by the USFWS and California Department of Fish and Game (CDFG). The search area includes the Casmalia and Surf USGS 7.5 minute quadrangles. Additional species were added to the list from our knowledge of the area, and from review of museum specimen data and other private consultant survey reports from the region.

Figure 5 in Section 12.0 depicts the current GIS data for federally listed species and critical habitat mapped in the vicinity of the Action Area by the CNDDB and USFWS.

4.1 Federally Listed Species that May Be Affected by the Project

Six federally listed species are known to occur or have the potential to occur in the Action Area, and could potentially be affected by the Project (Table 2).

The El Segundo Blue Butterfly has been detected in the vicinity of the Narlon Bridge (VAFB 2012), and presence is assumed within the Action Areas. The Project is likely to result in adverse effects to this species.

Tidewater goby and unarmored threespine stickleback are reported in San Antonio Creek in the vicinity of the Action Area. The old access bridge will be removed and replaced when water levels are low in San Antonio Creek. No work will occur within the OHWM. Measures would be implemented to minimize indirect effects to these species and their aquatic habitat, however, the Project is likely to adversely affect tidewater goby and unarmored threespine stickleback.

California red-legged frog is a federally listed threatened species that is reported from San Antonio Creek within the Action Area (CNDDB #491). Protective measures would be implemented to minimize effects to these species and their habitat, however work conducted near channel banks during access bridge installation and ground disturbance activities under the railroad bridge are likely to adversely affect this species.

Western snowy plover and California least tern are listed bird species that nest on open beaches with little to no vegetation. The Action Area does not have appropriate nesting habitat to support these species, however, they are known to nest west of the Narlon Bridge site in open beach and dune habitat. Night lighting during bridge change-out operations is likely to adversely affect snowy plover and California least tern if they were found to be nesting west of the bridge.

TABLE 2. FEDERALLY LISTED SPECIES THAT OCCUR IN THE REGION Six species are listed in this table that are governed by the ESA, and which were detected or have the potential to occur within the Action Area and could be affected by the Project.

Common and Scientific Names	Fed/State Status Global/State Rank DFG Rank or CNPS List	Nesting/ Breeding/ Blooming Period	Habitat Preference	Potential Habitat?	Observed on Site?
Western Snowy Plover *Charadrius nivosus*	Threatened/none G4T3/S2 SSC	March 15 through August 15	Sandy beaches, salt pond levees, and shorelines of large alkali lakes. Needs friable soils for nesting.	No. Suitable habitat is not present within the Action Area. Potential nesting habitat is present on open beach and dunes west of Narlon Bridge.	No
Tidewater Goby *Eucyclogobius newberryi*	Endangered/none G3/S2S3 SSC	n/a	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	Yes. Tidewater Goby is known to occur within San Antonio Creek in the vicinity of the Action Area (CNDDB Occurrence No. 57).	Yes. (Page and Ball et al. 2009)
El Segundo Blue Butterfly *Euphilotes battoides allyni*	Endangered/None		Host plant, Coast Buckwheat (*Eriogonum parvifolium*)	Yes. *E. parvifolium* plants are present within and adjacent to the Action Area.	Assumed Present
Unarmored Threespine Stickleback *Gasterosteus aculeatus williamsoni*	Endangered/ Endangered G5T1/S1 Special Animal	n/a	Weedy pools, backwaters, and among emergent vegetation at the stream edge, in small S. Calif. streams. Requires cool, clear water.	Yes. This species is known to occur within San Antonio Creek in the vicinity of the Action Area (CNDDB Occurrence No. 1).	Yes. (Page and Ball et al. 2009)
California Red-legged Frog *Rana draytonii*	Threatened/none G4T2T3/S2S3 SSC	January - September	Lowlands and foothills in or near sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks for larval development.	Yes. CRLF is known to occur within the Action Area (CNDDB Occurrence No. 491, from 2001)	No
California Least Tern *Sternula antillarum browni*	Endangered/ Endangered G4T2T3/S22S3 None	May through August	Nests along the coast. Colonial breeder on bare or sparsely vegetated, flat substrates; sand beaches, alkali flats, land fills, or paved areas.	No. Suitable habitat is not present within the Action Area. Potential nesting habitat is present on open beach and dunes west of Narlon Bridge.	No

5.0 Species Accounts

Species accounts for the six species listed above that occur or have the potential to occur within the Action Area are provided below. Effects Determinations are provided in Section 6.0. Avoidance and Minimization Measures are provided in Section 7.0. California Natural Diversity Database (CNDDB) citations are given as the occurrence number for the species under discussion.

5.1 Western Snowy Plover

Listing Status: The Western snowy plover (*Charadrius nivosus*) is listed as threatened under the federal Endangered Species Act, and is not listed under the California Endangered Species Act.

Species Biology: The western snowy plover is a small shorebird in the family Charadriidae. It is less than seven inches in length. The western snowy plover is recognized as one of twelve snowy plover subspecies occurring worldwide, and one of two found in North America. The Pacific coast population of the western snowy plover ranges from southern Washington south to Baja California, Mexico, with most of the population breeding between San Francisco Bay and southern Baja California. Western snowy plovers winter in Coastal California and Mexico (SRS Technologies 2000). The nearest reported occurrence of snowy plover is approximately 0.5 mile west of the Project along the beach dunes (CNDDB #50).

Western snowy plovers usually nest in open and flat areas consisting of sandy or saline ground and little to no vegetation or driftwood (USFWS 2001). The majority of the individuals tend to be nesting site faithful, returning to the same site to breed in subsequent seasons (USFWS 2001). The breeding season covers early March to late September with the most southerly birds breeding earlier than the northerly (SRS Technologies 2000).

Western snowy plovers forage on invertebrates found in the wet sand and washed-ashore kelp of the intertidal zone and sandy areas above high tide (SRS Technologies 2000). Some of these invertebrate may include mole crabs (*Emerita analoga*), crabs (*Pachygraspsus crasspie*), and many species of polychaetes, amphipods, flies, beetles and clams (SRS Technologies 2000).

Survey Methods: Biological surveys were conducted in the Action Area in 2011. Suitable nesting habitat for western snowy plover is not present in the Action Area, however, snowy plovers are known to occur on the beach west of the project. Protocol-level surveys were not conducted and intensive survey methods were not undertaken in the Action Area.

Survey Results: Western snowy plover was not observed in or adjacent to the Action Area during biological surveys in 2011.

5.2 Tidewater Goby

Listing Status: The tidewater goby (*Eucyclogobius newberryi*) is listed as a threatened species under the federal Endangered Species Act; it has no state listing status.

Species Biology: Tidewater goby are relatively small (usually less than 50 mm), with large pectoral fins and pelvic fins that join to form an abdominal disc (USFWS 2011c). Males are nearly transparent while females are generally darker on the body and dorsal and anal fins. Tidewater gobies are found only in California, living in generally brackish water of coastal lagoons, estuaries, marshes, and the lowest reaches of coastal streams. They occur along the coast from the Smith River near the Oregon border to Agua Hedionda Lagoon in San Diego County. Preferred habitat includes salinities of less than 10 ppt, temperatures of 8 °C to 25 °C, and well-oxygenated waters (Moyle 2002). They are not present in areas where steep, rocky substrate occurs without coastal beaches and estuaries. If extirpated from a site, tidewater gobies can recolonize previously occupied habitats when environmental conditions are restored and individuals repopulate the area, often through natural or human-induced efforts (USFWS 2011c). The CNDDB lists tidewater gobies as having occurred in that portion of San Antonio Creek from the mouth to almost 2 miles upstream (CNDDB #57).

Tidewater gobies generally live for one year, though rare exceptions have been noted. Local populations can range from a few to several thousand individuals (USFWS 2011c). Reproduction can occur year round, but generally peaks in April and May (USEPA 2010; USFWS 2011c). Males dig a burrow 10 to 20 cm deep in course sand. Females lay 300 to 500 eggs that stick to the burrow wall. The male then guards the nest for several days until the young hatch and become pelagic.

Tidewater goby prey includes aquatic insects and small crustaceans such as mysid shrimp and amphipods. They are in turn eaten by steelhead, staghorn sculpin, and wading or diving birds such as herons or mergansers (USEPA 2010). Factors that can adversely impact goby populations include sedimentation, poor habitat management, pollution, breaching lagoon sandbars, and competition with or predation by nonnative fish species (Moyle 2002).

Survey Methods: San Antonio Creek within and immediately adjacent to the Action Area was inspected visually during June 2011. Protocol-level surveys were not conducted and intensive survey methods (dip netting, seining, snorkeling, etc.) were not undertaken. The stream bottom was inspected from the existing wood bridge and, where possible, from areas within the riparian vegetation that allowed portions of the stream to be viewed.

Survey Results: Tidewater goby was not observed in San Antonio Creek in the vicinity of the Action Area during these inspections. The CNDDB lists tidewater gobies as having occurred in San Antonio Creek from the mouth to almost 2 miles upstream (CNDDB #57).

5.3 El Segundo Blue Butterfly

Listing Status: The El Segundo blue butterfly (*Euphilotes battoides allyni*) is listed as an endangered species under the federal Endangered Species Act; it has no state listing status.

Species Biology: The El Segundo blue butterfly (ESBB) requires coast buckwheat (*Eriogonum parvifolium*) to complete their lifecycle. The life span of this animal is about one year, although some pupae are known to remain in a type of dormancy for two or more years (USFWS 1998a). The adult butterflies are active from mid-June to early

September. The onset of flight is closely synchronized to the beginning of the flowering cycle of coast buckwheat. Adults consume coast buckwheat pollen and nectar, and mate and lay eggs on coast buckwheat flowers. Eggs hatch within 3 to 5 days, and larvae undergo four instars prior to pupation. During the larval ("caterpillar") stage, individuals remain concealed within flower heads and feed primarily on coast buckwheat seeds. By late September, the flowerheads have generally grown old and are unproductive and the larvae have pupated underground or in the leaf litter at the base of the food plants until they emerge as adult butterflies (USFWS 1998a, USFWS 2008b).

El Segundo Blue Butterflies are found in dune scrub habitat throughout Vandenberg Air Force Base. Based on GIS shapefiles provided by VAFB biologists on April 30, 2012, ESBB is present at the north end of the Narlon Bridge and immediate vicinity, and in coastal dune scrub habitat adjacent to existing unpaved access roads.

Survey Methods: General botanical and wildlife surveys were conducted during site inspections in 2011. In August of 2011, biologists conducted reconnaissance surveys and mapped coast buckwheat occurrences within the Action Area. VAFB conducts comprehensive annual surveys for this species independent of the subject project.

Survey Results: ESBB is present under the north end of the Narlon Bridge and immediate vicinity, and in dune scrub habitat adjacent to existing unpaved access roads. *E. parvifolium* is uncommon in the other staging areas north and south of the Narlon bridge within the Action Area.

5.4 Unarmored Threespine Stickleback

Listing Status: The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) is listed as endangered under the federal Endangered Species Act, and Endangered under the California Endangered Species Act.

Species Biology: Unarmored threespine stickleback are relatively small, rarely exceeding 50 mm, with no or up to two "plates" on their lateral surface (Moyle 2002). Their name comes from the characteristic set of three rigid spines projecting upward and immediately anterior to the dorsal fin. Colors range from olive to dark green, white to golden ventral surface, and clear fins. Several species of stickleback occur throughout the State. Unarmored threespine stickleback were once abundant but are now rare. Populations are restricted to the upper Santa Clara River and its tributaries in Los Angeles County, San Antonio Creek on Vandenberg Air Force Base in Santa Barbara County, and the Shay Creek vicinity of San Bernardino County (USFWS 2009c). Stickleback prefer "quiet water" and are found in shallow, weedy pools and backwaters or among emergent plants at stream edges over gravel, sand, and mud, although they can complete their entire lifecycle in either fresh or salt water (Moyle, 2002). Favorable habitats are usually shaded by dense and abundant vegetation, while algal mats floating in open reaches are also utilized (USFWS 2009c). This species is known to occur in San Antonio Creek (CNDDB #1).

Most stickleback live about a year. Females tend to be larger than males. Nests are built among aquatic plants and spawning typically occurs in April through July (Moyle 2002). Males piece together nests of fine plant debris and algal strands, mate with several females, and defend their territory vigorously (USFWS 2009c). Eggs hatch in about a week and fry remain in the nest for a few days before eventually dispersing.

Typical prey includes aquatic insects, crustaceans, and earthworms, though cannibalization of stickleback eggs is common during the breeding season (Moyle 2002). In turn, stickleback are eaten by salmonids and birds, and frequently serve as hosts for intermediate stages of bird tapeworms. Factors that adversely affect unarmored threespine stickleback populations include stream channelization, urbanization, agricultural practices that contribute sediment or nutrients to streams, oxygen reduction, groundwater removal, invasive vegetation (particularly *Arundo donax*), and pollution, among others (USFWS 2009).

Survey Methods: San Antonio Creek within and immediately adjacent to the Action Area was inspected visually during June 2011. Extensive surveys were not conducted and intensive survey methods (dip netting, seining, snorkeling, etc.) were not undertaken. The stream bottom was inspected from the existing wood bridge and, where possible, from areas within the riparian vegetation that allowed portions of the stream to be viewed.

Survey Results: Unarmored threespine stickleback were not observed in or adjacent to the Action Area during these inspections. Unarmored threespine stickleback is known to occur in San Antonio Creek within the Action Area (CNDDB #1).

5.5 California Red-legged Frog

Listing Status: California red-legged frog (*Rana draytonii*) is listed as a threatened species under the federal Endangered Species Act; it has no state listing status.

Species Biology: California red-legged frogs are the largest frog native to the State. Adult bodies can reach 5 inches in length. Color can be reddish to gray, and the legs may or may not have characteristic red shading. The characteristic identifier of this species is the dorsolateral fold extending from just behind the eye to the joint of the legs, and positioned halfway between the frog's spine and each side.

California red-legged frogs (CRLF) were once quite common throughout the State, occurring from sea level to elevations of about 5,200 feet. It now occurs in only 30 percent of its former range, primarily in coastal drainages of central California from Marin County south to northern Baja California (USFWS 2002b). The most significant threat to CRLF is chytrid fungus *(Batroachochytrium dendrobatidis* or Bd) (USFWS 2010c). Habitat requirements include aquatic breeding sites mixed with riparian and upland dispersal habitats. California red-legged frogs have been known to migrate up to a mile across upland areas to find nearby water sources. This species has been found at several locations on Vandenberg AFB, including along San Antonio Creek at the Action Area (CNDDB #491).

California red-legged frogs generally require seasonal pools or streams that hold water until late summer for successful breeding, which occurs from November through April. Eggs are deposited on emergent vegetation such as rushes, cattails, and other vegetation, with masses containing 2,000 to 5,000 eggs floating on the water surface. Eggs hatch in 6 to 14 days depending on water temperature, with tadpoles developing in 20 to 22 days and terrestrial frogs developing in 11 to 20 weeks (USFWS 2002b). Reproduction begins after 2 to 3 years. California red-legged frogs can live for 8 to 10 years but average lifespan is likely lower (USFWS 2002b).

Larval California red-legged frogs are thought to graze on algae. Adult frogs primarily consume invertebrates, but small vertebrates including Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*) represent a significant portion of their diet. Foraging occurs along shorelines and the water surface but can also occur several meters into dense riparian areas (USFWS 2002b). Adult and subadult frogs feed primarily at night. Factors adversely affecting California red-legged frogs include urbanization, habitat fragmentation and degradation, impoundments, and predation by centrarchid fish and bullfrogs (*R. catesbeiana*).

Survey Methods: San Antonio Creek within and immediately adjacent to the Action Area was inspected visually during site visits by A&M biologist in January, February, and June 2011. Extensive surveys were not conducted and intensive survey methods (dip netting, seining, snorkeling, etc.) were not undertaken. The stream bottom was inspected from the existing wood bridge and, where possible, from areas within the riparian vegetation that allowed portions of the stream to be viewed.

Survey Results: California red-legged frogs were not detected within the Action Area during visual inspections of the site by Althouse and Meade, Inc. biologists in 2011, or in previous pre-construction vegetation maintenance surveys conducted since 2004. However, CRLF are reported from several locations on VAFB, including within San Antonio Creek in the Action Area (CNDDB #491).

5.6 California Least Tern

Listing Status: The California least tern (*Sternula antillarum browni*) is listed as endangered under the federal Endangered Species Act, and Endangered under the California Endangered Species Act.

Species Biology: The California least tern is the smallest of the North American terns found along the Pacific Coast of California at less than 25 cm when full grown. It ranges from San Francisco south to Baja California with winter migration starting in the autumn (USFWS 2006). Although the route is not clearly defined, fall migrants are fairly common on beaches of Central America (USFWS 2006).

The California least tern has long, narrow wings that are pale grey and black tipped. It has a black head cap and a forked tail. This species feeds exclusively on small fish caught in estuaries, bays and near-shore marine waters. Predators include other birds such as gull-billed terns and burrowing owls (USFWS 2009). Nesting colonies can be found on relatively open beaches that are kept clear of vegetation from natural tidal scouring often near estuaries (USFWS 2006, USFWS 2009). A typical nest consists of a simple scrape in sand and shell fragments (USFWS 2006). This species is very gregarious and actively forages, nests, roosts, and migrates in colonies. A nesting colony usually consists of about 25 breeding pairs (USFWS 2006). The nearest reported occurrence is approximately 0.45 miles west of the Action Area (CNDDB #8).

Survey Methods: Biological surveys were conducted in the Action Area in 2011. Suitable nesting habitat for California least tern is not present in the Action Area, but they are known to occur on the beach dunes west of the project. Protocol-level surveys were not conducted and intensive survey methods were not undertaken.

Survey Results: California least tern was not observed in or adjacent to the Action Area during biological surveys in 2011.

6.0 Effects Determinations

The Project is likely to adversely affect El Segundo Blue Butterfly, tidewater goby, unarmored threespine stickleback, California red-legged frog, snowy plover, and California least tern.

6.1 Western Snowy Plover

Although the Action Area does not have appropriate nesting habitat to support western snowy plover, noise effects from bridge construction could potentially affect this species which nests on open beach habitat west of the Action Area. Large dunes are present between the bridge site and the potential nesting habitat on the open beach. Noise produced during installation of the construction access bridge will be generated from the bottom of the San Antonio Creek valley and will be buffered by dense willow riparian vegetation and adjacent hills. Due to the natural barriers and the distance from the beach (approximately 3,000 feet), noise effects to this species are anticipated to be very minimal and would constitute an insignificant effect. No long-term indirect impacts are anticipated to occur from the proposed Project, as western snowy plover does not occur within the Action Areas.

Night lighting may be necessary during drilling operations and would be limited to the area immediately under the bridge to buffer light from reaching foredune habitat west of the project. However, night lighting during bridge change-out operations would not necessarily be limited to under the bridge and, therefore, could adversely affect these federally listed birds if they are found to be nesting on the beach west of the bridge.

Direct Effects: Short-term direct impacts could include noise and lighting effects from bridge construction. Due to the natural barriers (riparian vegetation and adjacent hills), and the distance from the beach, noise effects to Western snowy plover are anticipated to be very minimal and would constitute an insignificant effect. Night lighting during bridge change-out operations may adversely affect nesting western snowy plover.

Effects Determination: **May Affect, Likely to Adversely Affect**. This is the appropriate effects determination because effects from night lighting during bridge change-out operations may adversely affect these birds if they are found to be nesting on beach habitat west of the Narlon Bridge.

6.2 Tidewater Goby

No work would occur within the OHWM of San Antonio Creek. H-piles will be placed outside the OHWM to support the new access bridges. No pile driving will occur within the channel. The new railroad bridge will span San Antonio Creek and will be supported by large concrete columns. Appropriate measures (Section 7.0) will be implemented to minimize potential sediment runoff.

Direct Effects: No long-term direct effects to tidewater goby are anticipated to occur from the proposed Project. The old access bridge will be removed and replaced when water levels are low in San Antonio Creek. During construction, sediment could enter the waterway and adversely affect burrows with goby eggs during their Spring and Summer reproductive period. Measures will be implemented to minimize impacts to tidewater goby and their habitat.

Effects Determination: **May Affect, Likely to Adversely Affect**. This is the appropriate effects determination because, although UPRR's proposed protective measures will minimize the potential for sediment to enter San Antonio Creek, work near channel banks during access bridge installation could adversely affect tidewater goby.

6.3 El Segundo Blue Butterfly

The El Segundo Blue Butterfly (ESBB) could be adversely affected by construction of the replacement bridge. The butterfly is likely present under the bridge, within the proposed staging area southwest of the bridge, and in dune scrub habitat adjacent to dirt access roads. The project will occur during the ESBB pupal ("cocoon") stage that lasts for one or more years and during the flight season, mid-June to September.

Direct Effects: ESBB may be directly affected by temporary staging activities that would remove *E. parvifolium* plants and may harm pupae. This ground disturbance is short-term (for the duration of construction). No potential long-term direct effects are anticipated from the Project. Direct effects could include an increase in dust produced from construction vehicles utilizing unpaved access roads and vehicle strikes. Dust could cover *E. parvifolium* flowers and make them unpalatable to ESBB, however, a water truck and/or non-toxic dust palliative will be used to control dust on dirt access roads to minimize this impact.

Effects Determination: **May Affect, Likely to Adversely Affect**. This is the appropriate effects determination in light of the potential for direct take in the Action Area under the Narlon Bridge and in staging areas that contain coastal dune scrub habitat and *E. parvifolium* host plants.

6.4 Unarmored Threespine Stickleback

No work would occur within the OHWM of San Antonio Creek. H-piles will be placed outside the OHWM to support the new access bridge. No pile driving will occur within the channel. The new railroad bridge will span San Antonio Creek and will be supported by large concrete columns. Appropriate measures (Section 7.0) will be implemented to minimize potential sediment runoff.

Direct Effects: No long-term direct effects to unarmored threespine stickleback are anticipated to occur from the proposed Project. The old access bridge will be removed and replaced when water levels are low in San Antonio Creek. During construction, sediment could enter the waterway and adversely affect fish health. Inadvertent contamination of the waterway could occur from vehicular leaks or improper maintenance. Measures will be implemented to minimize impacts to unarmored threespine stickleback and their habitat.

Effects Determination: **May Affect, Likely to Adversely Affect**. Although UPRR's proposed erosion and sediment control measures will minimize the potential for sediment to enter San Antonio Creek, work near channel banks during installation access bridges may adversely affect unarmored threespine stickleback.

6.5 California Red-legged Frog

No work would occur within the OHWM of San Antonio Creek. H-piles will be placed outside the OHWM to support the new access bridge. The new railroad bridge will span

San Antonio Creek and will be supported by large concrete columns. Appropriate erosion and sediment control measures (Section 7.0) will be installed to minimize potential sediment runoff. When exclusionary silt fence is used, and/or when active construction is in progress, a biologist will conduct daily monitoring of the work area to minimize potential impacts to CRLF. A Service-approved biological monitor will be present on site during all construction activities occurring in the riparian area.

Direct Effects: No significant long term direct effects to California red-legged frog are anticipated to occur from the proposed Project. Short-term direct effects could occur during capture and relocation of CRLF, from direct mortality from vehicle strikes, during ground disturbance activities in the riparian area, and during access bridge replacement. The old access bridge will be removed and replaced when water levels are low in San Antonio Creek. Noise generated during construction operations may startle or disturb CRLF in the vicinity of the Project. During construction, sediment could enter the waterway and adversely affect egg masses. Inadvertent contamination of the waterway could occur from vehicular leaks or improper maintenance. Measures would be implemented to minimize impacts to the frog and its habitat.

Effects Determination: **May Affect, Likely to Adversely Affect**. Although UPRR's proposed erosion and sediment control measures will minimize the potential for sediment to enter San Antonio Creek, work near channel banks and adjacent riparian habitat during access bridge installation, and ground disturbance activities adjacent to the riparian area could adversely affect CRLF.

6.6 California Least Tern

Although the Action Area does not have appropriate nesting habitat to support California least tern, noise and lighting effects from bridge construction could potentially affect this species, which may nest on open beach habitat west of the Action Area. Noise effects in Least tern habitat are not anticipated to be louder than the sound of crashing waves at high tide. Noise produced during installation of the construction access bridge will be generated from the bottom of the San Antonio Creek valley and will be buffered from tern habitat by dense willow riparian vegetation and adjacent hills. Due to the natural barriers and the distance from the beach (approximately 3,000 feet), noise effects to this species are anticipated to be very minimal and would constitute an insignificant effect.

Night lighting may be necessary during drilling operations and would be limited to the area immediately under the bridge to buffer light from reaching beach and dune habitat west of the project. However, night lighting during bridge change-out operations would not necessarily be limited to under the bridge and, therefore, could adversely affect these federally listed birds if they are found to be nesting on the beach west of the bridge.

Direct Effects: No long-term indirect impacts are anticipated to occur from the proposed Project. Short-term direct impacts could include noise and lighting effects from bridge construction. As discussed in Section 6.1, large dunes are present between the bridge site and potential open beach nesting habitat. Due to this natural barrier and the distance from the beach, noise effects to California least tern are anticipated to be very minimal and would constitute an insignificant effect. Night lighting during bridge change-out operations may adversely affect nesting California least tern. Sedimentation effects on water quality in San Antonio Creek could adversely affect their prey base.

Effects Determination: **May Affect, Likely to Adversely Affect**. This is the appropriate effects determination because effects from night lighting during bridge change-out operations may adversely affect these birds if they are found to be nesting on beach habitat west of the Narlon Bridge.

7.0 Avoidance and Minimization Measures

Sensitive biological resources are present within the Action Area. Minimization Measures (MM) below provide avoidance and protection measures for listed species. Listed species associated with San Antonio Creek (i.e. tidewater goby, unarmored threespine stickleback, and California red-legged frog) could be adversely affected by sediment runoff, however UPRR will provide standard Minimization Measures (Section 7.1) to prevent direct and indirect effects to these species.

7.1 Standard Minimization Measures

The following Minimization Measures are recommended to prevent erosion and minimize impacts to San Antonio Creek and listed aquatic species:

MM-1. Equipment and vehicles shall be cleaned of weed seeds prior to use in the project area to prevent the introduction of weeds. If equipment or vehicles move from one watershed to another on base, wheels, undercarriages, and bumpers will be cleaned prior to traveling. If no nearby wash facility or means to collect on site and dispose of rinse water to a sewer is available, equipment vehicles may be air blasted on site.

MM-2. The edge of riparian vegetation will be shown on construction plans and boundaries of the work area will be shown on construction plans.

MM-3. Construction fencing shall be placed along the outer edge of action area to protect the dune scrub and riparian habitat from incidental impacts.

MM-4. During construction, riparian vegetation will be left undisturbed along San Antonio Creek channel banks in all areas.

MM-5. Clearing and grubbing would occur prior to the February bird nesting season. Riparian vegetation in the work area will be cut, with roots and two inches of stem remaining to allow plants to re-grow when construction is complete, and to provide permanent erosion control.

MM-6. An environmental monitor shall be present during mowing, clearing and grubbing activities (pruning and mowing), crane pad construction (earth moving activities), and during vegetation removal. The environmental monitor shall document compliance with all best practices and environmental compliance items for the project. The environmental monitor shall be qualified to move wildlife from the project areas as needed.

MM-7. Appropriate best management practices shall be utilized at the site to prevent sediment pollution from entering San Antonio Creek. Erosion control measures shall include both temporary and permanent protection, including but not limited to installation of silt fence, straw wattles, erosion control fabrics, and hydroseed.

A Storm Water Pollution Prevention Plan will be prepared and implemented by qualified practitioners.

MM-8. No diversion or dewatering is proposed within the live channel.

MM-9. A dewatering plan for drilled shaft operations will be prepared prior to construction. All project-related dewatering actions during drilled shaft operations and prior to casing fill will only occur during daylight hours. Wet spoils removed from the drill holes will be contained in above-ground, bermed structures that prevent dirty water from entering the creek. Water will be pumped into a container such as a Baker tank, or equivalent. Water and/or non-toxic dust palliative may be used for dust control. If excess water is captured, it will be tested for water quality per Regional Water Quality Control Board Region 3 standards. If filtered water quality is at or above San Antonio Creek water quality, water may be discharged to the creek in a manner that does not increase turbidity in the creek (e.g. through a vegetated filter). Biological monitoring may include additional patrols of banks and isolated pools and turbidity testing in San Antonio Creek.

MM-10. All hazardous materials required to operate and maintain construction equipment will be properly used in accordance with manufacturer's specifications.

MM-11. The contractor will follow an approved spill prevention plan, including procedures to ensure that all equipment is properly maintained and free of leaks and all necessary repairs incorporate proper spill containment.

MM-12. Hazardous materials will be properly stored and managed in secured areas located outside of the San Antonio Creek riparian corridor.

MM-13. Mobile equipment will be staged, repaired, and maintained at least 500 feet outside the San Antonio Creek riparian corridor. Large equipment such as cranes will be staged adjacent to the bridge, outside of the live stream. Fueling of equipment will be conducted in pre-designated areas, outside of the live stream. Spill containment materials will be placed around the equipment before refueling. Standing equipment (e.g. cranes) will be outfitted with drip pans and hydrocarbon absorbent pads.

MM-14. Stationary equipment operating within the riparian area will be placed on protective mats to prevent contamination of the creek bed.

MM-15. Night lighting required for pile construction (e.g. drilling operations) will be limited to areas that buffer light from reaching foredune habitat west of the project (e.g. place lights below bridge) to minimize impacts to federally listed birds.

MM-16. Preconstruction surveys for nesting Western snowy plover and California least tern would be conducted by a Service approved biologist prior to drilling operations and bridge change out operations to determine if these federally listed birds are nesting on beach or dune habitat west of the Narlon Bridge. If either species is found to be nesting, a qualified biological monitor will be present during night lighting operations to monitor effects of night lighting.

MM-17. If it is necessary to refuel or repair equipment within the riparian corridor, a qualified biologist will be present to document protection of water quality and biological resources.

MM-18. All temporary disturbed areas, including the access roads, will be restored (at a minimum) to the original condition (see conceptual restoration plan in Appendix C).

MM-19. Disturbed riparian areas will be planted with willow live-stakes and blackberries planted 6 feet on-center where willows have not naturally resprouted. Live stake planting will occur between November 1 and January 30 during the year following construction. The riparian edge will be reseeded per the restoration plan (Appendix C).

MM-20. Disturbed dune scrub vegetation will be seeded with at least six species from the following mix (as local material is available), and may include additional seeds collected in the area:

TABLE 3. Dune scrub seed mix.

Species	**Lbs/Acre**
Lotus scoparius	4.0
Achillea millefolium	1.0
Camissonia cheiranthifolia	1.0
Eriophyllum confertiflorum	1.0
Ericameria ericoides	1.0
Eschscholzia californica (seeds collected from nearby VAFB dune scrub)	1.5
Lupinus chamissonis	2.0
Vulpia microstachys	8.0
Artemisia californica	0.2
Gnaphalium californicum	0.1
Mimulus aurantiacus aurantiacus	0.1

Coast buckwheat seeds will be added to the dune scrub seed mix on VAFB property at a rate of four (4) pounds per acre. Coast buckwheat seeds will be sourced from VAFB or will be collected from VAFB by a Service-approved biologist.

7.2 Nesting Habitat Minimization Measures

Migratory non-game native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory non-game birds (as listed under the Federal MBTA). If avoidance of construction during the nesting bird season is not practicable in potentially affected areas, the following BMP is proposed:

MM-21. Within one week of ground disturbance activities, if work occurs between March and August, nesting bird surveys shall be conducted. If construction activities must be conducted between March and August, nesting bird surveys

shall take place within one week of habitat disturbance. If surveys do not locate nesting birds, construction activities may be conducted. If nesting birds are located, no construction activities shall occur within 15 feet of nests until chicks are fledged. VAFB biologists may be consulted regarding reduction of set-backs from nests on their property, in the event that the species nesting is tolerant of human disturbance. Reduction in the setback would be determined on a case-by-case basis. A pre-construction survey report shall be prepared upon completion of the survey. The report shall discuss fencing or flagging of the buffer zone and make recommendations on additional monitoring requirements**.** A map of the project site and nest locations shall be included with the report.

7.3 Aquatic Species Protection

MM-22. Water quality parameters will be measured prior to the commencement of the project in a manner that minimizes adverse impacts to the unarmored threespine stickleback, tidewater goby, and California red-legged frog.

MM-23. A contingency plan will be developed for the recovery and salvage of unarmored threespine sticklebacks, tidewater goby, and California red-legged frogs in the event of a local toxic spill or accidental dewatering of their respective habitats.

MM-24. All project activities that may affect the California red-legged frog, unarmored threespine stickleback, tidewater goby, or their respective habitats must be monitored by a Service-approved biologist.

7.4 California Red-legged Frog Protection and Minimization Measures

MM-25. Qualified biologists will brief all project personnel prior to participating in construction activities. At a minimum, the briefing will include a description of the project components and techniques, a description of the listed species occurring in the project area, and the general and specific measures and restrictions to protect the species during implementation of the project.

MM-26. Prior to start of construction activities, install exclusionary silt fencing to adequately exclude CRLF from the project area during active construction. These fences may be opened during periods of no-construction (e.g. on weekends) to prevent entrapment of CRLF.

MM-27. Service-approved biological monitor(s) shall be present on site during all construction activities occurring in the riparian zone. Prior to the start of construction activities in the riparian zone each day, biologist(s) will survey the work sites for CRLF, look under parked vehicles and heavy equipment frequently (especially every morning before work starts). California red-legged frogs captured during surveys or construction activities will be relocated to the nearest suitable habitat outside of the project area.

MM-28. All trash shall be removed from the site daily or secured in a predator-resistant container to avoid attracting predators to the site.

7.5 El Segundo Blue Butterfly Minimization Measures

MM-29. Where coast buckwheat occurs, vegetation maintenance will be conducted prior to construction, after larvae have fallen into the soil for the pupal stage of its life cycle.

MM-30. Coast buckwheat will be replanted on VAFB property to replace and enhance habitat for El Segundo Blue Butterfly. See MM-18, above for seed mix information.

8.0 Interrelated Actions

No interrelated actions are anticipated to occur near the Action Area that would affect listed species.

9.0 Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the Action Area considered in this Biological Assessment. Future federal actions that are unrelated to the Project are not considered in determining the cumulative effects because they are subject to separate consultation requirements pursuant to section 7 of the ESA (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

We are not aware of any other future projects to be conducted by state, local, or private entities within or near the Action Area that would affect listed species.

10.0 Conclusion

The replacement of the UPRR bridge may affect federally listed species. The bridge structure would be replaced in-kind with minimal permanent impacts. New concrete support structures for the railroad bridge would be permanent facilities. UPRR will minimize impacts to San Antonio Creek by implementing Minimization Measures. Willow riparian and historically disturbed dune scrub vegetation would be temporarily affected by staging and construction activities. Grading in the vicinity of the bridge will be necessary for large equipment to stage. UPRR will return all disturbed areas to pre-project contours.

One listed invertebrate species, the El Segundo Blue Butterfly, occurs within the Action Area. The Project is likely to adversely affect El Segundo Blue Butterfly. Minimization Measures for El Segundo Blue Butterfly would include appropriately timed vegetation maintenance (September to April, during the pupal phase) and dust control.

Work near channel banks during installation of the access bridges and ground disturbance activities at the Narlon Bridge site are likely to adversely affect tidewater goby and unarmored threespine stickleback. Protective measures would be implemented to minimize and avoid impacts to these aquatic species and their habitat. The old access bridge will be removed and replaced when water levels are low in San Antonio Creek. The new temporary access bridge east of the creek will also be installed when water

levels are low. Sediment and erosion control will be implemented to prevent soil movement to the creek.

Construction activities during installation of the access bridges and ground disturbance activities at the Narlon Bridge site are likely to adversely affect California red-legged frog. Preconstruction surveys, biological monitoring by a Service-approved biologist, and sediment and erosion control would be implemented to protect California red-legged frogs. Silt fence would be installed and checked daily to prevent frogs from entering the work areas.

The Action Area does not have appropriate nesting habitat to support western snowy plover or California least tern. However, both species could nest on beach and dune habitat west of the bridge. Noise effects are expected to be very minimal, constituting an insignificant effect. Night lighting during bridge change-out operations could disturb these birds if they are found to be nesting west of the bridge, therefore, we have determined that the Project is likely to adversely affect western snowy plover or California least tern.

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12.0 Figures

- **Figure 1. USGS Topographic Map**
- **Figure 2. Aerial Photograph with Action Areas**
- **Figure 3. Access Roads and Ingress/Egress**
- **Figure 4. Aerial Photograph of Narlon Bridge**
- **Figure 5. CNDDB & FWS Critical Habitat Map**

Figure 1. USGS Topographic Map

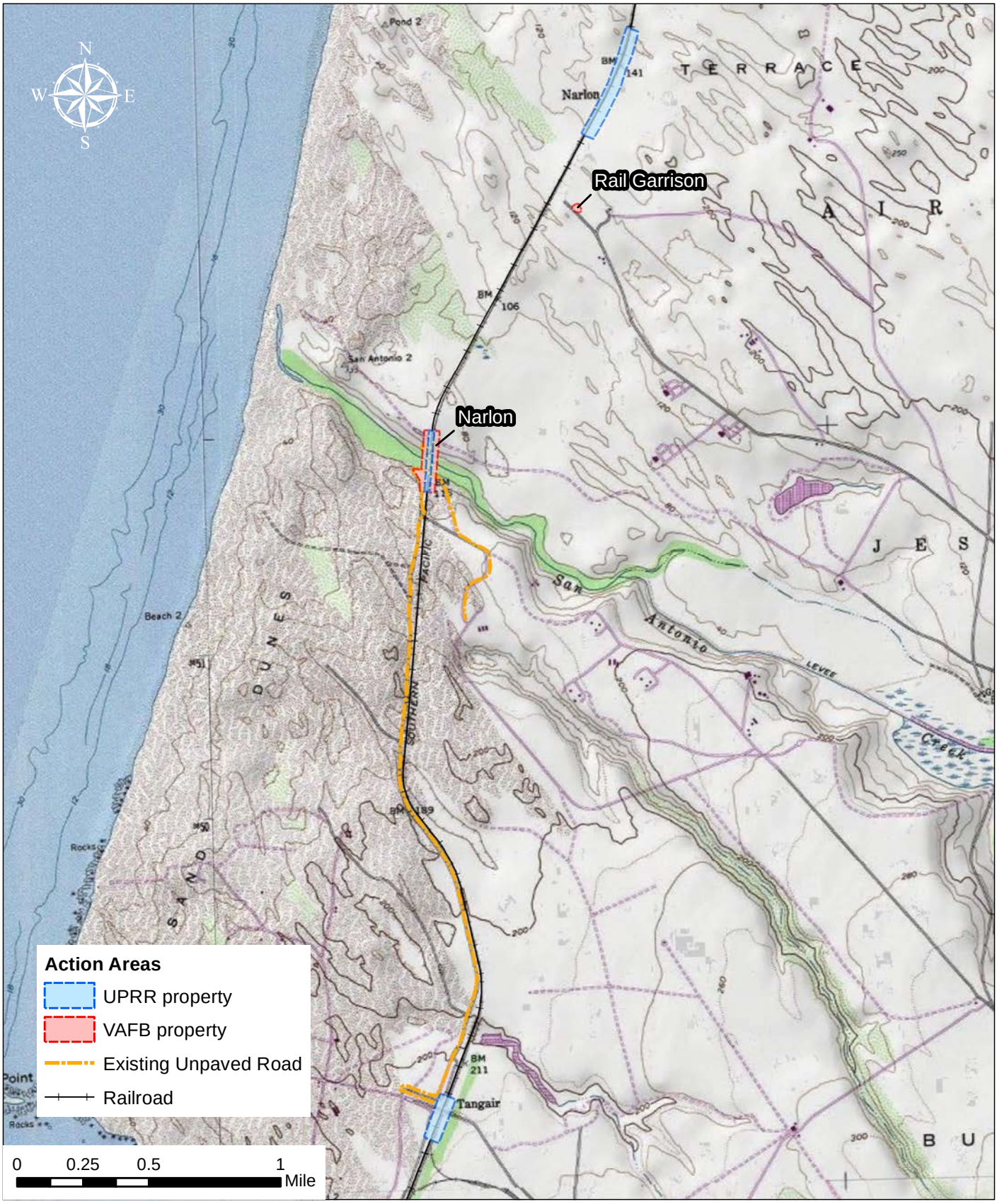


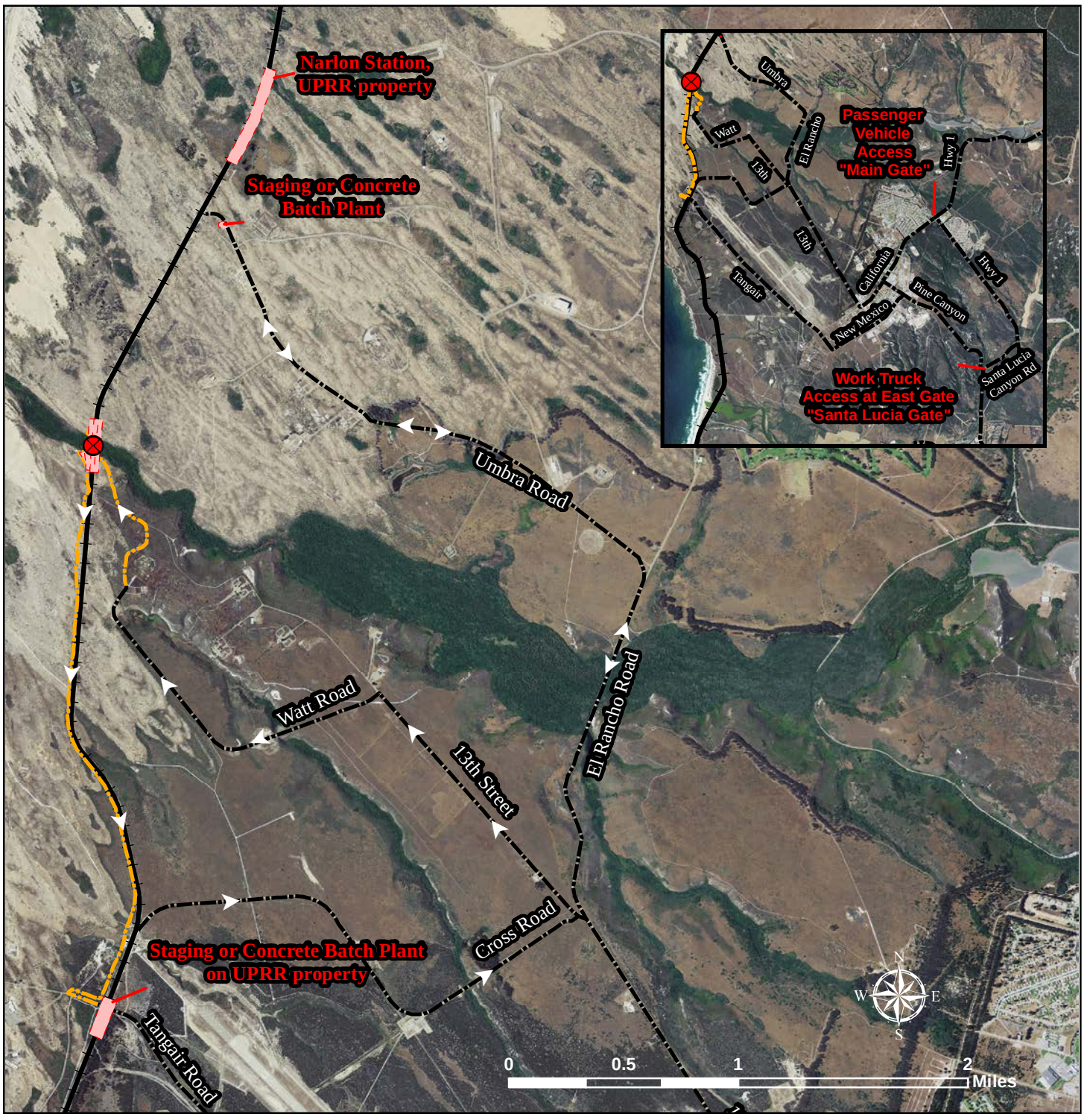
Figure 2. Aerial Photograph with Action Areas

Union Pacific Railroad

2009 Santa Barbara County
USDA Aerial Photography
Map Updated: September 05, 2012, 01:17 PM

Althouse and Meade, Inc.
1602 Spring Street
Paso Robles, CA 93446

Figure 3. Access Roads and Ingress/Egress

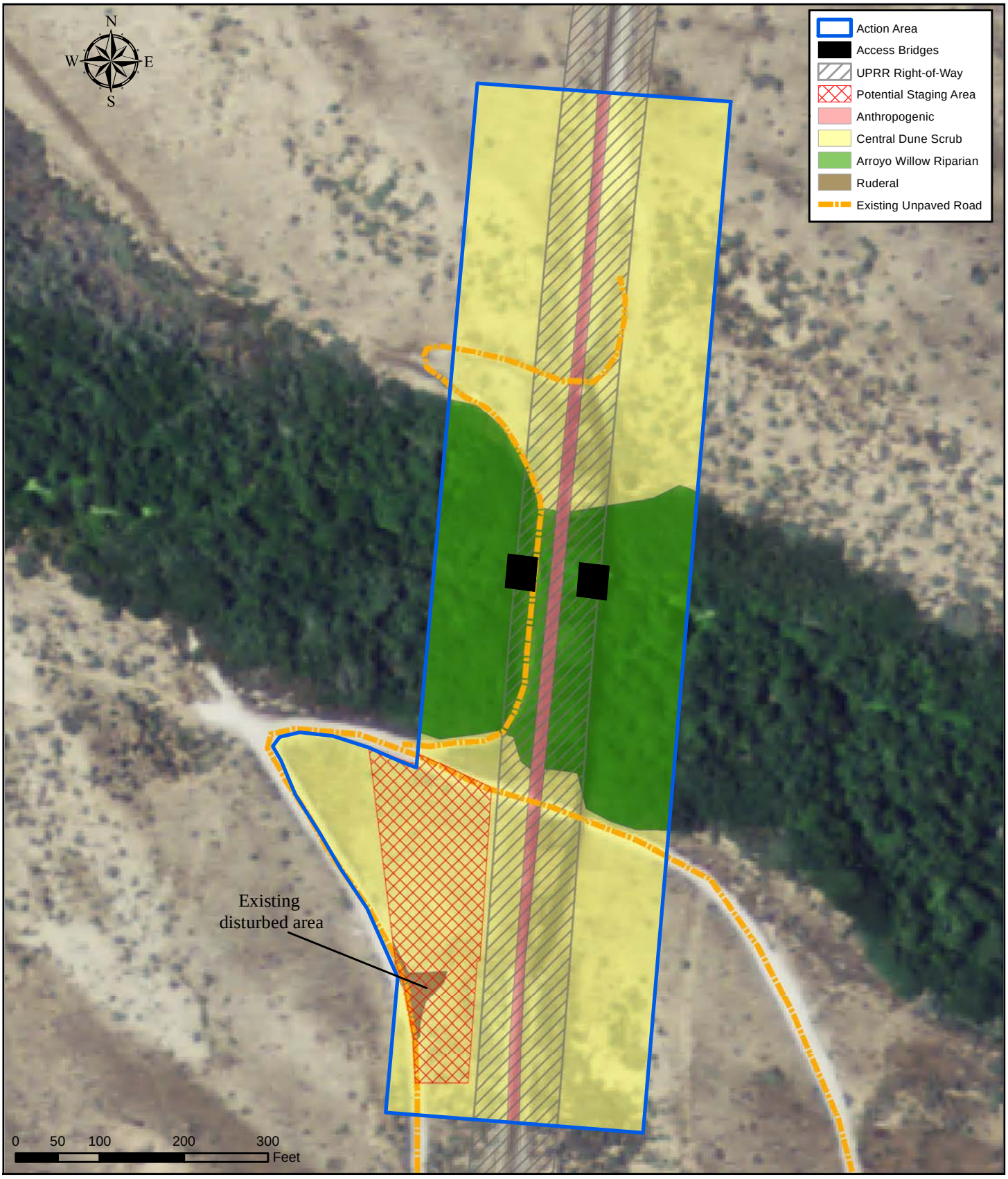


Union Pacific Railroad

2009 NAIP Aerial Photography
Map Updated: September 11, 2012 10:25 AM

Althouse and Meade, Inc.
1602 Spring Street
Paso Robles, CA 93446

Figure 4. Aerial of Narlon Bridge



Union Pacific Railroad

2009 NAIP Aerial Photography
Map Updated: April 26, 2012

Althouse and Meade, Inc.
1602 Spring Street
Paso Robles, CA 93446

Figure 5. Protected Biological Resources

Railroad, Santa Barbara Subdivision
Action Areas
Five Mile Radius
El Segundo blue butterfly (FE)
California red-legged frog (FT)
tidewater goby (FE)
tidewater goby (FE)
unarmored threespine stickleback (FE, SE)
California least tern (FE, SE)
California red-legged frog (FT)
western snowy plover (FT)
tidewater goby (FE)
unarmored threespine stickleback (FE, SE)
California red-legged frog
critical habitat

Union Pacific Railroad

2009 NAIP Aerial Photography
CNDDB Data Updated September 1, 2012
Map Updated: September 06, 2012 04:05 PM

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1602 Spring Street
Paso Robles, CA 93446

Appendix A: Botanical and Wildlife Inventory

Botanical Survey Results

Botanical surveys conducted from 2004 through August 2011 identified 121 species, subspecies, and varieties of vascular plant taxa within or immediately adjacent to the Action Area (Table A-1). These consist of 76 native species and 45 introduced species. Three special status plants were identified within the Action Area.

TABLE A-1. PLANT LIST.

Scientific Name	Special Status	Origin	Common Name
Trees - 1 Species			
Salix lasiolepis	None	Native	Arroyo Willow
Shrubs - 15 Species			
Arctostaphylos purissima	List 1B	Native	Purissima manzanita
Artemisia californica	None	Native	Coastal sagebrush
Baccharis pilularis	None	Native	Coyote brush
Ericameria ericoides	None	Native	Mock heather
Eriogonum parvifolium	None	Native	Coast buckwheat
Eriophyllum staechadifolium	None	Native	Coastal golden yarrow
Lupinus arboreus	None	Native	Bush lupine
Lupinus chamissonis	None	Native	Beach lupine
Mimulus aurantiacus	None	Native	Bush monkeyflower
Rhamnus californica ssp. *californica*	None	Native	Coffeeberry
Rosa californica	None	Native	California rose
Rubus ursinus	None	Native	California blackberry
Senecio blochmaniae	List 4.2	Native	Blochman's ragwort
Solanum douglasii	None	Native	Nightshade
Solanum xanti	None	Native	Purple nightshade
Toxicodendron diversilobum	None	Native	Poison oak
Herbs - 92 Species			
Abronia umbellata	None	Native	Common sand verbena
Ambrosia chamissonis	None	Native	Beach bursage
Amsinckia spectabilis	None	Native	Fireweed
Anagallis arvensis	None	Introduced	Scarlet pimpernel
Artemisia californica	None	Native	Coastal sagebrush
Artemisia douglasiana	None	Native	Mugwort
Astragalus pomonensis	None	Native	Pomona locoweed
Baccharis douglasii	None	Native	Marsh Baccharis

Scientific Name	Special Status	Origin	Common Name
Calystegia macrostegia ssp. *cyclostegia*	None	Native	Morning glory
Camissonia sp.	None	Native	Sun cups
Cardionema ramosissimum	None	Native	Sand-mat
Carduus pycnocephalus	None	Introduced	Italian thistle
Carex barbarae	None	Native	Santa Barbara sedge
Carex sp.	None	Native	Sedge
Carpobrotus edulis	None	Introduced	Iceplant
Centaurea melitensis	None	Introduced	Tocolote
Centaurium davyi	None	Native	Centaury
Chamaesyce serpens	None	Native	Spurge
Chamomilla suaveolens	None	Introduced	Chamomile
Chenopodium album	None	Introduced	Lamb's-quarters
Chenopodium californicum	None	Native	Pigweed
Cirsium occidentale var. venustum	None	Native	Red thistle
Cirsium vulgare	None	Introduced	Bull thistle
Conium maculatum	None	Introduced	Poison hemlock
Conyza bonariensis	None	Introduced	Asthmaweed
Conicosia pugioniformis	None	Introduced	Narrow-leaved ice plant
Corethrogyne [=Lessingia] filaginifolia	None	Native	California aster
Croton californicus	None	Native	California croton
Croton [=Eremocarpus] setigerus	None	Native	Dove weed
Cryptantha muricata	None	Native	Cryptantha
Deinandra [=Hemizonia] increscens ssp. *increscens*	None	Native	Grassland tarweed
Dudleya lanceolata	None	Native	Lance-leaved dudleya
Erigeron sp.	None	Native	Daisy
Eriophyllum confertiflorum	None	Native	Golden yarrow
Erodium botrys	None	Introduced	Fillaree
Erodium cicutarium	None	Introduced	Redstem filaree
Eschscholzia californica	None	Native	California poppy
Euphorbia peplus	None	Introduced	Petty spurge
Filago gallica	None	Introduced	Herba impia
Foeniculum vulgare	None	Introduced	Fennel
Galium parisiense	None	Introduced	Wall bedstraw
Gilia sp.	None	Native	Gilia

Scientific Name	Special Status	Origin	Common Name
Gnaphalium californicum	None	Native	California everlasting
Gnaphalium canescens	None	Native	Everlasting
Gnaphalium palustre	None	Native	Marsh cudweed
Gnaphalium purpureum	None	Native	Everlasting
Grindelia hirsutula	None	Native	Gumplant
Helianthemum scoparium	None	Native	Rush rose
Herniaria hirsuta	None	Introduced	Rupturewort
Heterotheca grandiflora	None	Introduced	Telegraph weed
Hirschfeldia incana	None	Introduced	Mustard
Horkelia cuneata ssp. *cuneata*	None	Native	Horkelia
Hypochaeris radicata	None	Introduced	Rough cat's-ear
Isolepis cernuus var. *californicus*	None	Native	California clubrush
Juncus bufonius	None	Native	Toadrush
Juncus patens	None	Native	Rush
Juncus phaeocephalus	None	Native	Brown-headed rush
Lemna sp.	None	Native	Duckweed
Lotus scoparius	None	Native	Deerweed
Ludwigia peploides var. *peploides*	None	Native	Yellow waterweed
Malacothrix saxatilis var. *tenuifolia*	None	Native	Cliff-dandelion
Medicago polymorpha	None	Introduced	California burclover
Melilotus indica	None	Introduced	Annual sweetclover
Mesembryanthemum crystallinum	None	Introduced	Ice plant
Monardella frutescens	List 1B.2	Native	San Luis Obispo monardella
Mucronea californica	List 4.2	Native	California spineflower
Nasturtium officinale	None	Native	Common watercress
Orobanche californica	None	Native	California broomrape
Phacelia ramosissima var. *montereyensis*	None	Native	Shrubby phacelia
Plantago coronopus	None	Native	Buckhorn plantain
Plantago erecta	None	Native	California plantain
Polycarpon tetraphyllum	None	Introduced	Four leaved polycarp
Polygonum amphibium	None	Native	Water smartweed
Polygonum arenastrum	None	Introduced	Common knotweed
Polygonum lapathifolium	None	Native	Dock-leaf smartweed
Rumex acetosella	None	Introduced	Sheep sorrel
Rumex crispus	None	Introduced	Curly dock

Scientific Name	Special Status	Origin	Common Name
Salsola tragus	None	Introduced	Russian thistle
Sanicula crassicaulis	None	Native	Sanicle
Scrophularia californica	None	Native	California figwort
Senecio vulgaris	None	Introduced	Common groundsel
Silene gallica	None	Introduced	Windmill pink
Silybum marianum	None	Introduced	Milk thistle
Sonchus asper ssp. *asper*	None	Introduced	Prickly sow-thistle
Sonchus oleraceus	None	Introduced	Common sow thistle
Spergularia rubra	None	Native	Sand spurrey
Stephanomeria sp.	None	Native	Chicory
Trifolium sp.	None	Native	Clover
Urtica dioica ssp. *holosericea*	None	Native	Nettle
Verbena lasiostachys	None	Native	Verbena
Vicia sp.	None	Introduced	Vetch
Veronica anagallis-aquatica	None	Native	Water speedwell
Grasses - 13 Species			
Avena fatua	None	Introduced	Wild oat
Bromus carinatus	None	Native	California brome
Bromus diandrus	None	Introduced	Ripgut brome
Bromus hordeaceus	None	Introduced	Soft chess brome
Bromus madritensis ssp. *rubens*	None	Introduced	Red top brome
Ehrharta calycina	None	Introduced	Veldt grass
Koeleria phleoides	None	Introduced	Annual junegrass
Lamarckia aurea	None	Introduced	Goldentop
Leymus condensatus	None	Native	Giant wild rye
Lolium multiflorum	None	Introduced	Italian ryegrass
Polypogon monspeliensis	None	Introduced	Annual beardgrass
Schismus arabicus	None	Introduced	Mediterranean grass
Vulpia myuros	None	Introduced	Rattail fescue

Wildlife Survey Results

During site visits conducted from 2004 to August 2011 Althouse and Meade, Inc. biologists observed a variety of wildlife in the Action Area for the currently proposed project. These include common birds such as Western scrub jay (*Aphelocoma californica*), wrentit (*Chamaea fasciata*), black phoebe (*Sayornis nigricans*) and ruby-crowned kinglet (*Regulus calendula*), common mammals such as valley pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*) and wild pig (*Sus scrofa*), common amphibians including black-bellied slender salamander (*Batrachoseps nigriventris*) and Monterey ensatina (*Ensatina eschscholzii eschscholzii*), and numerous reptiles, including Southern Pacific rattlesnake (*Crotalus oreganus helleri*), ring-necked snake (*Diadophis punctatus vandenburgii*), and San Diego gopher snake (*Pituophis catenifer annectens*). A complete list of wildlife observed in the Action Area is provided in Table A-2. Small mammal trapping was not conducted as part of our biological surveys. Two abandoned raptor nests were observed on the bridge structure in January 2011.

TABLE A-2. WILDLIFE LIST.

Common Name	Scientific Name	Special Status	General Habitat Preference
Amphibians - 2 species			
Black-bellied Slender Salamander	*Batrachoseps nigriventris*	None	Moist habitats
Monterey Ensatina	*Ensatina eschscholzii eschscholzii*	None	Riparian, oak woodlands, grasslands
Reptiles - 3 species			
Southern Pacific Rattlesnake	*Crotalus oreganus helleri*	None	Dry, rocky habitats
Monterey Ringneck Snake	*Diadophis punctatus vandenburgii*	None	Woodlands, grasslands, chaparral
San Diego Gopher Snake	*Pituophis catenifer annectens*	None	Woodland, grassland, rural
Western Fence Lizard	*Sceloporus occidentalis*	None	Variety of habitat types
Birds - 23 species			
Western Scrub Jay	*Aphelocoma californica*	None	Oak, riparian woodlands
Great Blue Heron	*Ardea herodias*	Special Animal (Rookery Site)	Water habitats, grasslands
Great Horned Owl	*Bubo virginianus*	None	Woodland, grassland
Red-tailed Hawk	*Buteo jamaicensis*	None	Open, semi-open country
Anna's Hummingbird	*Calypte anna*	None	Many habitats
Turkey Vulture	*Cathartes aura*	None	Open country
Wrentit	*Chamaea fasciata*	None	Riparian, chaparral
Northern Flicker	*Colaptes auratus*	None	Woodlands

Common Name	Scientific Name	Special Status	General Habitat Preference
Stellar's Jay	*Cyanocitta stelleri*	None	Woodlands
Yellow-rumped Warbler	*Dendroica coronata*	None	Woodlands, brush, open country
Black-throated Gray Warbler	*Dendroica nigricans*	None	Oak, riparian woodlands
Townsend's Warbler	*Dendroica townsendii*	None	Riparian, oak woodlands
Common Yellowthroat	*Geothlypis trichas*	None	Marshes, streamsides
Song Sparrow	*Melospiza melodia*	None	Oak, riparian woodland
Downy Woodpecker	*Picoides pubescens*	None	Oak, riparian woodlands
California Towhee	*Pipilo crissalis*	None	Brushy habitats
Spotted Towhee	*Pipilo erythrophthalmus*	None	Dense brushy areas
Bushtit	*Psaltriparus minimus*	None	Woodlands, chaparral
Ruby-crowned Kinglet	*Regulus calendula*	None	Oak, riparian woodlands
Black Phoebe	*Sayornis nigricans*	None	Near water
California Thrasher	*Toxostoma redivivum*	None	Chaparral, coastal scrub
Golden-crowned Sparrow	*Zonotrichia atricapilla*	None	Dense woodlands, brushy areas
White-crowned Sparrow	*Zonotrichia leucophrys*	None	Oak, riparian woodlands
Mammals - 6 species			
Coyote	*Canis latrans*	None	Open woodlands, brushy areas, wide ranging.
Kangaroo Rat	*Dipodomys* sp.	None	Dunes
Brush Rabbit	*Sylvilagus bachmani*	None	Brushy habitats
Mule Deer	*Odocoileus hemionus*	None	Many habitats
Valley Pocket Gopher	*Thomomys bottae*	None	Variety of habitats
Wild Pig	*Sus scrofa*	None	Woodlands

Appendix B: Other Federally-listed Species Reported from the Region

The Project was determined to have no effect on several listed species reported from the region. Southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*Vireo bellii pusillus*) are federally listed endangered species of birds that are known to nest in riparian habitats in the region. There are no nesting records for either species in or near the Action Area, and none were observed during our surveys. Project Minimization Measures are proposed to avoid the potential for construction activities to adversely affect these species. Riparian vegetation will be pruned and cleared in the late fall after the nesting season and prior to construction. Therefore, the Project will have no effect on Southwestern willow flycatcher or least Bell's vireo.

San Antonio Creek was surveyed in 2002 by National Marine Fisheries Service as part of a steelhead distribution study. Steelhead trout *(Oncorhynchus mykiss)* was determined to be "absent" from the drainage (NMFS 2003). This watershed is not listed as critical habitat for steelhead by NMFS in the 2005 Federal Register, and is not included in the 2012 Recovery Plan for this species. Thorough fish surveys of San Antonio Creek in 2008 (Carl Page and Morgan Ball et al. 2009) did not observe any steelhead. In 2011 National Marine Fisheries Service stated, "Casual survey of general conditions of the lower [San Antonio] creek concluded that the low gradient and soft sediment substrate did not give the stream a high priority status for further investigation" with regard to steelhead presence or abundance. Therefore, the Project will have no effect on steelhead (Southern California DPS).

Vandenberg monkeyflower (*Mimulus fremontii* var. *vandenbergensis*) is a federal ESA Candidate species, and La Graciosa thistle (*Cirsium scariosum* var. *loncholepis*) is a federally listed endangered species. Vandenberg monkeyflower occurs in chaparral within sandy openings. La Graciosa thistle occurs on the margins of mesic areas such as dune swales, and is not known to occur on VAFB. Neither species has been found in the Action Area during seasonally appropriate botanical surveys, and we do not expect these species will be present within the Action Area in the future. A biological monitor would conduct preconstruction surveys to ensure that any new recruits would be discovered. The Project will have no effect on Vandenberg monkeyflower or La Graciosa thistle.

Beach layia (*Layia carnosa*) is listed as endangered under the federal ESA and is known to occur within coastal dune scrub habitat west of the railroad tracks, north of Tangair Road. UPRR vehicles and equipment will stay on the designated access roads (Figure 3) and thereby avoid impacts beach layia. A water truck and/or non-toxic dust palliative will be used to control dust on dirt access roads to avoid impacts to beach layia. With implementation of Minimization Measures, the Project will have no effect on beach layia.

Gaviota tarplant *(Deinandra increascens* ssp. *villosa)* is a federally listed upland plant not found in the Action Areas according to DNA analysis by Dr. Bruce Baldwin (2009) and confirmed by VAFB personnel (pers. comm. Rhys Evans April 30, 2012). Therefore, the Project will have no effect on Gaviota tarplant.

Gambel's watercress *(Rorippa gambellii)* is a federally listed endangered wetland species that has not been documented within the area. Although the action area constitutes potential habitat, the Project will have no effect on Gambel's watercress.

Appendix C: Conceptual Restoration Plan

Conceptual Vegetation Restoration Plan for Union Pacific Railroad Milepost 291.33, Santa Barbara Subdivision Bridge Replacement Project Vandenberg Air Force Base, Santa Barbara County, California

Note: This plan is prepared for review and approval by VAFB during the Environmental Assessment preparation process, and is not integral to the associated Biological Assessment or necessary for USFWS Biological Opinion preparation.

I. INTRODUCTION

Implementation of restoration will begin upon completion of the railroad bridge replacement project at San Antonio Creek, expected in fall of 2014. During implementation, biotechnical soil stabilization methods will use vegetative material, mainly willows in the riparian zone, upland native dune vegetation or seeds found within the area and structural components such as natural bank stabilization and grade-control structures. Willow branch cuttings will be used for live stakes and horizontal brush-layering techniques, as appropriate. Live stake materials will be watered-in after installation. Placement of willow poles and watering-in will facilitate root growth and willow woodland establishment.

II. OBJECTIVE

Arroyo Willow Riparian and Central Dune Scrub habitats on Vandenberg Air Force Base (VAFB) that are impacted during the Narlon bridge replacement project will be restored. Habitats disturbed by construction activities will be restored to an ecologically functional state and monitored.

III. SITE PROTECTION AND FINANCIAL ASSURANCE

Habitats impacted on VAFB property will be mapped by a qualified biologist approved by VAFB resource managers. Geographic Information System (GIS) shapefiles will be provided to VAFB resource managers. GIS data will be used by VAFB resource managers to prevent base activities or planned projects from occurring within sensitive restoration areas. A trust fund (or equivalent) will be established in the amount of $45,000 per acre of VAFB dune and riparian habitat impacted to cover the cost of repair and maintenance of the restoration areas associated with the Narlon bridge replacement project. Union Pacific Railroad will hire a landscape contractor to implement restoration, and will provide a funding mechanism to maintain restored areas for five years.

IV. BASELINE INFORMATION

The proposed bridge replacement project is anticipated to temporarily impact 1.8 acres of Arroyo Willow Riparian and 4.4 acres of Central Dune Scrub habitats on VAFB property. Restoration will occur on site. Dune scrub habitat has been historically disturbed and contains a high proportion of non-native vegetation such as veldt grass and iceplant. Willow riparian contains patches of non-native mustard and poison hemlock. Willow riparian habitat heavily impacted by temporary access roads, temporary bridges, and staging operations will be evaluated separately from other areas that appear to be recovering naturally (e.g. places where willows are obviously growing back through disturbed soil). Pre-construction 10-meter square quadrats (a minimum of 6 per habitat type) will be inspected prior to the start of construction to establish baseline vegetative

cover (absolute cover and species composition) prior to site disturbance. This information will be provided to VAFB resource managers.

V. RESTORATION WORK PLAN

a) SITE PREPARATION

Any imported topsoil shall consist of fertile soil similar to the area and shall contain an amount of organic matter normal to the region. It shall be obtained from well-drained arable land and shall be reasonably free from subsoil, refuse, roots, heavy or stiff clay, stones larger than one inch in size, coarse sand, noxious seeds, sticks, brush, litter and other deleterious substances. Imported topsoil shall be capable of sustaining healthy plant life. Ensure that any local or imported soil used shall be free of weed seeds. If local topsoil is salvaged and re-used, methods to successfully remove weed seeds shall be specified. Local topsoil shall be capable of sustaining healthy plant life. The disturbed soil areas will receive a standard treatment including proper soil preparation to ensure seed germination and planting success, soil amendments, compost if needed, and a seed mix and weed-free native straw mulch for temporary cover.

b) PLANTING

Planting and hydroseed application will occur in the fall, between October 1 and December 21, preferably between October 1 and November 15 to minimize supplemental water demands and optimize growth during relatively warm days in the fall.

Riparian areas on VAFB will be revegetated with willows, native blackberries, and California wild roses. Disturbed riparian areas where vegetation was severely impacted by access roads and temporary bridge installation will be planted with willow live-stakes 10 feet on center and inter-planted with blackberries and California wild roses, for an on-center spacing of 5-feet (maximum) between installed plants. Lightly to moderately disturbed riparian areas will be evaluated by a VAFB qualified biologist or restoration specialist to determine appropriate restoration planting densities. Disturbed soil between plants will be covered with 3-inches (minimum) of wood mulch to inhibit weeds, preserve soil moisture, and inhibit erosion.

Slope or bank stabilization structures will use granular filter, rock, and integrated willow pole plantings. If hydromulch is applied with seed, it will be installed with 2,000 lbs/acre mulch, 60 lbs/acre guar gum, 60 lbs/acre AM 120 mycchorrhizal inoculum (or, equivalent soil inoculant).

Riparian areas on UPRR's ROW will be revegetated with native blackberries planted 3-feet on-center. Disturbed soil between plants will be covered with 3-inches (minimum) of wood mulch to inhibit weeds and to preserve soil moisture. Disturbed soil near the interface of riparian and dune scrub vegetation will be re-seeded with the following mix, and may include seeds found within the area:

Table 1. Narlon Bridge - Riparian Edge Seed Mix

Species	Lbs/Acre
Achillea millefolium	1.00
Artemisia douglasiana	0.20
Artemisia dracunculus	0.10
Atriplex lentiformis brewerii	2.00

Baccharis salicifolia	0.10
Hordeum brachyantherum	10.00
Layia platyglossa	0.50
Leymus triticoides Rio	8.00
Phacelia ramosissima	0.50
Plantago erecta	3.00
Scrophularia californica	0.20
Trifolium obtusiflorum	2.00

Dune scrub areas on will be stabilized and revegetated with native dune shrubs including California sagebrush, mock heather, and bush monkeyflower. Seed may be hand broadcast and raked in by hand. Disturbed dune scrub vegetation will be seeded with at least six species from the following mix (as local material is available), and may include additional seeds collected in the area:

Table 2. Narlon Bridge – Dune Scrub Seed Mix

Species	**Lbs/Acre**
Lotus scoparius	4.0
Achillea millefolium	1.0
Camissonia cheiranthifolia	1.0
Eriophyllum confertiflorum	1.0
Ericameria ericoides	1.0
Eschscholzia californica (seeds collected from nearby VAFB dune scrub)	1.5
Lupinus chamissonis	2.0
Vulpia microstachys	8.0
Artemisia californica	0.2
Gnaphalium californicum	0.1
Mimulus aurantiacus aurantiacus	0.1

Coast buckwheat seeds will be added to the dune scrub seed mix on VAFB property at a rate of four (4) pounds per acre. Coast buckwheat seeds will be sourced from VAFB or will be collected from VAFB by a Service-approved biologist.

Seed mixes may be obtained from S&S Seeds, Carpinteria, CA: Phone (805) 684-0436, FAX (805) 684-2798. [Recommendation: Seeds should be ordered as soon as the job starts to ensure that they will be available for the landscape subcontractor.]

VI. MAINTENANCE PLAN

Remove weeds regularly during the first three years to minimize competition with desired plants and to minimize recruitment of weeds. Weed abatement should be implemented annually in years four and five.

- Weed site one week following the first inch of rain received in the fall. Weed restored areas with emphasis on eliminating seedlings of target weeds and non-native annual grasses. This measure should be implemented in all three years of the restoration project.

- Check site for weed competition around plugs and transplants, and perform weed control on a monthly basis during the growing season (February 1 – November 30), for the first year following installation. Reduce to once every six weeks for year 2, and once every other month for year 3. Perform weed control annually in the spring in years 4 and 5.
- Check site for target weeds during monthly maintenance activities and treat as needed. A restoration coordinator will review sites monthly during years 1 to 3 and annually during years 4 and 5 and will direct needed removal by hand, herbicide, or other established method to encourage the growth of native species.
- Provide water, as needed, to maintain riparian shrubs, especially during years 1 and 2. [Note: water must be trucked to the site.]

VII. PERFORMANCE STANDARDS

TABLE 1. PERFORMANCE STANDARDS. Success criteria are outlined through the first three year monitoring period. Survival rate is the primary performance standard that will be used to determine project success.

Feature	Performance Criteria and Assessment Method	Year 1	Year 2	Year 3
Train Landscape Contractors	Biologist will provide training regarding protected biological resources and target weeds for all workers who implement or maintain restoration areas.	100%	100%	100%
Plant Installation	Survival Rate	>80%	>80%	>80%
Weed Eradication	% cover by non-native weeds such as veldt grass, mustard, and poison hemlock	<25%	<10%	<10%
Erosion Control and Water Quality (slope and streambank protection)	Rills, gullies, or sediment loads will be repaired or removed. Repaired areas will be protected prior to the next rain event from erosion with bio-degradable materials and/or revegetated (Section V).	As-needed	As-needed	As-needed
Willow height	Approximate the average height of patches of willows to the nearest foot.	<1 ft	2 ft	>4 ft

Performance standards are anticipated to be met by year 3, and will be monitored through year 5 (anticipated to be 2019).

By year 5, the following additional performance standards will be met:

1. Five years post-construction, 80% native absolute live cover within the project area.
2. Five years post-construction, less than 15% non-native absolute live cover within the project area.

VIII. MONITORING REQUIREMENTS

Restored areas will be monitored during the first three years to determine whether vegetative growth requires weeding or watering. A biologist will monitor work progress and consult with the restoration workers to ensure plants are installed, irrigated and maintained, and problems are addressed in a timely fashion. During the first year, monitoring will consist of site visits during preparation and installation to provide training and answer questions. Follow-up monitoring visits will be made on a quarterly schedule to identify weed issues and other challenges that may require adaptive management.

Once per year for five years, a biologist will perform quantitative monitoring in the spring or early summer (June or July) to assess success of the restoration project. Sites will be inspected for target weeds. During annual monitoring visits, six 10-meter plots will be assessed for vegetative cover by species in each habitat type (riparian and dune). Results will be compared with original vegetation sampling conducted prior to construction to assess changes in species diversity and abundance. Monitoring Year 1 begins on the day planting activities are completed.

Quantitative monitoring will also include the following data for each quadrat:

a. % cover for each species
b. % cover for native species
c. % cover for non-native species
d. % dead cover
e. % substrate cover (mulch, soil, plant litter, etc.)
f. general health and stature of plants
g. signs of reproduction

Photo monitoring points will be established at each quadrat sampling location. Results of quantitative monitoring will be compared from year to year, with photographs to show relative success of restoration activities. Maps with photo points, weed treatment areas, and locations for remediation will be prepared each year and included in an annual report.

Biologist(s) will document wildlife observed in the restoration areas during monitoring site visits. The adequacy of slope and stream bank protection will be monitored. Extent of erosion and observed sedimentation into the stream within the project area will be documented.

Progress reports will be provided to VAFB and UPRR annually by September 1 of each year following installation of plant material. The report will provide an assessment of progress in meeting success criteria and will propose recommended management actions and contingency measures if criteria are not on track to be met. A summary report will be completed when performance criteria are met, expected by fall 2019.

IX. LONG TERM MANAGEMENT PLAN

Restored areas on VAFB property will be managed and maintained as habitat occupied by both common and rare species.

Restored areas on UPRR property will be managed to reduce fire fuel and maintain erosion control. Routine maintenance along the railroad's right-of-way will periodically cut vegetation to four inches above ground.

X. ADAPTIVE MANAGEMENT PLAN

When warranted, reseeding, water application, additional restoration plantings and weeding will be implemented based on results of monitoring site visits. Recommendations for remediation such as re-planting or re-seeding will be provided to UPRR and/or VAFB and the designated landscape contractor as soon as practicable following each monitoring site visit (i.e., within one week).

XI. FINANCIAL ASSURANCES

Union Pacific Railroad has budgeted on-site mitigation maintenance and monitoring into their construction plans for facility maintenance projects. Union Pacific Railroad will provide a letter of assurance that finances are committed to restore willow riparian and dune scrub habitat temporarily impacted by railroad facility maintenance operations.

XII. CONCLUSION

Enhancement of willow and dune scrub restoration areas is expected to attain a success rate of at least 80 percent of plants installed within three years, and will be maintained and monitored for five years. Timely plant installation and late spring/early fall irrigation will facilitate high survival and quick establishment. The existing seed bank is expected to produce a strong natural recruitment during the first two years that will complement plant installations and fill in empty spaces during the five-year monitoring period. If restoration is not successful by the end of the first three-year period, remediation and/or additional maintenance and monitoring will be required for those areas that have not met the performance criteria. If restoration implementation is completed in 2014, maintenance and monitoring may be completed by fall 2019.

APPENDIX B. ADDENDUM TO THE BIOLOGICAL ASSESSMENT

1.0 Narlon BA Addendum

1.1 Project Description

The Narlon Bridge Replacement Project would remove an antiquated and deteriorating steel bridge crossing San Antonio Creek at Union Pacific Railroad (UPRR) Mile Post (MP) 291.33, Santa Barbara Subdivision. The existing bridge was built in 1896. Over time, the steel supports have corroded and deteriorated, rendering the bridge in need of replacement. An old access bridge would be replaced with a structure that can support heavy equipment for bridge construction.

The Action Area evaluated in this BA comprises the four areas shown in Table 1 and Figure 1. (1) **Narlon Bridge Project Site** includes UPRR's property in the vicinity of the bridge (50 feet from centerline of tracks for approximately 1,230 linear feet) and Vandenberg Air Force Base (VAFB) property 100-feet east and west of Narlon Bridge (work area, 7.7 acres), plus an additional staging area for temporary office and equipment storage in a disturbed area southwest of the bridge (1.4 acre). The total Action Area near the Narlon bridge project site would be approximately 9.1 acres. (2) **Tangair Staging Area** would be utilized as a spoils pile lay-down area and possibly a concrete batch plant south of Tangair Road on UPRR property, along approximately 950 linear feet of track where the ROW is approximately 300 feet wide. (3) **Narlon Station Staging Area** is located approximately 1.6 miles north of the bridge, and would be used for materials staging on UPRR property, along approximately 2400 linear feet of track where the right-of-way is over 100 feet wide (10.8 acres). (4) Rail Garrison Staging Area, located at the terminus of Umbra Road adjacent to an existing spur-track, would be used for equipment staging, re-bar cage production, and possibly a concrete batch plant within an existing 0.6 acre asphalt cul-de-sac.

TABLE 1. Narlon Bridge Replacement Project Action Areas

Site Name	Ownership	Type	Acres
1. Narlon Bridge Project Site	UPRR and VAFB	Active Work Zone	7.7
		Staging (Office and Equipment)	1.4
2. Tangair Staging Area	UPRR	Staging (Spoils Piles and Concrete Plant)	6.5
3. Narlon Station Staging Area	UPRR	Staging (Materials)	10.8
4. Rail Garrison Staging Area (existing asphalt pad by spur track)	VAFB	Staging (Equipment or Concrete Plant)	0.6
		Total	27.0

1.1.1 Narlon Bridge Project Site

UPRR plans to construct a new bridge to replace the 720-foot-long open-deck Narlon Bridge. The new bridge will be approximately 760 feet in length and span San Antonio Creek. The approximately 16-foot wide bridge deck will be supported by eleven (11) new concrete columns anchored by drilled footings ranging in diameter from 4-feet to 9-feet cast-in-place concrete.

The largest span between support columns will be approximately 180-feet. The Narlon Bridge Project Site totals approximately 9.1 acres (Figure 2), consisting of 7.7 acres of Active Work Zone and a 1.4 acre Bridge Staging Area (see also Section 1.1.2, Construction Staging Areas).

The project also includes replacement of an existing approximately 15-foot wide and 40-foot long access bridge ("access bridge"). The access bridge is located on the west side of the existing Narlon Bridge and will be replaced using H-piles placed well outside of the ordinary high water line to allow safe crossing of a 300-ton crane and other construction equipment across San Antonio Creek (Exhibit A). The new access bridge will temporarily be approximately 35-feet wide and 40-feet long and comprised of two segments that are side-by-side (a 20-foot segment and a 15-foot segment). The 20-foot segment on VAFB property will be removed upon completion of construction and the temporary abutments restored to pre-existing conditions. The remaining 15-foot wide by 40-foot long segment will remain in place for permanent operations and maintenance use by UPRR.

The project also includes a temporary construction access bridge to enable cranes and drill rigs to cross San Antonio Creek working along the east side of Narlon Bridge. The eastern temporary bridge would be approximately 35-feet wide by 50-feet long. Approximately 15 to 20 feet of the bridge would be constructed on VAFB property within the proposed Action Area. Approximately 600 cubic yards of fill (300 c.y. on each side of the creek and out of the creek, and above the ordinary high water mark) would be placed to provide temporary abutments and ramps for the bridge. The bridge would span approximately 50 feet and rest on the temporary abutments. The bridge would be capable of supporting a 300-ton crane, made of steel and designed to American Association of State Highway and Transportation Officials (AASHTO – US) bridge design codes. Upon completion of construction, the bridge would be removed by rail car and the fill for the abutments would be re-contoured to match the existing grade or transported offsite by railcar.

1.1.2 Construction Staging Areas

Staging areas are proposed for materials, equipment, a temporary concrete batch plant, and spoils storage area. One approximately 1.4-acre staging area will be located southwest of the Narlon Bridge outside of UPRR ROW, and includes an area historically used by VAFB for maintenance activities ("Bridge Staging Area" discussed in Section 1.1.1 above). A second staging area approximately 10.8 acres in size will be located approximately 1.25 miles northwest of the Narlon Bridge within UPRR ROW ("Narlon Station Staging Area"). This area would be used for stockpiling bridge parts adjacent to an existing siding track.

Concrete will be mixed at one of two proposed locations for a batch plant. The actual location of the batch plant will be determined at the time of construction but both locations are being included for consideration in the Form 813 and other agency approvals (e.g. Endangered Species Act Section 7 consultation) approval process. The first location is the approximately 0.6-acre Rail Garrison Site (rail spur and paved parking lot) located approximately one mile northwest of the Narlon Bridge and outside of UPRR ROW, off of Umbra Road. The Rail Garrison Site may also be used for rebar and rail assembly and storage. The second location is the Tangair Staging Area, a 6.5-acre area located within the UPRR ROW near Tangair Road approximately 2.4 miles south of the Narlon Bridge. Concrete would be delivered to the project site on existing VAFB access roads by truck. An on-site batch plant will minimize access impacts to the VAFB Santa

Lucia gate operations and improve efficiency of concrete delivery for the project. Raw materials for concrete will be brought in by rail.

Dirt spoils from the installation of the new bridge footings will be temporarily stock piled within the Tangair Staging Area. Excess soil will be removed by rail as work trains become available. A concrete batch plant may be constructed on UPRR property at the Tangair staging area, and access would be under the Tangair bridge to avoid impacts to VAFB bridge facilities.

Traffic will move one direction on existing dirt access roads between staging areas to minimize dust and vegetation impacts.

1.2 Floodway and Channel Definition

Willow riparian vegetation dominates the floodway in the Narlon Bridge Project Site (approximately 2.4 acres; 300 feet upstream/downstream and approximately 340 feet wide). The active channel is approximately 26 feet wide and 4 feet deep (0.18 acre; 300 feet upstream/downstream and 26 feet wide). The channel banks are nearly vertical and are densely vegetated with blackberries and poison oak. The active channel is defined by its perennial water (baseflow observed over the years is generally one to two feet deep) and well-defined banks that confine ordinary high water flows. Floodwaters overtop the active channel banks and spread through the willow riparian vegetation. Flood patterns at the Narlon Bridge Project Site are generally confined to an area below the existing access road under the south side of the bridge (190 feet south of San Antonio Creek) and the slope north of the bridge that rises sharply approximately 125 feet north of the creek.

1.3 Access Bridge Configuration

Two proposed access bridges would span the active channel. Abutments would be placed well outside the channel banks so as not to require disturbance of the channel banks. Exhibit A (attached) illustrates the location of the proposed access bridge relative to the active channel and channel banks. The blue line above the channel shown in the figure indicates that the flood plain extends north and south of the active channel. The line estimates flood-flow elevation based on site observations by Althouse and Meade, Inc. biologists.

1.4 Dewatering Discussion

Pile boring and filling operations may require dewatering. Water will be pumped into temporary tanks (e.g. Baker Tank or equivalent). After water is tested for pollutants (e.g. hydrocarbons, pH, and turbidity) and proven to be clean, it may be used for dust control operations or may be discharged into dirt bags set on straw bales and dissipated through riparian stubble back into San Antonio Creek. Dirty water will be contained and removed to a legal disposal site. Mud spoils will be temporarily placed at the Tangair Staging Area, and will be hauled off site by rail to a legal disposal site. Mud spoils may also be tested for hydrocarbons and other potential contaminants and transferred to a Vandenberg Air Force Base receiver site, if the transfer process has prior approval through Base environmental review protocols.

The total volume of water that may be discharged would be less than 500,000 gallons, total. Potential discharge volumes were estimated by HDR Inc. engineers on October 24, 2012 based

on their review of Narlon Bridge geotechnical reports and estimates of permeability in subsurface layers. Potential volumes from each shaft (two shafts per bridge bent) were estimated and a 20 percent safety factor added for each of 11 bents. The highest estimated volume of water generated per bent was 62,000 gallons, and the lowest estimated volume was 12,000 gallons.

We reviewed the potential water height effect on the downstream lagoon surface elevation. The purpose of our review was to evaluate the potential for construction discharge water to cause a breach in a terminal dune that separates the Pacific Ocean from brackish lagoon water in Lower San Antonio Creek.

The lagoon surface area is approximately four acres, as measured using ArcGIS. In order for the lagoon surface to be raised one foot in elevation, four acre-feet* of water (1.3 million gallons) would have to be rapidly discharged. The path length from the bridge site to the lagoon is approximately 3100 feet. If clean water is discharged to San Antonio Creek, the discharge would occur over a period of weeks or months, and would be unlikely to raise the lagoon surface elevation more than a few inches, and would not likely affect the terminal dune.

* One acre-foot equals 325,851.4 gallons

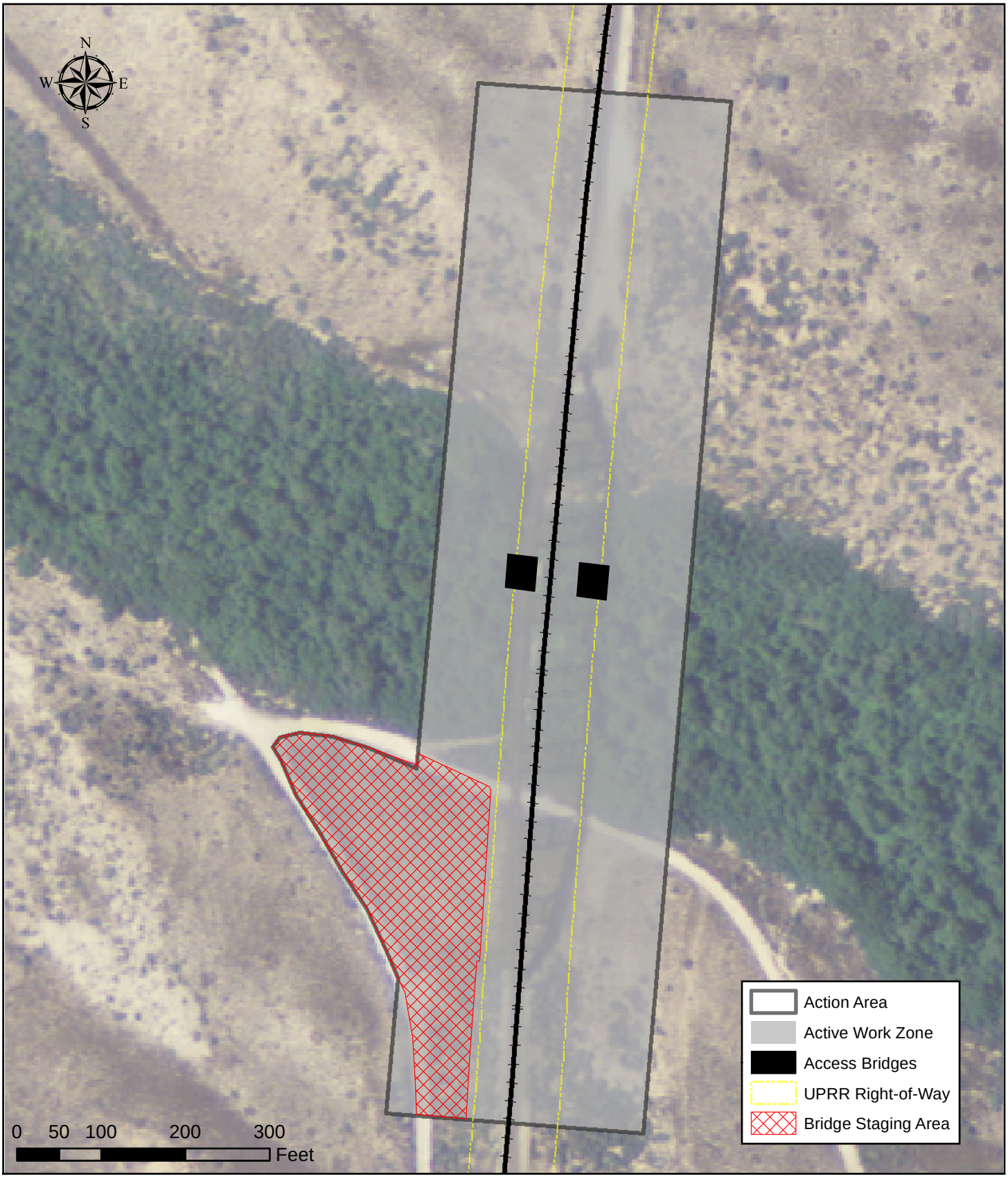
Figure 1. Aerial Photograph with Action Areas

Union Pacific Railroad

2012 Santa Barbara County
USDA Aerial Photography
Map Updated: November 08, 2012, 08:20 AM

Althouse and Meade, Inc.
1602 Spring Street
Paso Robles, CA 93446

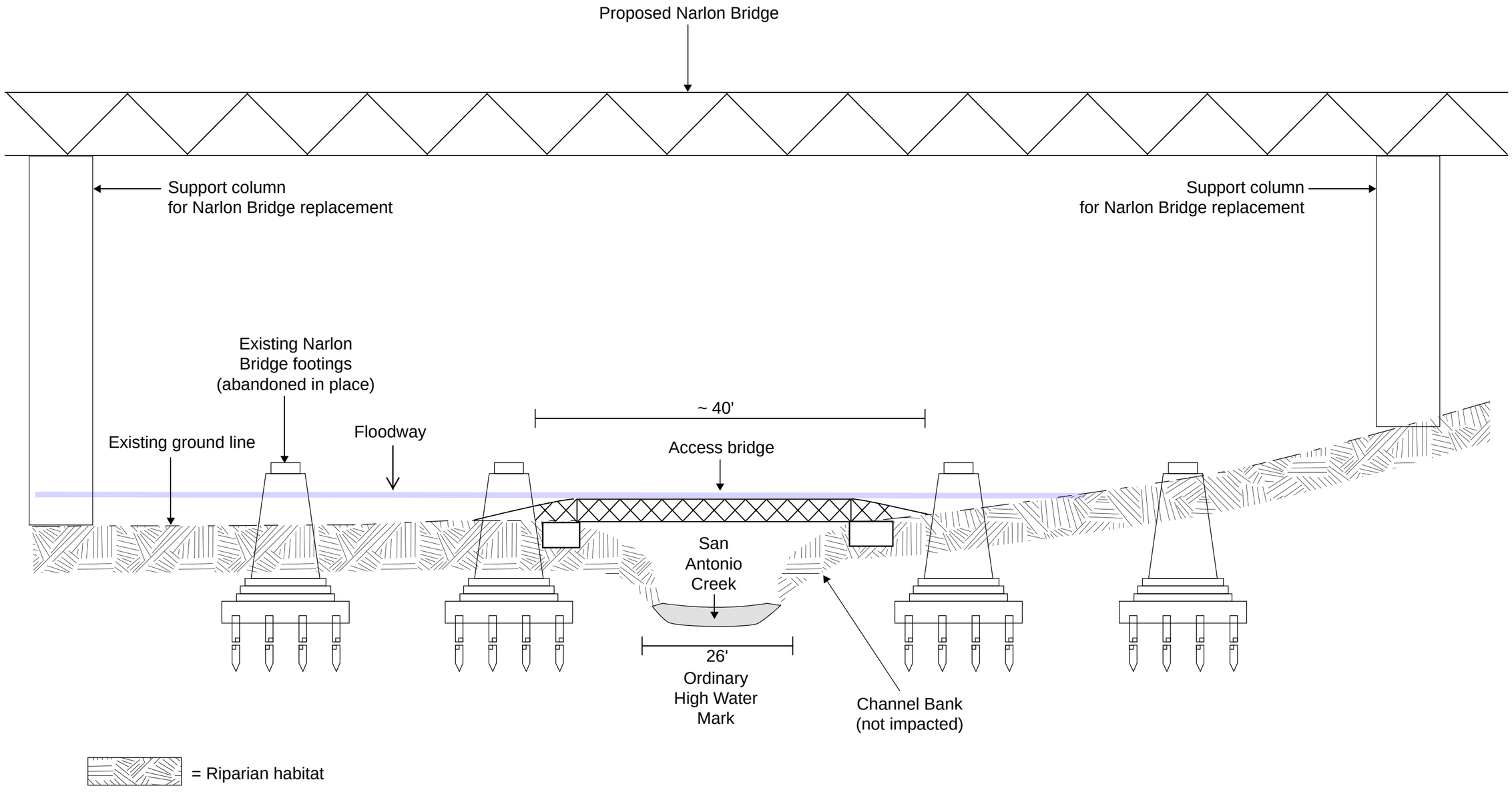
Figure 2. Narlon Bridge Project Site



Union Pacific Railroad

2012 NAIP Aerial Photography
Map Updated: October 24, 2012

Althouse and Meade, Inc.
1602 Spring Street
Paso Robles, CA 93446



Estimated floodway indicated by Althouse and Meade, Inc. 11/8/2012

Schematic Drawing - Not to Scale

EXHIBIT A
Access Bridge Replacement
UPRR SBAR 291.33 Narlon Bridge Replacement Project

APPENDIX C. 2013 BIOLOGICAL OPINION AND 2019 LETTER

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2012-F-0526

August 29, 2013

Beatrice L. Kephart
30 CES/CEA
1028 Iceland Avenue
Vandenberg Air Force Base, California 93437-6010

Subject: Biological Opinion for the Narlon Railroad Bridge Replacement Project Vandenberg Air Force Base, Santa Barbara County, California (8-8-12-F-52)

Dear Ms. Kephart:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Air Force's (Air Force) proposal to issue an access agreement to Union Pacific Railroad (UPRR) to replace a railroad bridge over San Antonio Creek on Vandenberg Air Force Base (VAFB), and the effects on the federally endangered California least tern (*Sterna antillarum browni*), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), tidewater goby (*Eucyclogobius newberryi*), and El Segundo blue butterfly (*Euphilotes battoides* ssp. *allyni*), and the federally threatened western snowy plover (*Charadrius nivosus nivosus*) and California red-legged frog (*Rana draytonii*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act)(16 U.S.C. 1531 et seq.). Critical habitat has been designated for the tidewater goby, western snowy plover, and California red-legged frog throughout their respective ranges; however, no critical habitat for these species has been designated on VAFB. Critical habitat for the California least tern, unarmored threespine stickleback, and El Segundo blue butterfly has not been designated. Your request, dated September 18, 2012, was received in our office on September 21, 2012.

This biological opinion was prepared using information you provided in your letter requesting initiation of formal consultation, the biological assessment (UPRR 2012), and information in our files. A complete record of this consultation can be made available at the Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Air Force proposes to issue an access agreement to UPRR to replace the existing 720-foot-long open-deck Narlon Bridge and an existing access bridge with a new railroad bridge and access bridge. The existing railroad bridge, which was built in 1896, poses a safety risk. The new railroad bridge would be approximately 760 feet in length and span San Antonio Creek. The approximately 16-foot-wide bridge deck would be supported by 11 new concrete columns anchored by drilled footings ranging in diameter from 4-feet to 9-feet cast-in-place concrete. The largest span between support columns would be approximately 180-feet. The existing access bridge would be replaced because it is not structurally capable of supporting construction and maintenance equipment. The total duration of construction is approximately 2 years.

The proposed project activities would be implemented in three phases as summarized below:

Phase 1 – Install Environmental Protection Measures, Access, and Laydown Areas
Exclusionary fencing for California red-legged frog would be installed by biological monitors and cultural sites would be protected, as needed, by covering them with road base or fill. VAFB roads would be maintained by UPRR during construction and returned to pre-project condition (with exception of roads improved with road base, which would be left in place). Existing roads would not be widened for the proposed project. No new roads would be created for the project. The existing dirt road for the west access bridge would be maintained by adding road base or soil binders. During construction operations a water truck and/or non-toxic dust palliative or soil binder would be used to control dust on dirt access roads. Dust palliatives would be approved by VAFB natural resources and public works departments, and would be applied in a manner that protects water quality in San Antonio Creek. Dust palliatives would only be used outside of the riparian zone; water would be used within the riparian zone.

The existing access bridge is located on the west side of the existing Narlon Bridge and would be replaced using H-piles to allow safe crossing of a 300-ton crane and other construction equipment across San Antonio Creek. The new access bridge would temporarily be approximately 35-feet wide and 40-feet long and comprised of two segments that are side-by-side (a 20-foot segment and a 15-foot segment). The 20-foot segment would be removed upon completion of construction and the temporary abutments restored to pre-existing conditions. The remaining 15-foot wide by 40-foot-long segment would remain in place for permanent operations and maintenance use by UPRR.

UPRR also proposes to construct a temporary construction access bridge enabling construction equipment to cross San Antonio Creek to the east of the Narlon Bridge. The temporary eastside access bridge would be approximately 35-feet wide by 50-feet long. Approximately 600 cubic yards (cy) of fill (300 cy on each side of San Antonio Creek) would be placed above the ordinary high water mark to provide temporary abutments and ramps for the bridge. Upon completion of construction of the Narlon Bridge, the temporary eastside access bridge would be removed by

rail car and the fill for the abutments would be re-contoured to match the existing grade or transported offsite by railcar.

Phase 2 – Construct New Bridge

Four staging areas are proposed for materials, a temporary concrete batch plant, and spoils storage area. One approximately 0.6-acre staging area would be located southwest of the Narlon Bridge in an area used by VAFB for maintenance activities ("Bridge Staging Area"). A second staging area approximately 10.8 acres in size would be located approximately 1.25 miles northwest of the Narlon Bridge ("Narlon Station Staging Area").

Concrete would be mixed at one of two proposed locations for a batch plant. The actual location of the batch plant would be determined at the time of construction but both locations are being included for consideration. The first location for consideration is the Rail Garrison staging (rail spur and paved parking lot) area located approximately 1 mile north of the Narlon Bridge. The Rail Garrison site may also be used for storage, rebar and rail assembly. The second location for consideration is the Tangair Staging area, a 6.5-acre area located approximately 2.4 miles south of the Narlon Bridge. Concrete would be delivered to the project site on existing VAFB access roads by truck. An on-site batch plant would minimize impacts to the VAFB Santa Lucia gate and improve efficiency of concrete delivery for the project. Raw materials for concrete would be brought in by rail and stored on existing paved areas. Dirt spoils from the installation of the new bridge footings would be temporarily stock piled within the Tangair Staging area. Excess soil would be removed by rail as work trains become available. Staging areas would be returned to their pre-project conditions. Areas graded for crane pads would be re-contoured to pre-project contours. Disturbed areas would be stabilized and permanently vegetated with native vegetation.

Cranes and equipment to construct the new railroad bridge would be mobilized and brought onsite via rail and existing roads. Access to an additional 100 feet upstream and downstream of Narlon Bridge would be needed to allow for crane movement. The extent of temporary construction disturbance is anticipated to be less than the maximum allotted 300-foot width at some points. Impacts to San Antonio Creek riparian zone would be minimized to the extent possible, but would include cutting and trimming of riparian vegetation at or near ground level and placing crane mats over work areas.

The contractor would drill footings for the concrete columns. After drilling is complete, concrete columns would be poured in place to support the new railroad bridge. UPRR would remove the existing spans and cut them into smaller pieces on site so that these pieces can be loaded into railcars to be hauled away. As the existing spans are taken out, new spans would be installed in their place on the new substructure system to allow for train passage. Night work may be necessary during drilling and bridge change-out operations. As such, night lighting may be required to facilitate project activities.

Ground disturbance would be limited the construction areas described above, primarily under the existing bridge or in one of the proposed facility staging areas. Concrete footings would be drilled into the area below the existing bridge to support the new bridge. No work would occur within the ordinary high water mark of San Antonio Creek.

Phase 3 – Remove Old Bridge
After the new bridge is complete, the old bridge segments would be hauled away by railcar to a facility authorized to accept scrap material. The existing footings would be abandoned in place so that additional ground disturbance would not occur from removal. Steel piles would be removed from the 34 brick and stone footings (various heights, less than 6 feet tall) that would remain in place. No additional ground disturbance would occur during final demolition.
The avoidance and minimization measures identified in the biological assessment (UPRR 2012) are described in Appendix A of this biological opinion.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species,* which evaluates the range-wide condition of the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog, the factors responsible for that condition, and the species' survival and recovery needs; (2) the *Environmental Baseline,* which evaluates the condition of these species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of these species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on these species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of each of these species, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these species in the wild.

STATUS OF THE SPECIES

California Least Tern
The California least tern, which is one of three subspecies of least tern in the United States, was listed as endangered in 1970 (35 FR 16047). We issued a revised recovery plan in 1985 (Service 1985a). A 5-year review for the California least tern was completed in September 2006 (Service 2006a). The State of California listed the California least tern as endangered in 1971. In addition, the California least tern is a fully protected species under California law.

The California least tern was historically concentrated in three southern California counties: Los Angeles, Orange, and San Diego. Between Ventura County and the San Francisco Bay area, only Guadalupe Dunes-Mussel Rock Dunes, and Purisima Point (on VAFB) have been used regularly by California least terns (Marschalek 2006). At the time of listing, a census revealed 600 pairs of breeding California least terns in California, but recovery efforts instituted since the time of listing have helped raise numbers of breeding birds. Statewide surveys conducted in 1995 counted 2,598 pairs (Caffrey 1995) and the population increased to approximately 7,100

pairs by 2005. In addition, the number of California least tern sites has nearly doubled since the time of listing, with most of the California least tern colonies occurring in southern California.

Since 1970, nesting sites have been documented in California from the San Francisco Bay area to the Tijuana River at the Mexican border (Marschalek 2006), and in Mexico within the Gulf of California and on the west coast of Baja California from Ensenada to San José del Cabo at the tip of the peninsula (Lamb 1927, Grinnell 1928, Patten and Erikson 1996). In 1991 and 1992, a survey of the west coast of the Baja peninsula documented 13 breeding colonies at 5 different locations, from Ensenada through Bahía Magdalena with one to six sites at each location. Large nesting colonies along the California coast have been discontinuous and are spread out along beaches at the mouths of larger estuaries. The Santa Margarita River mouth in San Diego County generally hosts the largest number of California least terns among all locations.

The California least tern breeding season typically begins in April. California least terns nest in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. In addition, nesting areas are relatively flat sandy beaches in close proximity to foraging habitat, and have relative seclusion from disturbance and predation. California least terns are very gregarious and forage, roost, nest, and migrate in colonies, although there are many records of solitary pairs nesting at certain sites, or low densities of limited nesting pairs over several miles of beach habitat (Service 1985a). A typical colony size is 25 pairs; a typical clutch is 2 eggs. Eggs are laid in the first part of May and hatch in early June. After the eggs are laid, the nest is sometimes lined with shell fragments and small pebbles. Eggs are incubated primarily by the female for 20 to 25 days. Chicks usually fledge by late June. California least terns can re-nest up to two times per year if eggs or chicks are lost early in the breeding season.

California least terns forage primarily in near-shore ocean waters and in shallow estuaries and lagoons (Massey 1987). At colonies where feeding activities have been studied, California least terns foraged mostly within 2 miles of the breeding area and primarily in near-shore ocean waters less than 60 feet deep (Collins et al. 1979, Atwood and Minsky 1983). Prey items include northern anchovy (*Engraulis mordax*), topsmelt (*Atherinops affinis*), California grunion (*Leuresthes tenuis*), and killifish (*Fundulus parvipinnis*). Severe El Niño Southern Oscillations can affect the California least tern's food supply.

Repeated disturbance in California least tern breeding sites can also have substantial effects on California least tern reproductive success and cause nest failure, re-nesting, and site abandonment (Massey and Fancher 1989). For example, the California least tern colony at Ormond Beach in Ventura County, California, was repeatedly disturbed by paragliders and ultralight aircraft. In a period of 4 years, all nesting attempts at Ormond Beach had failed and the site was abandoned (C. Dellith, Service biologist, pers. obs. 2006). Once this source of disturbance was removed, the colony returned and nesting resumed to pre-disturbance numbers.

The decline of the California least tern is attributed primarily to the loss and fragmentation of breeding and foraging habitat, although the rate of habitat loss in recent years is reduced because almost all coastal habitats have already been fragmented and degraded. Most colonies are small

patches of degraded nesting habitat surrounded on all sides by human activity. Additionally, there is a lack of undisturbed or moderately-disturbed suitable breeding habitat available for population expansion. The level of human coastal use is expected to continue the conflict between resurging California least tern populations and limited habitat availability. Although most of the important nesting sites are in public ownership, competing land uses continue to be a major threat resulting in disturbance to, or elimination of, nesting habitat. These remaining nests sites must be intensively managed to conserve suitable nesting habitat.

Recovery Plan for the California Least Tern

The 1985 final recovery plan for the California least tern states that the goal of recovery efforts is the reclassification of the species from endangered to threatened and, ultimately, delisting of the species. The recovery plan states that reclassification to threatened status may be considered when: 1) there are at least 1,200 breeding pairs distributed in at least 15 of 23 coastal management areas; 2) each of the 15 "secure" coastal management areas must have at least 20 breeding pairs; and 3) each of the 15 "secure" coastal management areas must have a 3-year mean reproductive rate of at least 1.0 young fledged per breeding pair.

The recovery plan states that delisting of the California least tern may be considered when: 1) at least 1,200 breeding pairs are distributed in at least 20 of 23 coastal management areas; 2) each of the 20 "secure" coastal management areas must have a 5-year mean reproductive rate of at least 1.0 young fledged per breeding pair; and 3) the San Francisco Bay, Mission Bay, and San Diego Bay are included within the 20 secure management areas with 4, 6, and 6 secure colonies respectively.

5-Year Review for the California Least Tern

The 5-year review for the California least tern states that the recovery criteria in the recovery plan do not reflect the best available and most up-to date information on the biology of the species and its habitat. Since the completion of the recovery plan, new information about the species population dynamics and its threats had been discovered; however, the 5-year review also states that the California least tern population in California had increased from 600 pairs in 1973 to approximately 7,100 pairs in 2005. The number of California least tern sites had nearly doubled since the time of listing, with most of the California least tern colonies occurring in Southern California. While the number of California least tern had increased at the San Francisco Bay colonies, no increase in the number of colonies had been observed in the Bay area, as required by the recovery plan's delisting criteria. The level of production (fledged young per year) had declined and continues on a downward trend (Marschaleck 2006). According to the 5-year review, new information suggests that even at these production levels, the California least tern populations are continuing to increase.

The 5-year review for the California least tern states that threats to the species' habitat have been ameliorated, but not eliminated. Habitat for the species had been degraded throughout its range, and competing human activities continued to threaten the California least tern. At the time the 5-year review was published, the remaining nesting colonies were concentrated in five southern California counties and located on small sites within wildlife refuges, military installations, and

other public lands requiring intensive management. Within these managed sites, the species remains vulnerable to predation, invasive non-native plants, and human-related disturbance. Without continued intensive management of these sites, threats of habitat loss and predation could reverse the population recovery that has been observed since the species was listed. Therefore, the 5-year review makes a recommendation to reclassify the California least tern from endangered to threatened.

Unarmored Threespine Stickleback

The unarmored threespine stickleback was federally listed as endangered in 1970 primarily due to competition with and predation by non-native fish, loss of habitat through urbanization and channelization, and introgression with other subspecies of sticklebacks (35 FR 16047). The unarmored threespine stickleback is a fully protected species under California law (see California Fish and Game Code, Section 5515 (b)(9)). The recovery plan for the unarmored threespine stickleback (Service 1985b) provides additional information on the biology of the species, reasons for its decline, areas of essential habitat, and the actions needed for recovery of the species. A 5-year review for the unarmored threespine stickleback was completed in May 2009 (Service 2009).

On November 17, 1980, the Service proposed designating approximately 31.7 miles of streams in Los Angeles and Santa Barbara counties as critical habitat for the unarmored threespine stickleback (45 FR 76012). The proposed critical habitat included three stream zones of the upper Santa Clara River, including the Del Valle zone, the San Francisquito zone, and the Soledad Canyon zone. The Del Valle zone includes the action area and runs from the confluence with San Martinez Grande Canyon upstream to the I-5 Bridge. On September 17, 2002, the Service determined that a designation of critical habitat for unarmored threespine stickleback should not be made because the initial Federal listing was in 1970 under the Endangered Species Conservation Act of 1969, the predecessor of the Act (67 FR 58850). The Endangered Species Conservation Act did not have a critical habitat designation requirement. A lawsuit brought by the Center for Biological Diversity resulted in a decision by the Ninth Circuit Court of Appeals in 2006 upholding the Service decision to not designate critical habitat for unarmored threespine stickleback. Therefore, critical habitat for the unarmored threespine stickleback will not be discussed further in this biological opinion.

Unarmored threespine stickleback are small fish (up to 2.36 inches) inhabiting slow moving reaches or quiet water microhabitats of streams and rivers. Favorable habitats usually are shaded by dense and abundant vegetation. In more open reaches, algal mats or barriers may provide refuge for the species. Unarmored threespine stickleback feed primarily on benthic insects, small crustaceans, and snails, and to a lesser degree, on flat worms, nematodes, and terrestrial insects. Unarmored threespine stickleback reproduce throughout the year with a minimum of breeding activity occurring from October to January. Reproduction occurs in areas with adequate aquatic vegetation and gentle flow of water where males establish and vigorously defend territories. The male builds a nest of fine plant debris and algal strands and courts all females that enter his territory; a single nest may contain the eggs of several females. Following

spawning, the males defend the nests and the newly hatched fry, which hatch after approximately 6 days. Unarmored threespine stickleback are believed to live for only 1 year (Service 1985b).

Unarmored threespine stickleback historically were distributed throughout southern California but are now restricted to the upper Santa Clara River and its tributaries in Los Angeles County, San Antonio Creek on Vandenberg Air Force Base in Santa Barbara County, Shay Creek (tributary to Baldwin Lake) in San Bernardino County, and San Felipe Creek in San Diego County. A population was transplanted into San Felipe Creek in the Salton Sea drainage and into Cañada Honda Creek on VAFB. Transplanted populations tend not to persist (Moyle 2002). In fact, no individuals have been observed in Cañada Honda Creek in 13 years (R. Evans, VAFB Natural Resource Lead, pers. comm., 2008).

Habitat degradation in the form of flood control and channelization are the primary threats to the survival of the unarmored threespine stickleback. Other forms of habitat degradation can occur when people or livestock trample stream banks, causing increased soil erosion and sedimentation in streams and breeding pools and reducing the availability of plants and insects that serve as habitat and food for the species. Damage to, or destruction of, the emergent vegetation along the stream banks also degrades the shallow, weedy nursery areas that provide abundant food and shelter for unarmored threespine stickleback.

Other threats to unarmored threespine stickleback often occur in popular riparian areas near campgrounds where humans dam pools for wading and inadvertently trample adjacent sand or gravel bars during streamside recreational activities. These activities force the unarmored threespine stickleback to constantly move away from human traffic or be driven into areas where they are more susceptible to injury or mortality due to predation or recreational activities.

Exotic predators such as African clawed frogs (*Xenopus laevis*), bullfrogs (*Lithobates catesbeiana*), mosquitofish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and green sunfish (*Lepomis cyanellus*), prey on or compete for resources with unarmored threespine stickleback. In addition, certain non-native species may serve as vectors for the Ich parasite (*Ichthyopthirius multifilis*) that could infect populations of unarmored threespine stickleback. Populations of unarmored threespine stickleback in the Angeles National Forest were severely affected by the introduction of Ich in 1995 (U.S. Forest Service 2000). Introduced goldfish (*Carasius auratus*) were suspected to be the source of the Ich infestation.

Population in Santa Barbara County

In the Fall of 2008, the San Antonio Creek Bank Stabilization Project at VAFB was initiated along approximately 0.875 miles of San Antonio Creek, located between Highway 1 and the Lee Road Utility Bridge (upstream of the action area for this consultation) to repair extensive damage associated with storm flows in 1998, and to halt continued erosion. A combination of the installation of grade control structures, bioengineered bank stabilization, and restoration of historical flood terraces were conducted on this portion of creek. In addition to stabilizing and restoring the creek channel, these measures were also expected to provide long-term ecological

benefits to the creek by enhancing riparian habitat and increasing the habitat quality for federally threatened and endangered species.

In 2009, the immediate effects of the bank stabilization project on unarmored threespine stickleback were assessed by comparing results from pre-construction surveys conducted in 2008 and surveys conducted in 2009. These surveys documented changes in the distribution and population of the unarmored threespine stickleback. In order to continue to meet the requirements of the Clean Water Act, Section 404 Permit (SPL-2007-00611) associated with this project, which require the implementation of a Compensatory Mitigation and Monitoring Plan (CMMP; 16 December 2011) these monitoring surveys were repeated in 2011-2012 using the same methodologies applied in 2009. Overall, more unarmored threespine stickleback were observed within the survey areas during 2011-2012 than during the 2008-2009 surveys and the CMMP success criterion for the unarmored threespine stickleback at the site were being exceeded. Overall density of unarmored threespine stickleback declined at several fish survey sites; however, unarmored threespine stickleback expanded their range within the project area. Prior to the start of construction, unarmored threespine stickleback were only found at one survey site. Following construction, unarmored threespine stickleback were found at all survey sites.

Recovery Plan for the Unarmored Threespine Stickleback

The 1985 final recovery plan for the unarmored threespine stickleback states that the species could be considered recovered when: (1) habitat conditions for each of the known remnant populations have been stabilized at or near historical carrying capacities; (2) the other known threats have been addressed in a manner that assures the continued existence of these populations; and (3) at least five self-sustaining populations have been maintained within the historical range of unarmored threespine stickleback for a period of 5 consecutive years without significant threats to their continued existence.

The plan states that to reach the point of recovery, the known extant populations must be preserved and protected, additional populations will need to be successfully reintroduced into historical habitats, the spread of exotic organisms will need to be controlled, and degraded habitats will need to be restored and maintained. In order to do this, adequate instream flows must be maintained in all essential habitats, land uses must be regulated to maintain good water quality, the introduction of additional exotic organisms must be prevented, the spread of established populations of exotic organisms controlled, suitable reintroduction sites within the historical range must be found, and habitat conditions must be monitored to ensure that satisfactory conditions for unarmored threespine stickleback are being maintained.

The recovery strategy for the unarmored threespine stickleback, as defined in the recovery plan, includes the following actions: (1) close regulation of removal (take) of the species; (2) monitoring and appropriate management of habitat conditions; (3) implementation of contingency plans to protect the species from natural or man-made disasters; and (4) establishment of additional populations in suitable reintroduction sites as needed.

The recovery plan identified essential habitat for the unarmored threespine stickleback in Los Angeles County and Santa Barbara County. The essential habitat in Los Angeles County is entirely within the upper Santa Clara River drainage and the essential habitat in Santa Barbara County is entirely within San Antonio Creek. The recovery plan also identifies another habitat management category called the essential management area. The essential management area include all areas in the Santa Clara River watershed upstream from the juncture with and including San Martinez Grande Canyon that are not identified as essential habitat and all of the San Antonio Creek watershed that is not identified as essential habitat (Service 1985b). Essential management areas are expected to be management to the extent that adequate flows of good quality water are maintained in the essential habitat zones so that the quantity and quality of the essential habitat is not significantly reduced.

5-Year Review for the Unarmored Threespine Stickleback

The 5-year review for the unarmored threespine stickleback states that the unarmored threespine stickleback continue to be threatened by: agricultural, industrial, and municipal water pollution; channelization and other habitat modifications associated with urbanization; stream flow alterations caused by water diversion; groundwater pumping; introduction of competing and predatory species; hybridization with partially armored threespine stickleback; drought; and stochastic extinction. Although some efforts have been and are being made to acquire habitat for the species, little has been done so far, and none of the recovery criteria in the recovery plan for the unarmored threespine stickleback (Service 1985b) have been fully met. Furthermore, with the new information available on the genetics of some populations, the loss of one of the few remaining populations would not only move the subspecies further toward extinction but could also result in the extinction of an entirely different, although as yet undescribed, subspecies or species. Based on these ongoing threats and the small number and isolation of existing populations, the 5-year review concludes that the unarmored threespine stickleback continues to be threatened with extinction throughout all or a significant portion of its range.

Tidewater Goby

The tidewater goby was listed as endangered on March 7, 1994 (59 FR 5494). On June 24, 1999, the Service proposed to remove the populations occurring north of Orange County, California, from the endangered species list (64 FR 33816). In November 2002, the Service withdrew this proposed delisting rule and determined it appropriate to retain the tidewater goby's listing as endangered throughout its range (67 FR 67803). A recovery plan for the tidewater goby was completed on December 12, 2005 (Service 2005). A 5-year review for the tidewater goby was completed in September 2007 (Service 2007a). Unless otherwise noted, information in the following species account is summarized from the following sources: Wang (1982), Irwin and Soltz (1984), Lafferty et al. (1999a, 1999b), Swift et al. (1989, 1993, 1997), Worcester (1992), Swenson (1995, 1999), and Swenson and McCray (1996).

The tidewater goby is endemic to California and typically inhabits coastal lagoons, estuaries, and marshes, preferring relatively low salinities of approximately 12 parts per thousand (ppt). Tidewater goby habitat is characterized by brackish estuaries, lagoons, and lower stream reaches where the water is fairly still but not stagnant. They tend to be found in the upstream portions of

lagoons. Tidewater gobies can withstand a range of habitat conditions and have been documented in waters with salinity levels that range from 0 to 42 ppt, temperatures from 46 to 77 degrees Fahrenheit, and depths from approximately 10 inches to 6.5 feet.
The tidewater goby is primarily an annual species in central and southern California, although some variation in life history has been observed. If reproductive output during a single season fails, few (if any) tidewater gobies survive into the next year. Reproduction typically peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and amount of rainfall. Males begin the breeding ritual by digging burrows (3 to 4 inches deep) in clean, coarse sand of open areas. Females then deposit eggs into the burrows, averaging 400 eggs per spawning effort. Males remain in the burrows to guard the eggs. They frequently forego feeding, which may contribute to the mid-summer mortality observed in some populations. Within 9 to 10 days, larvae emerge and are approximately 0.20 to 0.27 inch in length. Tidewater gobies live in vegetated areas in the lagoon until they are 0.60 to 0.70 inch long. When they reach this life stage, they become substrate-oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events. Vegetation is critical for over-wintering tidewater gobies because it provides refuge from high water flows.

Tidewater gobies feed on small invertebrates, including mysids, amphipods, ostracods, snails, aquatic insect larvae, and particularly chironomid larvae. Tidewater gobies of less than 0.30 inch in length probably feed on unicellular phytoplankton or zooplankton, similar to many other early stage larval fishes.

Historically, the tidewater goby occurred in at least 135 California coastal lagoons and estuaries from Tillas Slough near the Oregon border south to Agua Hedionda Lagoon in northern San Diego County. The southern extent of its distribution has been reduced by approximately 8 miles. The species is currently known to occur in about 112 locations, although the number of sites fluctuates with climatic conditions. Currently, the most stable populations are in lagoons and estuaries of intermediate size (5 to 124 acres) that are relatively unaffected by human activities. Six regional clades based on morphological differences (Ahnelt et. al. 2004) that are supported by genetic work done by Dawson et al. (2001) have been used to define recovery units for the tidewater goby (Service 2005). There are 26 recovery sub-units described in the recovery plan for the tidewater goby (Service 2005).

Tidewater gobies enter the marine environment when sandbars are breached during storm events. The species' tolerance of high salinities (up to 60 ppt) for short periods of time enables it to withstand marine environment conditions where salinities are approximately 35 ppt, thereby allowing the species to re-establish or colonize lagoons and estuaries following flood events. However, genetic studies indicate that individual populations rarely have contact with other populations so natural recolonization may be rare. In Santa Barbara County during the fall of 1994, tidewater gobies were reported as common in the Santa Ynez River 4 miles upstream from the lagoon (Swift et al. 1997); however, by January 1995, they were absent at the upstream sites.

Tidewater gobies that are found upstream of lagoons in summer and fall tend to be juveniles. The highest densities of tidewater gobies are typically present in the fall.

Native predators are not known to be important regulators of tidewater goby population size in the lagoons of southern California. Rather, population declines are attributed to environmental conditions. During high flows, streams flood and breach lagoon barriers creating strong tidal conditions. As a result, tidewater goby populations plummet. Populations typically recover quickly in summer, with recorded mean densities of 54 to 323 fish per square foot. Tidewater goby densities are greatest among emergent and submerged vegetation (Moyle 2002).

The decline of the tidewater goby is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands. Some extirpations are believed to be related to pollution, upstream water diversions, and the introduction of non-native predatory fish species (most notably, centrarchid sunfish and bass (*Micropterus* spp.)). These threats continue to affect some of the remaining populations of tidewater gobies.

Recovery Plan for the Tidewater Goby

The 2005 final recovery plan for the tidewater goby states that the goal of recovery efforts is the reclassification of the species from endangered to threatened and, ultimately, delisting of the species. The recovery plan states that reclassification to threatened status may be considered when: 1) Specific threats to each metapopulation, such as habitat destruction and alteration (e.g., coastal development, upstream diversion, channelization of rivers and streams, discharge of agriculture and sewage effluents), introduced predators (e.g., centrarchid fishes), and competition with introduced species (e.g., yellowfin and chameleon gobies), have been addressed through the development and implementation of individual management plans that cumulatively cover the full range of the species; and 2) A metapopulation viability analysis based on scientifically credible monitoring over a 10-year period indicates that each Recovery Unit is viable. The target for downlisting is for individual Sub-Units within each Recovery Unit to have a 75 percent or better chance of persistence for a minimum of 100 years. Specifically, the target is for at least 5 Sub-Units in the North Coast Unit, 8 Sub-Units in the Greater Bay Unit, 3 Sub-Units in the Central Coast Unit, 3 Sub-Units in the Conception Unit, 1 Sub-Unit in the Los Angeles/Ventura Unit, and 2 Sub-Units in the South Coast Unit to individually have a 75 percent chance of persisting for 100 years.

The recovery plan states that delisting of the tidewater goby may be considered when: (1) downlisting criteria have been met; and (2) A metapopulation viability analysis projects that all recovery units are viable, as in the downlisting criterion except that the target for Sub-Units is a 95 percent probability of persistence for 100 years.

5-Year Review for the Tidewater Goby

The 5-year review for the tidewater goby states that the recovery plan reflects up-to-date information; however, the 5-year review reconsiders the downlisting and delisting criteria in the recovery plan. The 5-year review states that other, currently available information on the species

may also be used to determine the appropriate listing of the species under the Act. These include the current number of occupied localities, current laws and regulations that act to protect the species, and our current understanding of threats and their impact on the tidewater goby. The 5-year review recommends that we reclassify the tidewater goby from endangered to threatened because we concluded that the species is not in imminent danger of extinction. The main reason for this recommendation was that the number of localities known to be occupied had more than doubled since listing. The 5-year review also concluded that the tidewater goby may be more resilient in the face of severe drought events than believed at the time of listing. The 5-year review also states that threats identified at the time of listing had been reduced or are not as serious as thought. Although numerous threats to the tidewater goby have been identified (e.g., non-native predation and competition, pollution, cattle grazing), information on the degree of impact these threats may have on tidewater gobies is generally lacking. According to the 5-year review, the increase in occupied localities indicates that these threats appear to not be having a major impact on the tidewater goby.

On May 18, 2010, we received a petition dated May 13, 2010, from The Pacific Legal Foundation**,** requesting that the tidewater goby be reclassified as threatened under the Act. Included in the petition was reference to the 5-year review of the tidewater goby's status published by the Service in 2007. We published a 90-day finding on January 19, 2011 (76 FR 3069), that stated our conclusion that the petition presented substantial scientific or commercial information indicating that the petitioned action (reclassification of the tidewater goby) may be warranted. We will announce a 12-month finding on the petition to reclassify the tidewater goby as threatened under the Act in 2013.

El Segundo Blue Butterfly

The El Segundo blue butterfly was federally listed as endangered on June 1, 1976 (Service 1976). We issued a recovery plan for the El Segundo blue butterfly on September 28, 1998 (Service 1998). A 5-year review for the El Segundo blue butterfly was completed in March 2008 (Service 2008). The El Segundo blue butterfly is in the family Lycaenidae. It is one of five subspecies comprising the polytypic species, square-spotted blue butterfly *(Euphilotes battoides)*. Like all species in the genus *Euphilotes*, the El Segundo blue butterfly spends its entire life cycle in intimate association with a species of buckwheat, in this case coast buckwheat (*Eriogonum parvifolium*). However, the nearly complete association of all life stages with a single plant is unique among North American butterflies. El Segundo blue butterfly adults mate, nectar, lay eggs, perch, and in most cases probably die on flower heads (Mattoni 1990).

The adult stage of the El Segundo blue butterfly begins in early June and concludes in early to mid-September. The onset of this stage is closely synchronized with the beginning of the flowering season for coast buckwheat (Mattoni 1990). Typically, adult females survive up to 2 weeks whereas a male may survive up to 7 days (G. Pratt, Department of Entomology, University of California Riverside, pers. comm. 2006a). Upon emergence as adults, females fly to coast buckwheat flower heads where they mate with males that are constantly moving among flower heads (Service 1998). Eggs hatch within 3 to 5 days. The larvae then undergo four instars to complete growth, a process that takes 18 to 25 days (Service 1998). By the third instar,

the larvae develop honey glands, and are thereafter usually tended by ants (e.g., *Iridiomyrmex humilis*, *Conomyrmex* spp.), which may protect them from parasitoids (e.g., Branchoid wasp (*Cortesia* spp.)) and small predators (Mattoni 1990). The larvae remain concealed within flower heads and initially feed on pollen, then switch to feeding on seeds sometime during the first and second instar (Pratt, pers. comm. 2006a). Larvae are highly polymorphic, varying from almost pure white or yellow to strikingly marked individuals with a dull red-to-maroon background broken by a series of yellow or white dashes (Mattoni 1990). By September, coast buckwheat plants have generally senesced and the larvae fall or crawl to the ground and diapause in the soil. They emerge as adults the following June. Some pupae may remain in diapause for 2 or more years (Service 1998). At least 0.5 inch of rain must penetrate the soil to accumulate enough moisture for the pupae to undergo a life stage change (Pratt, pers. comm. 2006a).

Population dynamics of this species are closely allied with the coast buckwheat. Although individual buckwheat plants may live 20 years or more, young plants generally do not flower until their second year of growth (Arnold and Goins 1987). Younger and older plants do not produce as many flowers as middle-aged buckwheat plants, which support the most El Segundo blue butterflies (Arnold and Goins 1987). Field observations suggest that most solitary buckwheat plants less than about 5 years of age do not produce enough flowers for larvae to effectively utilize them (Arnold 1983). Therefore, survival of the El Segundo blue butterfly is dependent upon maintenance of middle-aged buckwheat plants, plus recruitment of younger plants to replace older individuals that senesce (Arnold 1983).

The range of coast buckwheat is greater than the known range of the El Segundo blue butterfly; coast buckwheat occurs from San Diego County to the northern end of Monterey County (Pratt, pers. comm. 2006b). However, the southern extent of the El Segundo blue butterfly's known distribution is Malaga Cove in Los Angeles County; before 2005 when the butterfly was discovered in Santa Barbara County, the northern extent of the subspecies' known distribution was the Ballona Wetlands, which is also in Los Angeles County. The El Segundo blue butterfly appears further limited to areas with high sand content (Service 1998).

In general, the El Segundo blue butterfly is negatively impacted by its host plants' competition with non-native vegetation; competition, predation, and parasitism by other insects utilizing coast buckwheat; and habitat fragmentation. Relatively fast-growing exotics such as acacia (*Acacia* spp.), iceplant, other buckwheat species (*Eriogonum* spp.), and non-native grasses compete with coast buckwheat by inhibiting seedlings from sprouting and maturing to juveniles (Mattoni 1990). Pratt (1987) observed numerous insects living in coast buckwheat inflorescences along with El Segundo blue butterfly larvae, including larvae in the families of Cochylidae, Gelechiidae, Geometridae, Riodinidae, and even other Lycaenidae.

Habitat fragmentation is detrimental to small, isolated populations and produces edge effects that facilitate the introduction of invasive plant species that can out-compete and displace coast buckwheat. Urbanization and land conversion have fragmented the historic range of the El Segundo blue butterfly such that extant populations now operate as independent units rather than parts of a metapopulation or a single, cohesive, wide-ranging population. Small populations

have higher probabilities of extinction than larger populations because their low abundance renders them susceptible to inbreeding, loss of genetic variation, high variability in age and sex ratios, demographic stochasticity, and other random, naturally occurring events such as droughts or disease epidemics (Soulé 1987). Isolated populations are more susceptible to elimination by stochastic events because the likelihood of recolonization following such events is negatively correlated with the extent of isolation (Wilcox and Murphy 1985).

For several decades following the subspecies' description, the El Segundo blue butterfly was presumed to be endemic to southwestern Los Angeles County in coastal southern California. Museum records reveal that the El Segundo blue butterfly was once widespread on the El Segundo sand dunes and specimens were collected at El Segundo, Redondo Beach, Manhattan Beach, and at several locations on the Palos Verdes peninsula (Donahue 1975). Until their discovery at VAFB, populations were currently known to survive at four locations in Los Angeles County: the Ballona Wetlands, the Airport Dunes, the Chevron Preserve, and Malaga Cove. Four recovery units, based on geographic proximity, habitat similarity, and possible genetic exchange, encompass these areas with the known populations and (or) areas with restorable habitat (Service 1998).

Population in Santa Barbara County

The El Segundo blue butterfly was reported to occur at VAFB in 2005 by Dr. Gordon Pratt and by Dr. Pratt and Dr. Richard Arnold in 2007 (Pratt, pers. comm. 2006a; E. Bell, Vandenberg Air Force Base biologist, pers. comm. 2007), although it is not clear whether the individuals observed at VAFB are actually the El Segundo blue butterfly or a morphologically similar species. Clarifying the taxonomic status of these populations is not trivial as *Euphilotes* is a diverse genus with known cryptic speciation (i.e., some species are very similar morphologically) (Mattoni 1988). Wing characters are notoriously unreliable due to individual variability, so single individuals usually cannot be confidently determined without other clues such as location, flight season, and larval host plant (G. Ballmer, Department of Entomology, University of California Riverside, pers. comm. 2006). Given the geographic separation between VAFB and the El Segundo Dunes (approximately 120 miles) and the relatively limited dispersal capability of El Segundo blue butterflies, it is possible that the butterflies observed at VAFB are not El Segundo blue butterflies but rather an undescribed species. Conversely, it is also possible that suitable habitat for the El Segundo blue butterfly was once contiguous from the El Segundo sand dunes to Santa Barbara County and has been displaced in some areas by development and other anthropogenic causes resulting in a disjunction in the species' distribution. Based on wing morphology, flight period, genitalia, and host plant association; these individuals were determined to be more similar to the El Segundo blue butterfly than to any other known *Euphilotes battoides* group taxon (Ballmer, pers. comm. 2006; Pratt, pers. comm. 2006c).

Butterflies in the genus *Euphilotes* can be very similar morphologically yet significantly different genetically (Mattoni 1990; Pratt 1994). Individual male butterflies were collected from VAFB to compare the genetic signatures with known El Segundo blue butterflies (Pratt and Stouthamer 2008). We have reviewed the results of the genetic study and determined that the resulting information was not conclusive enough to make a determination that the butterfly in question is

not the El Segundo blue butterfly. Therefore, we consider this species to be the El Segundo blue butterfly until we receive definitive information demonstrating otherwise.

Based on surveys conducted at VAFB in 2010, the Air Force observed 361 El Segundo blue butterflies; 217 on North Base and 145 on South Base. In 2009, 329 butterflies were observed; 154 on North Base and 175 on South Base. Arnold (1986) conducted capture-recapture studies in Los Angeles County and reported that the majority of El Segundo blue butterflies moved 100 feet or less between captures; 79 percent and 87 percent for females and males, respectively. Approximately 93 percent of females and males moved 200 feet or less, and only 3 percent of females and 4 percent of males moved more than 500 feet. The farthest distance moved by any individual butterfly was approximately 7,200 feet (1.36 miles). Based upon the most recent survey data from 2011, and taking into account that the vast majority of individual El Segundo blue butterflies move 200 feet or less, calculating a 200-foot buffer around each known occupied location produces a figure of approximately 1,004 acres of known occupied habitat at VAFB.

Notably, the 200-foot buffer was derived from studies at the Chevron Refinery in El Segundo. This preserve is 1.5 acres and is completely surrounded by urban areas. The area contains high concentrations of coast buckwheat plants that grow in close proximity to one another. Therefore, the adult butterflies would not have to disperse very far to locate suitable buckwheat flower heads. In contrast, the preserve at the Los Angeles International Airport is 200 acres and contains widely scattered coast buckwheat plants. At this site, El Segundo blue butterflies were detected dispersing up to 1.4 miles. Additionally, adult butterflies dispersed up to 0.5 mile from occupied locations to colonize restoration sites in Los Angeles and Redondo Beach. Because the El Segundo blue butterfly has been observed to disperse farther distances in larger areas that contain more widely scattered plants, such as VAFB, the 200-foot buffer may represent the lower end of the dispersal distance capability of the El Segundo blue butterfly (Air Force 2010).

Surveys were also conducted within habitat accessible to the public outside of VAFB. These sites included Sweeney and Santa Rosa Roads in Lompoc. The butterflies observed were morphologically consistent with the El Segundo blue butterfly and were found in association with flowering coast buckwheat stands. Subsequently, both Dr. Richard Arnold and Dr. Gordon Pratt determined these butterflies to be the El Segundo blue butterfly through examination of genitalia. A total of 18 El Segundo blue butterflies and approximately 26 acres of occupied habitat were documented in these areas.

Recovery Plan for the El Segundo Blue Butterfly

The recovery plan for the El Segundo blue butterfly (Service 1998) was written prior to the discovery of the species on VAFB, so the base is not considered in the plan. The overall goals of recovery are applicable, however. According to the recovery plan (Service 1998), the El Segundo blue butterfly can be considered for downlisting to threatened status when:

1. At least one secure population in each of the four Recovery Units (RUs) -Ballona, Airport, El Segundo, and Torrance - are permanently protected. The Airport Dunes (Napoleon Street and Waterview Street to the north, Vista del Mar to the west, Pershing Drive to the east, and

Imperial Highway to the south) located in the Airport RU contains the largest population of the butterfly and is the most likely one that can survive disease, predators, parasites, and other perturbations. The Airport Dunes must be one of the protected populations.

2. Each of the four populations are managed to maintain coastal dune habitat dominated by local native species including coast buckwheat.

3. As determined by a scientifically credible monitoring plan, each of the four populations must exhibit a statistically significant upward trend (based on transect counts) for at least 10 years (approximately 10 butterfly generations). Population management in each Recovery Unit must ensure that discrete population growth rates (lambdas) are maintained at or above 1.0, indicating a stable or increasing population.

4. A program is initiated to inform the public about the El Segundo blue butterfly and its habitat.

5-Year Review for the El Segundo Blue Butterfly

The 5-year review for the El Segundo blue butterfly states that the subspecies continues to be threatened by: habitat degradation, habitat fragmentation; introduction of parasitic, competing and predatory insect species; and stochastic extinction. Because of the recent success of habitat restoration efforts, we believe the recovery potential for this subspecies has improved. Based on these ongoing threats and the small number and isolation of existing populations, the 5-year review concludes that the El Segundo blue butterfly continues to be threatened with extinction throughout all or a significant portion of its range.

Western Snowy Plover

The Pacific coast population of the western snowy plover was federally listed as threatened on March 5, 1993 (58 FR 12864). We issued a recovery plan for the western snowy plover in September 2007 (Service 2007b). A 5-year review for the western snowy plover was completed in May 2006 (Service 2006b).

The western snowy plover, a small shorebird in the family Charadriidae, weighs from 1.2 to 2 ounces and ranges in length from 5.9 to 6.6 inches (Page et al. 1995). It is pale gray-brown above and white below, with a white hindneck collar and dark lateral breast patches, forehead bar, and eye patches. The bill and legs are blackish. In breeding plumage, males usually have black markings on the head and breast; in females, usually one or more of these markings are dark brown. Early in the breeding season, a rufous crown may be evident on breeding males, but it is not typically seen on females. In non-breeding plumage, sexes cannot be distinguished because the breeding markings disappear. Fledged juveniles have buffy edges on their upper parts and can be distinguished from adults until approximately July through October, depending on when in the nesting season they hatched. After this period, molt and feather wear makes fledged juveniles indistinguishable from adults. Individual birds 1 year or older are considered to be breeding adults. The mean annual life span of western snowy plovers is estimated at about 3 years, but at least one individual was at least 15 years old when last seen (Page et al. 1995).

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California. Prior to 1970, western snowy plovers bred at 53 coastal locations in California. Between 1970 and 1981, western snowy plovers stopped breeding in parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County (Page and Stenzel 1981). In 2007, there were two nesting attempts documented on Los Angeles County beaches (SWCA 2007).
The current Pacific Coast population of the western snowy plover is sparse in Washington, Oregon, and northern California. In 2006, estimated populations were 70 adults along the Washington coast (Pearson et al. 2006), 177 to 179 adults along coastal Oregon (Lauten et al. 2006), and 2,231 adults in coastal California and San Francisco Bay (window survey including correction factor) (Page 2006, Service 2007b). The California population of western snowy plovers comprises at least 90 percent of the listed Pacific Coast population. Eight geographic areas support over three-quarters of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island (Page et al. 1991).

The Pacific Coast population of western snowy plovers nests near tidal waters along the mainland coast and offshore islands from Damon Point, Washington, to Bahía Magdelena, Baja California, Mexico. Most nesting occurs on unvegetated to moderately vegetated, dune-backed beaches and sand spits. Other less common nesting habitats include salt pans, dredge spoils, and salt pond levees. Nests consist of a shallow scrape or depression, sometimes lined with beach debris (e.g., small pebbles, shell fragments, plant debris, and mud chips); nest lining increases as incubation progresses. Nests are usually located within 328 feet of water, but can be farther away when there is no formative vegetative barrier between the nest and water (Page and Stenzel 1981). The majority of western snowy plovers are site-faithful (returning to the same breeding area in subsequent breeding seasons); some also disperse within and between years (Warriner et al. 1986, Stenzel et al. 1994).

The nesting season of the western snowy plover extends from early March through late September. Generally, the breeding season may be 2 to 4 weeks earlier in southern California than in Oregon and Washington. The earliest nests on the California coast occur during the first week of March in some years and by the third week of March in most years (Page et al. 1995). Peak initiation of nesting is from mid-April to mid-June (Warriner et al. 1986; Powell et al. 1997). On the Oregon coast, nesting may begin as early as mid-March, but most nests are initiated from mid-April through mid-July (Wilson-Jacobs and Meslow 1984). Peak nest initiation occurs from mid-May to early July (Stern et al. 1990). On the Washington coast, most adults arrive during late April, with maximum numbers present from mid-May to late June. The typical clutch size of western snowy plovers is three with a range from two to six (Warriner et al. 1986, Page et al. 1995). Both sexes incubate the eggs, which take about 27 days to hatch, with the female tending to incubate during the day and the male at night (Warriner et al. 1986). After losing a clutch or brood or successfully hatching a nest, western snowy plovers may re-nest at the same site or move up to several hundred miles to nest at other sites (Stenzel et al. 1994,

Powell et al. 1997). Re-nesting occurs 2 to 14 days after failure of a clutch, and up to five re-nesting attempts have been observed for a pair (Warriner et al. 1986).

Western snowy plover chicks are precocial (capable of a high degree of independence from birth), feeding on their own within hours of hatching. However, they are unable to fly until 1 month after hatching. Females generally desert males and broods by the sixth day, and thereafter the chicks are typically accompanied by only males. Females obtain new mates and initiate new nests while males rear the broods (Page et al. 1995).

Western snowy plovers are primarily visual foragers, using the run-stop-peck method of feeding typical of *Charadrius* species. They forage on invertebrates in the wet sand and amongst surf-cast kelp within the intertidal zone, in dry sand areas above the high tide, on salt pans, on spoil sites, and along the edges of salt marshes, salt ponds, and lagoons. Western snowy plovers sometimes probe for prey in the sand and pick insects from low-growing plants. Their food sources consist of immature and adult forms of aquatic and terrestrial invertebrates. Little quantitative information is available on food habits. The recovery plan (Service 2007b) identifies specific prey items, including beach hoppers (*Orchestoidea* spp.), for coastal western snowy plovers.

In western North America, the western snowy plover winters mainly in coastal areas from southern Washington to Central America (Page et al. 1995); however, the majority of birds winter south of Bodega Bay, California (Page et al. 1986). In winter, western snowy plovers are found on many of the beaches used for nesting, as well as some beaches where they do not nest. They also occur in man-made salt ponds and on estuarine sand and mud flats. In California, the majority of wintering western snowy plovers assemble on sand spits and dune-backed beaches. Some also occur on urban and bluff-backed beaches, which are rarely used for nesting (Page et al. 1986). Western snowy plovers that breed on the coast and inland are very site-faithful in winter.

Western snowy plover habitat is subject to erosion and accretion and is highly susceptible to degradation by mechanized beach cleaning; construction of seawalls, breakwaters, jetties, piers, homes, hotels, parking lots, access roads, trails, bike paths, day-use parks, marinas, ferry terminals, recreational facilities, and support services that may cause direct and indirect losses of breeding and wintering habitat for the western snowy plover. Urban development has permanently eliminated valuable nesting habitat on beaches in southern Washington (Brittell et al. 1976), Oregon (Oregon Department of Fish and Wildlife 1994), and California (Page and Stenzel 1981). Increased development increases human use of the beach, thereby increasing disturbance to nesting plovers. Human activities such as walking, jogging, fishing, fireworks, unleashed pets, horseback riding, and off-road vehicles can destroy the western snowy plover's cryptic nests and chicks.

In addition to causing direct loss of habitat, urban development can result in additional adverse impacts to western snowy plovers. Human activities can interfere with foraging activities by disrupting the ability of adults and chicks to get to the wet beach to feed and return to the dunes

or their nest (Burger and Fry 1993). Chicks can also become separated from their parents as a result of human disturbance of broods. Such disturbance could cause or contribute to chick mortality by interfering with essential chick-rearing behaviors or by causing intolerable stresses directly to the chicks (Cairns and McLaren 1980). For example, separation of chicks and their parent can lead to lethal exposure to wind and cold temperatures or disturbance that interferes with foraging could result in the starvation of western snowy plover chicks. In some instances, disturbance associated with these types of recreational activities is expected to temporarily flush western snowy plovers and not affect the birds in such a substantial manner. In other cases, such disturbance could interfere with the metabolism and thermoregulation of western snowy plover chicks and migrating or wintering adults such that they starve or egg production is impaired during the subsequent nesting season (Cairns 1982). The available information regarding the energetics of western snowy plovers is inadequate to assess the likelihood that such injury or mortality would result.

As has been shown with piping plovers (*Charadrius melodus*), a species that is behaviorally and ecologically similar to the western snowy plover, kites flown by people may be perceived as potential predators by western snowy plovers. Stunt kites may cause a greater response from western snowy plovers than traditional, more stationary kites. Hoopes et al. (1992) found that piping plovers responded to kites at an average distance of 279 feet, moved an average distance of over 328 feet, and responded for an average duration of 70 seconds. At Ocean Beach in San Francisco, California, western snowy plovers' reaction to kites ranged from increased vigilance while roosting in close proximity to the kite flying to walking or running approximately 33 to 82 feet away and resting again while remaining alert (Hatch 1997). Other kite-like instruments or sails, such as parachutes used to wind-surf or para-surf, can have the same adverse effect on western snowy plovers as kites, especially if parachutes are raised over the beach or in the surf near the shoreline.

West Nile virus, a mosquito-borne disease which can infect birds, reptiles, and mammals, has spread rapidly across the United States from the initial introduction in New England (National Audubon Society 2006). In 2004 to 2006 the disease was reported from two coastal counties (Lane and Lincoln) in Oregon but has not been reported from any coastal counties in Washington (U.S. Geological Survey 2006). The virus has been identified in dead piping plovers and killdeer (*Charadrius vociferus*), both of which are closely related to the western snowy plover (Center for Disease Control 2004).

Predator density is an important factor affecting the quality of western snowy plover nesting habitat (Stenzel et al. 1994). The presence of humans near western snowy plover nesting areas can increase the presence of predators due to improper disposal of trash. Predation can result in the loss of adults, chicks, or eggs. Predators can also separate chicks from adults, which can lead to chick mortality. Predation by both native and nonnative species limits western snowy plover reproductive success at many Pacific coast sites. Nonnative predators include eastern red foxes (*Vulpes vulpes regalis*), domestic and feral dogs, and Virginia opossums. Coyotes, American crows, common ravens, American kestrels, loggerhead shrikes, and several gull species (*Larus* spp.) are native predators of the western snowy plover. Domestic and feral cats are widespread

predators. The threat of predation by domestic cats intensifies when housing is constructed near western snowy plover breeding habitat. In addition, unnatural habitat features such as landscaped vegetation (e.g., palm trees), telephone poles, transmission towers, fences, buildings, and landfills near western snowy plover nesting areas attract predators (Service 2007b).

One of the most dramatic causes of habitat loss for coastal breeding western snowy plovers has been the encroachment of introduced European beachgrass (*Ammophila arenaria*) and American beachgrass (*Ammophila breviligulata*). European beachgrass was introduced to the west coast around 1898 to stabilize dunes (Wiedemann 1987); it has spread up and down the coast and now is found from British Columbia, Canada, to Ventura County in southern California. American beachgrass is native to the East Coast and the Great Lakes region. Currently, American beachgrass is the dominant introduced beachgrass species in much of the western snowy plover's range in the State of Washington (Seabloom and Wiedemann 1994).

In addition to the loss of nesting habitat, introduced beachgrass may adversely affect western snowy plover food sources. Slobodchikoff and Doyen (1977) found that beachgrass markedly depressed the diversity and abundance of sand-burrowing arthropods at coastal dune sites in central California. The beachgrass communities may also provide habitat for western snowy plover predators that historically would have been largely precluded by the lack of cover in the dune community (Stern et al. 1991).

Other nonnative plant species that have invaded coastal dunes, thereby reducing western snowy plover breeding habitat, include Scotch broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), South African iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia selloana*), jubata grass (*Cortaderia jubata*), and iceplant (*Mesembryanthemum* sp.). Shore pine (*Pinus contorta*) is a native plant species that has invaded coastal dunes and resulted in similar impacts to western snowy plovers (Schwendiman 1975, California Native Plant Society 1996, Powell 1996). Many nonnative weed species also occur on and along San Francisco Bay salt pond levees, resulting in unsuitable nesting habitat for western snowy plovers (Service 2007b).

The Pacific Coast population of western snowy plovers has experienced widespread loss of nesting habitat and reduced reproductive success at many nesting locations. The reasons for the decline and degree of threats vary by geographic location; however, the primary threat is habitat destruction and degradation. Habitat loss and degradation can be primarily attributed to human disturbance, urban development, introduced beachgrass, and expanding predator populations. Natural factors, such as inclement weather, have also affected the quality and quantity of western snowy plover habitat (58 FR 12864).

Recovery Plan for the Western Snowy Plover

The 2007 final recovery plan for the western snowy plover states that the goal of recovery efforts is to remove the western snowy plover from the list of endangered and threatened wildlife and plants by: (1) increasing population numbers distributed across the range of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy

plover populations and threats to determine success of recovery actions and refine management actions. The species would be considered for delisting when:

1. An average of 3,000 breeding adults has been maintained for 10 years, distributed among 6 recovery units as follows: Washington and Oregon, 250 breeding adults; Del Norte to Mendocino counties, California, 150 breeding adults; San Francisco Bay, California, 500 breeding adults; Sonoma to Monterey counties, California, 400 breeding adults; San Luis Obispo to Ventura counties, California, 1,200 breeding adults; and Los Angeles to San Diego counties, California, 500 breeding adults. This criterion also includes implementing monitoring of site-specific threats, incorporation of management activities into management plans to ameliorate or eliminate those threats, completion of research necessary to modify management and monitoring actions, and development of a post-delisting monitoring;

2. A yearly average productivity of at least one (1.0) fledged chick per male has been maintained in each recovery unit in the last 5 years prior to delisting; and

3. Mechanisms have been developed and implemented to assure long-term protection and management of breeding, wintering, and migration areas to maintain the subpopulation sizes and average productivity specified in Criteria 1 and 2. These mechanisms include establishment of recovery unit working groups, development and implementation of participation plans, development and implementation of management plans for Federal and State lands, protection and management of private lands, and public outreach and education.

5-Year Review for the Western Snowy Plover

The 5-year review for western snowy plover states that the subspecies continues to be threatened by: habitat loss and fragmentation; mortalities, injuries, and disturbance resulting from human activities; and lack of comprehensive State and local regulatory mechanisms throughout its range. Although overall increases in western snowy plover numbers, which can be attributed to management actions currently being implemented, have been observed, western snowy plover populations sizes are low or they are absent throughout parts of their historical range in Washington, Oregon, and California. Based on these ongoing threats, the 5-year review concludes that the western snowy plover continues to qualify as a threatened species under the Act.

California Red-legged Frog

The California red-legged frog was federally listed as threatened on May 23, 1996 (Service 1996). The Service completed a recovery plan for the species in 2002 (Service 2002). A 5-year review for the California red-legged frog has not been completed. The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Storer 1925). The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Historically, this subspecies was found throughout the Central Valley and Sierra Nevada foothills. Four additional occurrences have been recorded in the Sierra Nevada foothills since listing, bringing the total to five extant

populations, compared to approximately 26 historical records (71 FR 19244). Currently, California red-legged frogs are known from three disjunct regions in 26 California counties and one region in Baja California, Mexico (Grismer 2002; Fidenci 2004; and R. Smith and D. Krofta, in litt. 2005).

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. The diet of California red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food item of adults. Vertebrates, such as Pacific chorus frogs (*Pseudacris regilla*) and California mice (*Peromyscus californicus*), represented over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juveniles to be active diurnally and nocturnally, whereas adults were largely nocturnal.

California red-legged frogs breed from November through March; earlier breeding has been recorded in southern localities (Storer 1925). Males appear at breeding sites from 2 to 4 weeks before females (Storer 1925). Female California red-legged frogs deposit egg masses on emergent vegetation so that the masses float on the surface of the water (Hayes and Miyamoto 1984). Egg masses contain about 2,000 to 5,000 moderately-sized, dark reddish brown eggs (Storer 1925, Jennings and Hayes 1985). Eggs hatch in 6 to 14 days (Storer 1925). Larvae undergo metamorphosis for 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949). Sexual maturity can be attained at 2 years of age by males and 3 years of age by females (Jennings and Hayes 1985); adults may live 8 to 10 years (Jennings et al. 1992) although the average life span is considered to be much lower. The California red-legged frog is a relatively large aquatic frog ranging from 1.5 to 5 inches from the tip of the snout to the vent (Stebbins 2003).

California red-legged frogs breed in aquatic habitats. Tadpoles, juveniles, and adults have been collected from streams, creeks, ponds, marshes, plunge pools and backwaters of streams, dune ponds, lagoons, and estuaries. California red-legged frogs frequently breed in artificial impoundments such as stock ponds, if conditions are appropriate. Although California red-legged frogs successfully breed in streams and riparian systems, high seasonal flows and cold temperatures in streams often make these sites risky environments for eggs and tadpoles. The importance of riparian vegetation for this species is not well understood. When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding.

Juvenile and adult California red-legged frogs may disperse long distances from breeding sites throughout the year. They can be encountered living within streams at distances exceeding 1.8 miles from the nearest breeding site, and have been found up to 400 feet from water in adjacent dense riparian vegetation (Bulger et. al 2003). During periods of wet weather, starting with the first rains of fall, some individuals may make overland excursions through upland habitats. Most of these overland movements occur at night. Bulger et al. (2003) found marked California red-

legged frogs in Santa Cruz County making overland movements of up to 2 miles over the course of a wet season. These individual frogs were observed to make long-distance movements that are straight-line, point to point migrations over variable upland terrain rather than using riparian corridors for movement between habitats. For the California red-legged frog, suitable habitat is considered to include all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture (Service 1996).

Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog, catfish (*Ictalurus* spp.), bass, mosquitofish, red swamp crayfish, and signal crayfish (*Pacifasticus leniusculus*).

An additional threat affecting amphibians worldwide is the chytrid fungus *Batrachochytrium dendrobatidis*. *Batrachochytrium dendrobatidis* causes chytridiomycosis, a skin disease that has been found to disrupt osmoregulatory function in the skin of amphibians, resulting in an imbalance of electrolytes and death (Voyles et al. 2009). Chytridiomycosis in amphibians may be marked by deformed mouthparts in tadpoles, wherein most infected tadpoles will die at metamorphosis (Service 2002). Infected boreal toads (*Anaxyrus boreas boreas*) showed few clinical signs of the disease but many appeared weak or lethargic, exhibited excessive shedding of skin and were reluctant to flee at the approach of humans (U.S. Geological Service 2000, as cited in Service 2002). Chytrid fungi are widespread in the environment where they act as decomposers of keratin, chitin, cellulose, and other plant material, and are known parasites of fungi, algae, higher plants, protozoa, invertebrates, and most recently in vertebrates. Chytrid fungi reproduce asexually by means of minute, fragile, motile spores, and are probably spread directly from amphibian to amphibian in water. These fungi most likely move from one water source to another on migrating amphibians, waterbirds, or flying insects (Service 2002).

Since its discovery in 1998, chytrid fungus has likely been responsible for die-offs of a number of amphibian species, including remaining populations of the endangered boreal toad in the southern Rocky Mountains, and Chiricahua leopard frogs (*Rana chiricahuensis*) in Arizona (Colorado Herpetological Society 2000, as cited in Service 2002). Occurrences of infection have been observed in two amphibian species in the Sierra Nevada, the mountain yellow-legged frog (*Rana muscosa*) and the Yosemite toad (*Bufo canoris*). An infected California red-legged frog tadpole was collected in Calabasas Pond on the Ellicott Slough National Wildlife Refuge in Santa Cruz County (Service 2002).

The chytrid fungus is now recognized for its ability to spread quickly through amphibian populations and infect numerous species, causing high rates of mortality, and persisting at low host densities (Voyles et al. 2009). These recent findings validate the importance of taking precautions to prevent the spread of chytrid fungus or any disease agent into and/or between amphibian populations. It is considered a threat to California red-legged frog populations.

Recovery Plan for the California Red-Legged Frog
According to the recovery plan for the California red-legged frog, the strategy for the species' recovery involves: (1) protecting existing populations by reducing threats; (2) restoring and creating habitat that will be protected and managed in perpetuity; (3) surveying and monitoring populations and conducting research on the biology and threats to the species; and (4) reestablishing populations of the species within its historical range (Service 2002).

The recovery plan for the California red-legged frog identifies eight recovery units. These recovery units are based on the Recovery Team's determination that various regional areas of the species' range are essential to its survival and recovery. The recovery status of the animal is considered within the scale of Recovery Units as opposed to the overall range. Because of the varied status of this species and differing levels of threats throughout its range, recovery strategies differ per recovery unit to best meet the goal of delisting the species. For example, in areas where California red-legged frog populations appear to be stable, recovery strategies are intended to protect existing population numbers, whereas in areas where frogs have been extirpated or are declining, strategies are to stabilize, increase, augment, or reestablish populations.

The recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy allows for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of the California red-legged frog.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion and based on the information provided by the Air Force, we consider the action area to include the approximate 27 acres of the active work zone and associated access roads and staging areas, as well as the reach of San Antonio Creek extending from the Narlon Bridge to the Pacific Ocean. We are also including those habitats potentially affected by project night lighting to the west of the project site located on the beach. The action area consists five general areas described as follows: (1) the Narlon Bridge Project site which includes UPRR's property in the vicinity of the bridge (50 feet from centerline of tracks for approximately 1,230 linear feet) and VAFB property 100-feet east and west of Narlon Bridge (work area, 7.7 acres), plus an additional staging area for temporary office and equipment storage in a disturbed area southwest of the bridge (1.4 acre). The total area near the Narlon Bridge project site would be approximately 9.1 acres; (2) the

Tangair Staging Area which would be utilized as a spoils pile lay-down area and possibly a concrete batch plant south of Tangair Road on UPRR property, along approximately 950 linear feet of track where the UPRR right-of-way is approximately 300 feet wide; (3) the Narlon Station Staging Area which is located approximately 1.6 miles north of the bridge, and would be used for materials staging on UPRR property, along approximately 2,400 linear feet of track where the right-of-way is over 100 feet wide (10.8 acres); (4) the Rail Garrison Staging Area, which is located at the terminus of Umbra Road adjacent to an existing spur-track, and would be used for equipment staging, re-bar cage production, and possibly a concrete batch plant within an existing 0.6 acre asphalt cul-de-sac; and (5) the 1.2 mile reach of San Antonio Creek beginning at the Narlon Bridge and extending to the Pacific Ocean. This reach also includes the elevated fore dunes on the beach at the San Antonio Creek Lagoon.

Three distinct habitat types were identified within the action area which are: arroyo willow riparian, coastal dune scrub, and non-native disturbed and ruderal habitat. These habitat types are described as follows:

Arroyo Willow Riparian. San Antonio Creek is a perennial stream which flows through VAFB to the Pacific Ocean. Narlon Bridge spans San Antonio Creek approximately 1.2 miles upstream of its confluence with the ocean. Habitat along San Antonio Creek is also known as Central Coast Arroyo Willow Riparian Forest and Scrub. Arroyo willow (*Salix lasiolepis*) is the dominant canopy species along San Antonio Creek near the bridge. Understory vegetation includes poison oak (*Toxicodendron diversilobum*), blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). San Antonio Creek is perennial at this location. Vegetation within the railroad's ROW is maintained by UPRR approximately every other year.

Central Dune Scrub. Central Dune Scrub habitat occurs in upland areas under the bridge near the north and south abutments as well as in the proposed staging area southwest of the bridge, portions of the staging area northeast of Umbra Road, and at the Tangair Road site. Dune scrub habitat occurs on a partially stabilized dune system which supports a greater diversity of plants than typical pioneer dune communities. Sub-shrubs and shrubs are dominant, with areas of bare sand and a variety of herbaceous species. The dominant native shrubs are bush lupine (*Lupinus arboreus*), mock heather (*Ericameria ericoides*), coast buckwheat (*Eriogonum parvifolium*), and deerweed (*Lotus scoparius*). Common herbaceous species include California poppy (*Eschscholzia californica*), suncups (*Camissonia* ssp.), and many others. Manzanita (*Arctostaphylos purissima*) are also present in dune scrub habitat at the Tangair Road staging area. Veldt grass (*Ehrharta calycina*) and iceplant (*Carpobrotus edulis*) are common invasive species in the upland areas near the bridge.

Non-Native and Ruderal. Anthropogenic plant communities are dominated by plants introduced by man and established or maintained by human disturbance. Ruderal habitats contain assemblages of plants that thrive in waste areas, roadsides and similar disturbed sites (Holland and Keil 1995). Anthropogenic habitat includes features or material made by humans such as the existing Narlon bridge structure, adjacent access bridge, railroad, and VAFB access roads, and a large portion of the Tangair Road and Rail Garrison staging areas. Ruderal habitat includes a

portion of the proposed staging laydown area immediately southwest of the Narlon Bridge, as it is a previously disturbed area with bare gravel and dominated by introduced veldt grass. Eucalyptus trees *(Eucalyptus globulus*), present in the eastern portion of the Tangair Road site, are an anthropogenic component of a disturbed environment designated as "non-native tree" habitat by VAFB natural resources managers.

California Least Tern

The California least tern breeds on approximately 2,040 acres in the coastal foredunes of VAFB. Historically, the species nested in colonies in several locations along the coastal strand of north VAFB's coastline. With the exception of two nests established on San Antonio Beach in 2002, since 1998, California least terns have nested only at the primary colony site at Purisima Point, in relatively undisturbed bluff-top open dune habitat.

Biological surveys were conducted in the action area in 2011. Suitable nesting habitat for California least tern is present in the action area and they are known to occur on the beach dunes west of the project. Intensive survey for California least terns were not undertaken. California least terns were not observed in or adjacent to the project site during biological surveys in 2011. The nearest reported occurrence is approximately 0.45 mile west of the project site (CNDDB 2013).

Recovery of the California Least Tern

The revised recovery plan for the California least tern divides the geographic distribution of the California least tern into 23 Management Areas. The area covered by the 23 Management Areas encompasses all known breeding sites for the California least tern. The beach at San Antonio Creek are identified as a Coastal Management Area D in the recovery plan for the California least tern (Service 1985). Recovery objectives for this area include the development and implementation of a California least tern management plan. The 5-year review does not specify the recovery function of San Antonio Creek for California least terns.

The INRMP identifies key threats to California least terns on VAFB, which includes harassment and disturbance, and predation by other wildlife species. Presently, only native predators are known to impact California least terns on VAFB, and management is therefore focused on selective removal of individual problem predators in the context of maintaining ecosystem integrity. Historical and current nesting areas on VAFB are placed off-limits from 1 March through 30 September because California least terns co-locate with western snowy plovers. Signs and fences delineate off-limits areas and patrols are carried out during the nesting season to enforce restrictions.

Other management activities for California least terns on VAFB includes:

- The monitoring of California least terns during their nesting season.
- Restrictions in place each year from 1 March through 30 September provide protection for California least terns if they become established at new sites or re-colonize historical nesting areas.

- Although avian predators such as owls, American kestrels, loggerhead shrikes, and northern harriers are frequently sighted at or near California least tern nesting areas, studies to date show that only a few individual predators actually take California least terns, their eggs or chicks. These birds are live-trapped and relocated with the assistance of contracted raptor specialists.
- During each nesting season, small shelters are placed within the colonies to provide cover for California least tern chicks. The number and specific placement of shelters is evaluated each season to determine optimum placement.
- The placement of electric fences in sensitive areas to exclude predators.
- An active mammalian predator management program.
- An ongoing habitat restoration program.
- Impacts of launches on California least terns are monitored in accordance with Service Biological Opinions for applicable launch programs (Delta, Atlas, Taurus, and Falcon). Because year-round launch capability is essential to the Air Force mission at VAFB, the objective of launch monitoring is to identify launch-related impacts and develop additional management and/or mitigation measures if necessary to ensure conservation of California least terns on VAFB with no net loss to mission capability.

Unarmored Threespine Stickleback

Unarmored threespine stickleback are native to San Antonio Creek. The San Antonio Creek watershed has a drainage area of 154 square miles. The upper reaches of San Antonio Creek (i.e., upstream of Barka Slough) have intermittent flows, generally as runoff from the winter rains (November through April). The lower reaches of San Antonio Creek (i.e., downstream of Barka Slough) are perennial and are fed by surfacing groundwater in Barka Slough, a central dividing point in the San Antonio Creek watershed. Barka Slough is formed by underground, continuous bedrock between the Purisima and Casmalia Hills, just west (or downstream) of the slough. This bedrock forms a barrier to underground flows down the watershed through the unconsolidated deposits (Conoco 1985, URS 1987; in MSRS 2009b). In the lower San Antonio Creek basin, the creek flows west-northwest to the Pacific Ocean. Extensive emergent wetlands are located along part of the flood basin. The creek ends in a small lagoon that is generally confined from flow to the ocean by a sand berm, breaking through to the ocean only during large storms, at which time it is subject to tidal inundation (URS 1987, U.S.DOI 1981; in MSRS 2009b). The lower portion of San Antonio Creek is known to support the only native population of unarmored threespine stickleback in Santa Barbara County. The upstream portion of San Antonio Creek is characterized by a relatively straight and narrow stream course confined between steep incised banks. The lower portion where the unarmored threespine stickleback dominates is less constrained.

Dr. Camm Swift (1999) conducted surveys for special-status fish in San Antonio Creek from near the Lompoc-Casmalia Road crossing downstream to the lagoon, which is equivalent to the lower 4.97 miles of the creek above the lagoon. Surveys in the upstream 3.1 miles resulted in a total of approximately 47,700 individuals. In the downstream 1.56 miles of creek above the lagoon, the surveys resulted in a total of approximately 7,200 individuals. Adding both estimates results in approximately 55,000 individuals in the lower 5 miles of the creek above the lagoon.

Additional stickleback occur upstream, and were recorded upstream in at least one tributary just east of El Rancho Road south of the main stream. However, undoubtedly most of the unarmored threespine stickleback population is within approximately 3 miles of the stream centered on El Rancho Road where the stream gradient was lower, stream velocity was slower, the channel was more spread out, and native and nonnative predators were lacking (Swift 1999).

In June 2008, MSRS and Aquatic Resource Specialists (ARS) personnel repeated and expanded upon fish surveys conducted by Camm Swift in 1999 (MSRS 2009b). The previous seven segments that Dr. Swift surveyed were repeated. The additional segments were located from Marshallia Golf Course upstream to the U.S. Highway 1 Bridge. A total length of approximately 0.5 mile of main-stem stream channel was sampled in this study, which represents approximately 24 percent of the estimated 5-mile reach of San Antonio Creek within VAFB boundaries.

Densities of the unarmored threespine stickleback observed during this survey were considerably higher than those observed by Swift in 1999, which could be due to a variety of factors. Swift's survey followed the El Niño of 1997-1998 during which VAFB received 36 inches of rainfall, the highest on record since 1952. The 1998-1999 rainy season was also well above average at 20 inches (average 15 inches) and this level of precipitation caused creeks to reach peak flow rates that were two orders of magnitude greater than mean yearly peak flow over the past 30 years. Such high flows resulted in the removal of most herbaceous bank species, some creek side woody species, and beaver (*Castor canadensis*) dams. Many fish could have been killed or swept out to sea. Only one major scour event during the winter of 2005-2006 has occurred in the period between the surveys conducted by Dr. Swift in 1999 and the 2008 survey conducted by MSRS and ARS and did not approach the intensity of the 1998 flows. Rainfall totals for the two years preceding the 2008 survey were below average and the reduced flow may have allowed for the proliferation of in-stream vegetation and the accumulation of woody debris within the channel.

Based on the 2008 survey data, the Air Force estimated the population in San Antonio Creek to be approximately 462,500 individuals. They observed 18,653 individuals within 0.4 mile of creek, and then assumed that the density of unarmored threespine stickleback throughout the 10 miles of San Antonio Creek within the base, from the lagoon to the Highway 1 overpass, has a density similar to the areas surveyed. However, the 2008 data show that very few to no unarmored threespine stickleback upstream of site 12. In addition, Swift (1999) determined that the densities of the unarmored threespine stickleback were highest for the four transects about 1.2 miles above and below the El Rancho Road crossing and less concentrated downstream above the lagoon.

San Antonio Creek within and immediately adjacent to the action area was inspected visually for unarmored threespine stickleback in June 2011. Extensive surveys were not conducted and intensive survey methods (dip netting, seining, snorkeling, etc.) were not undertaken. The stream bottom was inspected from the existing wood bridge and, where possible, from areas within the riparian vegetation that allowed portions of the stream to be viewed. Unarmored

threespine stickleback were not observed in or adjacent to the action area during these inspections.

Recovery of the Unarmored Threespine Stickleback
A portion of the action area is within essential habitat identified as the San Antonio Creek Zone in the recovery plan for the unarmored threespine stickleback (Service 1985). Areas identified as essential habitat are expected to receive intensive management as described in the recovery tasks listed in the recovery plan. The 5-year review does not specify the recovery function of San Antonio Creek for unarmored threespine stickleback.

VAFB completed an Integrated Natural Resource Management Plan (INRMP) in August 2011 that provides some protection for the San Antonio Creek population of the unarmored threespine stickleback. Key threats to unarmored threespine stickleback population in San Antonio Creek include: habitat loss due to the drawdown of the San Antonio Aquifer primarily due to upstream agriculture needs, which results in decreased water flow in San Antonio Creek; and beaver activity in San Antonio Creek, which results in pooling and may encourage the introduction of exotic, predatory fish species. The INRMP prohibits the introduction of nonnative fish species into VAFB streams. Impacts to the unarmored threespine stickleback and its habitat are avoided whenever possible in project planning. Where impacts to habitat cannot be avoided, work is scheduled to avoid peak breeding periods whenever possible (March through July inclusive) and management measures are implemented that minimize impacts to the unarmored threespine stickleback and its habitat. Project-specific monitoring and protection measures are identified in section 7 consultations and National Environmental Policy Act (NEPA) documents, and are implemented as required.

Tidewater Goby
Tidewater gobies are known to occur in San Antonio Creek. The population of tidewater gobies in San Antonio Creek is estimated to be about 10,000 or more tidewater gobies in the spring before reproduction commences. Tidewater gobies were the most abundant fish species in each of the lagoons they inhabited on VAFB (Swift et al. 1997).

San Antonio Creek has a low gradient and habitat continuity between the lagoon and its tributary stream allowing tidewater gobies to disperse several miles upstream in the fall. High winter flows cause them to retreat or migrate back downstream to the lagoon. The tidewater goby has been documented in ponded freshwater habitats as far as 4.6 miles upstream from the ocean in San Antonio Creek (Swift et al. 1997).

The available tidewater goby habitat at San Antonio Creek lagoon encompasses approximately 4.9 to 7.4 acres. The CNDDB lists tidewater gobies as having occurred in San Antonio Creek from the mouth to almost 2 miles upstream. Reaches of San Antonio Creek within and immediately adjacent to the action area was inspected visually in June 2011. Protocol-level surveys were not conducted and intensive survey methods (dip netting, seining, snorkeling, etc.) were not undertaken. The stream bottom was inspected from the existing wood bridge and, where possible, from areas within the riparian vegetation that allowed portions of the stream to

be viewed. Tidewater goby was not observed in San Antonio Creek in the vicinity of the action area during these inspections.

Recovery of the Tidewater Goby

The final recovery plan for tidewater gobies subdivides the geographic distribution of tidewater gobies into six recovery units, encompassing a total of 26 sub-units defined according to genetic differentiation and geomorphology. San Antonio Creek is included the Conception Recovery Unit. The Conception Recovery Unit is divided into three sub-units and San Antonio Creek is included Sub-Unit CO 2, which extends from Point Sal to Point Arguello over generally sandy coast. Sub-Unit CO 2 is located entirely within Santa Barbara County. Primary tasks for this recovery unit as recommended in the recovery plan include: (1) population monitoring; (2) substantiate Sub-Units based on genetic studies; (3) improve habitat and remove threats; and (4) consider recolonization if there is a 25 percent reduction in the number of inhabited locations. The 5-year review does not specify the recovery function of San Antonio Creek for tidewater gobies.

The INRMP provides some protection for the San Antonio Creek population of the tidewater gobies. Key threats to tidewater gobies on VAFB include: Susceptibility of coastal lagoons to degradation through diversion of water (dewaters stream habitat, affects marsh habitats, and alters temperature and salinity), pollution from agricultural and sewage effluents, siltation (e.g., resulting from cattle overgrazing and feral pig activity), and urban development of surrounding lands. Introduced predatory fish, especially centrarchids and channel catfish, crayfish, and mosquito fish may threaten populations through direct predation on eggs, larvae, and adults. As mentioned above, the INRMP prohibits the introduction of nonnative fish species into VAFB streams. Impacts to tidewater gobies and its habitat are avoided whenever possible in project planning. Where impacts to habitat cannot be avoided, work is scheduled to avoid peak breeding periods whenever possible (March through July inclusive) and management measures are implemented that minimize impacts to the tidewater goby and its habitat. Project-specific monitoring and protection measures are identified in section 7 consultations, and NEPA documents, and implemented as required.

El Segundo Blue Butterfly

According to a biological assessment submitted by the Air Force (Air Force 2012), El Segundo blue butterflies have been documented at five locations on VAFB: Tranquillon Peak; Central San Antonio Creek terrace near the Narlon Bridge; South Spur Road; near the intersection of Coast Road and Bear Creek Road; and north of the Vandenberg tracking station.. The species is generally found on VAFB in coastal dune and central coast scrub habitats.

Based on GIS shapefiles provided by VAFB biologists on April 30, 2012, El Segundo blue butterflies are present at the north end of the Narlon Bridge and immediate vicinity, and in coastal dune scrub habitat adjacent to existing unpaved access roads. General botanical and wildlife surveys were conducted during site inspections in 2011. In July of 2013, VAFB biologists conducted reconnaissance surveys and quantified coast buckwheat (i.e., El Segundo

blue butterfly host plants) occurrences within the action area. Approximately 1,250 coast buckwheat plants were detected in the action area.

Recovery of the El Segundo Blue Butterfly

While the recovery plan for the El Segundo blue butterfly did not contemplate the role of VAFB in the species' recovery, the Air Force has taken numerous steps to conserve the species on the base. The 5-year review does not specify the recovery function of San Antonio Creek for the El Segundo blue butterfly.

The species is considered in the INRMP for the base and measures to conserve the El Segundo blue butterfly and its host plant are included. The positive conservation measures for the El Segundo blue butterfly the Air Force has implemented at VAFB so far include: (1) surveys to further delineate the species' occurrence on the base; (2) removal of invasive plants from hundreds of acres of potentially suitable habitat; (3) cooperated with research through U.C. Riverside and U.C. Santa Barbara; (4) public outreach; and (5) funding pioneering research into commensal relationships between the El Segundo blue butterfly and harvester ants (*Messor* spp., *Pogonomyrmex* spp.). Therefore, although the recovery plan for the El Segundo blue butterfly did not consider the potential presence of the species at VAFB, the Air Force has made a positive effort to conserve the species on the base, which would be consistent with other recovery efforts.

Western Snowy Plover

Western snowy plovers nest and winter on the foredunes along the coast of VAFB, from near Point Sal to Purisima Point, and along beaches north and south of the Santa Ynez River mouth. VAFB is also an important wintering area for western snowy plovers. In 2004, VAFB supported an estimated 22 percent of California's population of the species. Western snowy plover habitat on VAFB includes all sandy beaches and adjacent coastal dunes from the rocky headlands at the north end of Minuteman Beach to the pocket beaches and dune areas adjacent to Purisima Point on north VAFB, and all sandy beaches and adjacent coastal dunes from the rocky headlands at the north end of Wall Beach south to the rock cliffs jutting to the ocean at the south end of Surf Beach on south VAFB.

Biological surveys were conducted in the action area in 2011. Suitable nesting habitat for western snowy plover is present in the action area and they are known to occur on the beach west of the project site. Intensive surveys for western snowy plover were not undertaken. Western snowy plovers have never been detected within the project site; however, they have been detected approximately 0.3 mile west of the project site (S. Kaisersatt, VAFB Biological Scientist, Pers. Comm. 2013).

Recovery of the Western Snowy Plover

The Pacific coast population of the western snowy plover has been divided into six recovery units. The area covered by the six recovery units encompasses all known breeding and wintering sites for the Pacific coast population of the western snowy plover. The portion of the beach affected by the project is included in the VAFB Location CA–84 of the San Luis Obispo to Ventura County Recovery Unit (Unit 5) in the recovery plan for the Pacific Coast population of

western snowy plover (Service 2007b). Location CA–84 (as it is described in the recovery plan, (Service 2007b)) has been identified as a breeding and wintering site for this species. This Location is important for ensuring that breeding wintering, feeding, sheltering, and migratory habitat is distributed across the species' range and to maximize western snowy plover's range. The 5-year review does not specify the recovery function of San Antonio Creek for western snowy plovers.

The INRMP identifies key threats to western snowy plovers on VAFB, which include habitat loss through invasion by nonnative plant species, predation by other wildlife species, and human disturbance.

In the year 2000, VAFB instituted an interim beach management plan whereby all snowy plover nesting beaches are closed to recreational access between March 1 and September 30 of each year with the following exceptions:

- Recreational access to VAFB personnel only is permitted on 0.5 mile at the northern end of Minuteman Beach and 0.25 mile at the northern end of Wall Beach; and

- Recreational access to the public is permitted on 0.5 mile of beach near the Surf Railway Station.

In 2005, VAFB proposed this plan as a long-term plan for the period 2005 through 2009. In 2009, the plan was extended to cover the 2010-2014 breeding seasons. Elements of the plan include management of recreational access, habitat restoration, and predator management.

Recreational beach use is a major issue in western snowy plover management on VAFB, as the base works to meet its responsibilities under the Act while accommodating demand by the public and base personnel for recreational opportunities. Despite enforcement efforts by 30th Conservation Law Enforcement Program, Fish and Wildlife (30 SFS/S3SW) personnel and civilian beach patrol personnel, public violations of western snowy plover protection measures have represented a problem. These violations include, but are not limited to vandalism of signage, illegal beach fires, and intrusions into off-limits areas by people, horses, and pets. All of these violations directly threaten western snowy plovers, their eggs, and young. Requirements set forth in Service biological opinions for nesting seasons, mandate dawn-to-dusk patrols 7 days per week, plus two night patrols per week, and limit the number of violations that could occur before beach access is prohibited entirely. At the present time, 30 SFS/S3SW and civilian personnel regularly patrol beaches and cite offenders. A significant percentage of beach violations are the result of actions by visitors from out of the VAFB-Lompoc area. During the western snowy plover breeding season, civilian personnel may be assigned to patrol specific beach sectors to prevent incursions into closed beach areas. Western snowy plover conservation education is in the form of a kiosk, brochures, and videos. VAFB employs paid, seasonal staff to patrol beaches and educate beach visitors about the western snowy plover.

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VAFB has mapped occurrences of European beachgrass that degrade western snowy plover nesting sites. A completed habitat restoration plan includes eradication of nonnative beachgrass and iceplant and enhancement of native vegetation. The first of four phases of this plan was initiated in late 2008. Phases 2, 3, and 4 took place in 2010, 2011, and 2012, respectively. Phase 5 will take place in 2013. All phases include invasive species removal/treatment (including herbicide usage, mechanical removal and prescribed burning).

Management of the western snowy plover on VAFB includes:

- Restrictions on recreational beach access are implemented and enforced during the nesting season, and are evaluated each year for their effectiveness in protecting western snowy plovers.

- Recreational off-road vehicle activity is not permitted on western snowy plover beaches at any time. All-terrain vehicles (ATVs) are operated on these beaches only when essential to support the VAFB mission or in an emergency. 30 SFS/S3SW personnel, who have been trained how to operate ATVs to avoid impacts to western snowy plovers, are the focal point of contact for all mission operations involving ATV operation on base beaches. Where possible, horse and foot patrols are used.

- Leash laws are enforced throughout VAFB year-round. All pets are prohibited entirely in western snowy plover nesting beaches between March 1 and September 30 each year.

- A predator management plan developed in 2001, updated in 2004 and revised for the 2005-2009 and 2011-2015 plan periods, implements ecologically sound approaches to reducing predation of western snowy plover nests, chicks, and adults. This plan includes actions to reduce the attraction of predators and scavengers to western snowy plover beaches that are implemented from March 1 to September 30 each year, as follows:

- Prohibitions on littering are enforced.

- Prohibitions on feeding wildlife are enforced.

- Educational materials include information on the above rules and their importance to western snowy plover protection.

- Periodic inspection and trash removal in areas open to recreational access is conducted as needed. Inspections are conducted during open beach periods to minimize disturbance to western snowy plovers.

- To further reduce the attraction of western snowy plover beaches to predators and scavengers, marine mammal and other carcasses near nesting areas are removed in situations where the process of removal would not result in adverse impacts to western snowy plovers.

Pinniped and cetacean carcass removal is coordinated with NOAA Fisheries to ensure compliance with the Marine Mammal Protection Act (MMPA).

- Between October 1 and February 28 each year, base beaches are cleaned by VAFB personnel and community volunteers.

Program-specific monitoring of western snowy plovers, to determine impacts from launches and other Air Force activities, is conducted as required by Service biological opinions for applicable programs. Current programs for which western snowy plover monitoring is conducted include SLC-6 (Delta IV) and the first two launches of new space vehicle launch programs from SLC-2, SLC-3, TP-01 and LF 576-E.

Overflight restrictions maintain a minimum 500-foot altitude above western snowy plover nesting beaches, and established flight patterns minimize aircraft presence over these beaches.

California Red-Legged Frog

VAFB is located in the relative middle of the current range of the California red-legged frog. Many of the healthiest populations of the species (in terms of numbers of individuals) are located along the central coast of California, and California red-legged frogs are likely to be present in nearly all permanent streams and ponds on the base.

No project-specific surveys for California red-legged frogs were conducted within the action area; however, the Air Force has documented that the species occurs within the action area where suitable habitat is present. California red-legged frogs are known to occur in San Antonio Creek (CNDDB 2013). However, as a result of the San Antonio Creek Bank Stabilization Project completed in 2009, the immediate effects of the project on the California red-legged frog were assessed by comparing results from pre-construction surveys conducted in 2008 and surveys conducted in 2009. These surveys documented changes in the distribution and population of the California red-legged frog. These monitoring surveys were repeated in 2011-2012 using the same methodologies applied in 2009. Overall, more California red-legged frogs were observed within the survey areas during 2011-2012 than during the 2008-2009 surveys and the CMMP success criterion for this species at the site were exceeded. Although more California red-legged frogs were observed during 2011-2012, a closer analysis of the results showed that these California red-legged frogs were found disproportionately in stretches not directly affected by project activities.

Recovery of the California Red-Legged Frog

The action area and VAFB in general, are within the Northern Transverse Ranges and Tehachapi Mountains Recovery Unit for the California red-legged frog. The action area is also within the Santa Maria River-Santa Ynez River Core Area defined in the recovery plan (Service 2002). The recovery unit was described in the recovery plan as having a “high recovery status,’ meaning that the unit supports many populations of the species, has many areas of high habitat quality, and threat levels that range from low to high.

Some protections are afforded the California red-legged frog on VAFB due to implementation of the Air Force's INRMP. So far, the Air Force has implemented several actions that provide a positive conservation benefit: (1) public outreach and education; (2) working with researchers from U.C. Santa Barbara, the U.S. Geological Survey, and Department of the Navy, including chytridiomycosis studies; (3) surveys for new populations; (4) monitoring of known populations; and others. These efforts are consistent with the goals from the recovery plan of protecting known populations; protecting suitable habitat, corridors, and core areas; developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; developing land use guidelines; gathering biological and ecological data necessary for conservation of the species; and monitoring existing populations and conducting surveys for new populations.

EFFECTS OF THE ACTION

The project activities could temporarily or permanently affect the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and the California red-legged frog or their habitats. The proposed bridge replacement project is anticipated to temporarily affect approximately 1.8 acres of Arroyo Willow Riparian habitat including surface flow within San Antonio Creek, and 4.4 acres of Central Dune Scrub habitats on VAFB property. Consequently, we assume that for the unarmored threespine stickleback, tidewater goby, and California red-legged frog, suitable habitat may occur anywhere within San Antonio Creek including its arroyo willow habitat. Furthermore, we assume that California least tern and western snowy plover may occur anywhere in the beach habitat, and that El Segundo blue butterfly may occur anywhere in the central dune habitat

Project personnel not familiar with the biology of California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and the California red-legged frog could unknowingly cause harm, injure or kill these species by conducting activities that could otherwise be avoided or achieved in a less harmful way. The Air Force and UPRR propose to use personnel with demonstrable experience (i.e., qualified biologists) with California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and the California red-legged frog and their respective habitats to minimize potential effects from the project activities and its personnel on each of the respective species. The qualified biologist(s) would be responsible providing a pre-project briefing explaining the biology of California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and the California red-legged frog and the conservation measures being implemented to avoid them. Furthermore, the qualified biologist(s) would be responsible for providing guidance to project personnel conducting activities that could result in adverse affects to the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and the California red-legged frog.

California Least Tern

Although the project site does not have appropriate nesting habitat to support California least tern, noise and lighting effects from bridge construction may affect this species, which may nest on open beach habitat west of the project site. Noise from the project area could flush or startle California least terns nesting on a beach west of the project area exposing the adult, chicks, and eggs to nocturnal predators. Excessive noise could also lead to California least terns to abandon nests causing eggs not to hatch. Noise effects in California least tern habitat are not anticipated to be louder than the sound of crashing waves at high tide. Noise produced during installation of the construction access bridge would be generated from the bottom of the project area and would be buffered from California least tern habitat by dense willow riparian vegetation and adjacent hills.

No long-term indirect impacts are anticipated to occur from the proposed project. Short-term direct impacts could include noise and lighting effects from bridge construction. Large dunes are present between the project site and potential open beach nesting habitat. However, night lighting during bridge change-out operations may adversely affect nesting California least terns. Night lighting from the project area could illuminate California least tern nests on a beach west of the project area exposing the adult, chicks, and eggs to nocturnal predators. Suspended sediments from project activities may affect water quality in San Antonio Creek resulting limited visibility for foraging California least terns in the San Antonio Creek Lagoon. BMPs proposed by UPRR should minimize the effects of suspended sediments in the Lagoon.

Recovery of the California Least Tern

The recovery plan for California least tern focuses on: (1) developing and implementing site specific management plans; (2) preserving and properly managing nesting habitat; (3) protecting colonies against certain predation pressures and other disturbances; (4) refining management techniques through additional research; (5) developing a conservation education program; (6) enforcing laws and regulations that protect the California least tern and its habitat; and (7) determining that status of California least tern in Baja California, Mexico.
The 5-year review for the California least tern recommends: (1) that the recovery plan be revised; (2) continued management of existing nest sites; and (3) the creation of new nest sites and site expansion at existing sites.

Some of the recovery activities from the recovery plan or 5-year review were identified within the action area. The proposed action is not within Mexico. In addition, it does not involve or include: research for the species; unlawful activities; and is not proposed for restoration as a nesting site. Therefore, the proposed action is neutral as to these tasks and recommendations identified in the recovery plan and 5-year review. However, the proposed action does involve nearby breeding habitat for the California least tern. At issue are effects from night lighting, which would be limited in duration and temporary to the breeding habitat for the species. Lastly, although the proposed action does not include a site specific management plan, VAFB does have an INRMP, which includes the species and an education program involving the species. Therefore, the proposed action is neutral as to these tasks and recommendations identified in the recovery plan and 5-year review as well.

The proposed project will not affect the overall recovery goals as described in the recovery plan or 5-year review because it will not reduce the number of California least terns. Furthermore, the proposed project will not remove breeding habitat for the California least tern.

Unarmored Threespine Stickleback

No long-term direct effects to unarmored threespine stickleback are anticipated to occur from the proposed Project. The old access bridge would be removed and replaced when water levels are low in San Antonio Creek. Inadvertent contamination of the waterway could occur from vehicular leaks or improper maintenance. Project-related material releases onto channel substrate or into water would result in effects to water quality that may be hazardous to unarmored threespine stickleback. Debris falling into the river may also degrade water quality. Water quality in the San Antonio Creek could be affected if construction-related chemicals (fuels, lubricants, wastes) are accidentally introduced into the water or are allowed to accumulate in stream soils. Sedimentation that would occur during construction activities may result in unarmored threespine stickleback injury, death, and lowered breeding success. Sediment may affect unarmored threespine stickleback by impairing the efficiency of their gill filaments and exposing them to higher salinities and/or predation as they flee downstream. Direct effects of sedimentation include mortality, reduced physiological function, and egg nest smothering. Indirect effects of sedimentation include potential alteration to the food web which could create cascading effects to higher trophic levels. A reduction in phytoplankton can result from increased turbidity, which can thereafter reduce zooplankton, in turn reducing benthic macroinvertebrates, and thus reduce prey available to unarmored threespine stickleback (Henley et al. 2000). Effects resulting from the proposed project would be minimized by the UPRR's proposed implementation of standard BMPs for the project, which include measures to minimize erosion and sedimentation.

Construction equipment and materials that have the potential to contribute pollutants to storm water discharges include vehicle fluids (e.g., oil, grease, petroleum, coolants, etc.), raw landscaping materials and wastes (e.g., plant materials, etc.), and general litter. These materials may injure or kill unarmored threespine stickleback. The release of these materials into unarmored threespine stickleback habitat would be minimized by the implementation of the general BMPs, which includes measures to minimize or avoid the release of contaminants into unarmored threespine stickleback habitat.

Recovery of the Unarmored Threespine Stickleback

The recovery plan for the unarmored threespine stickleback designated three areas as very important for the survival and recovery of the species: (1) two disjunct reaches of the Santa Clara River in Los Angeles County; (2) a short reach of San Francisquito Canyon; and (3) and the lowermost 8.4 miles in San Antonio Creek in Santa Barbara County (Service 1985). The action area is within the lowermost 8.4 miles of San Antonio Creek.

According to the recovery plan and 5-year review, the unarmored threespine stickleback faces three major threats: (1) inadequate or unsuitable stream flows, (2) predation and/or overcompetition by exotic species, and (3) introgression by *G. a. microcephalus* (Service 1985).

Furthermore, the 5-year review identifies toxic spills and discharges as well as sedimentation from agriculture activities as threats. Each of these threats must be addressed to facilitate recovery of the species. With respect to the three major threats, project activities would take place entirely outside of the flowing water and no channelization proposed, and would therefore not be affecting recovery efforts for the subspecies. However, discharge of sediment and toxic materials has the potential to occur as a result of project activities. The potential for discharge of sediment or toxic material should be controlled through BMPs and water quality protective measures set forth in project description.

The proposed action could adversely affect unarmored threespine stickleback adults, juveniles, and/or eggs that occur within San Antonio Creek through increased sedimentation or contamination. These effects will be minimized by the UPRR's implementation of the minimization measures described above, and are not anticipated to substantially affect the survival of the subspecies in San Antonio Creek. Replacement of the Narlon Bridge is not anticipated to compromise the recovery of unarmored threespine stickleback.

Tidewater Goby

No long-term direct effects to tidewater goby are anticipated to occur from the proposed project. The old access bridge would be removed and replaced when water levels are low in San Antonio Creek. Inadvertent contamination of the waterway could occur from vehicular leaks or improper maintenance. Project-related material releases onto channel substrate or into water would result in effects to water quality that may be hazardous to tidewater gobies. Debris falling into the river may also degrade water quality. Water quality in the San Antonio Creek could be affected if construction-related chemicals (fuels, lubricants, wastes) are accidentally introduced into the water or are allowed to accumulate in stream soils. Sedimentation that would occur during construction activities may result in tidewater goby injury, death, and lowered breeding success. Sediment may affect tidewater gobies by impairing the efficiency of their gill filaments and exposing them to higher salinities and/or predation as they flee downstream. Direct effects of sedimentation include mortality, reduced physiological function, and burrow smothering. Indirect effects of sedimentation include potential alteration to the food web which could create cascading effects to higher trophic levels. A reduction in phytoplankton can result from increased turbidity, which can thereafter reduce zooplankton, in turn reducing benthic macroinvertebrates, and thus reduce prey available to tidewater gobies (Henley et al. 2000). Effects resulting from the proposed project would be minimized by the UPRR's proposed implementation of standard BMPs for the project, which include measures to minimize erosion and sedimentation.

Construction equipment and materials that have the potential to contribute pollutants to storm water discharges include vehicle fluids (e.g., oil, grease, petroleum, coolants, etc.), raw landscaping materials and wastes (e.g., plant materials, etc.), and general litter. These materials may injure or kill tidewater gobies. The release of these materials into tidewater goby habitat would be minimized by the implementation of the general BMPs, which includes measures to minimize or avoid the release of contaminants into tidewater goby habitat.

Recovery of the Tidewater Goby

The goal of the tidewater goby recovery plan is to conserve and recover tidewater gobies throughout its range by managing threats and perpetuating viable metapopulations within each recovery unit while maintaining morphological and genetic adaptations to regional and local environmental conditions. We do not expect the replacement of the Narlon Bridge to substantially affect the conservation of tidewater gobies within the Conception Recovery Unit, in terms of the recovery strategy described in the recovery plan because:

1. The tidewater goby recovery plan emphasizes the importance of the conservation of population units rather than individual fish, and the effects of the replacement of the Narlon Bridge are not expected to cause population-level declines in San Antonio Creek; and

2. The replacement of the Narlon Bridge would not adversely affect the metapopulation dynamics between individual populations within the Conception Recovery Unit.

The proposed action could adversely affect tidewater goby adults, juveniles, and/or eggs that occur within San Antonio Creek through increased sedimentation or contamination. These effects will be minimized by the UPRR's implementation of the minimization measures described above, and are not anticipated to substantially affect the survival of the species in San Antonio Creek. Replacement of the Narlon Bridge is not anticipated to compromise the recovery of tidewater gobies.

El Segundo Blue Butterfly

The El Segundo blue butterfly could be adversely affected by construction of the replacement bridge. The El Segundo blue butterfly is likely present under the bridge, within the proposed staging area southwest of the bridge, and in dune scrub habitat adjacent to dirt access roads. The project would occur during the El Segundo blue butterfly pupal ("cocoon") stage that lasts for one or more years and during the flight season, mid-June to September.

El Segundo blue butterfly may be directly affected by temporary staging activities that would remove its host plants and may harm, injure, or kill pupae. This ground disturbance is short-term (for the duration of construction); however, El Segundo blue butterfly pupae diapausing in the soil may be injured or killed by project equipment or from excavation activities such as digging holes. When host plants are lost, individual El Segundo blue butterfly larvae could be killed or injured as the plant is damaged or removed. Also, because project activities could occur during the flight season, damaging coast buckwheat plants could directly affect adults. We would expect some of the adult butterflies to be able to move out of harm's way to suitable habitat available nearby; however, some may be killed or injured. No potential long-term direct effects are anticipated from the proposed project. Direct effects could include an increase in dust produced from construction vehicles utilizing unpaved access roads and vehicle strikes. Dust could cover host plants flowers and make them unpalatable to El Segundo blue butterfly; however, a water truck and/or non-toxic dust palliative would be used to control dust on dirt access roads to minimize this impact. In places where lost buckwheat plants would be replaced by the Air Force, a temporary impact could result because these plants would need to mature

before El Segundo blue butterflies could use them to complete their life cycle. The temporary loss of mature host plants could slow El Segundo blue butterfly population recruitment and an overall reduction in the population of the subspecies in the action area.

Indirectly, disturbance of the soil where coast buckwheat grows could promote growth of non-native plants as the buckwheat plants are removed. Relatively fast-growing non-native plants outcompete coast buckwheat seedlings and prevent the native plants from sprouting and maturing to reproductive form. However, disturbed El Segundo blue butterfly habitat would be revegetated by planting of seed or plants of coast buckwheat and removal of invasive non-native invasive species (see Minimization Measure 10). Revegetation with native species (e.g., the host plant) should promote quicker growth of habitat and thereby reducing the temporary loss of habitat for the subspecies. Furthermore, equipment entering the action area could transport non-native plants, which would also outcompete coast buckwheat seedlings and prevent the native plants from sprouting and maturing to reproductive form. To minimize the spread of non-native plants the Air Force and UPRR would clean all equipment of all foreign plant material and debris prior to use in the action area.

A qualified biologist would conduct pre-project briefings for all workers. The pre-project briefing by a qualified biologist would ensure that all onsite personnel are aware of the presence of El Segundo blue butterfly, its habitat, and the minimization efforts to protect the subspecies from the effects of the proposed activities.

Recovery of the El Segundo Blue Butterfly

The goal of the El Segundo blue butterfly recovery plan is one viable population of El Segundo blue butterfly in each of the four recovery units, which are: Ballona, Airport, El Segundo, and Torrance. As noted earlier the population at VAFB was discovered after the recovery plan was published and is therefore not considered in the recovery plan. While we expect some adverse effects to the El Segundo blue butterfly as a result of the proposed project, the majority of the effects should be temporary and minimized by the Air Force's proposed measures. Rangewide, the level of effects to the El Segundo blue butterfly we anticipate will occur within the action area should not translate into a substantial diminishment of the numbers, reproduction, or distribution of the species.

Further, because we anticipate that the effects to individual El Segundo blue butterflies would be minor, and impacts to their habitat would be temporary and minimized to the extent possible, the population of the species on VAFB should be able to continue to contribute to its overall conservation. We do not expect the proposed actions to diminish the ability of the action area to contribute to the recovery of the El Segundo blue butterfly.

Western Snowy Plover

Although the project site does not have appropriate nesting habitat to support western snowy plovers, noise and lighting effects from bridge construction may affect this species, which may nest on open beach habitat west of the project site. Noise from the project area could flush or startle western snowy plovers nesting on a beach west of the project area exposing the adult,

chicks, and eggs to nocturnal predators. Excessive noise could also lead to western snowy plovers to abandon nests causing eggs to fail. Noise effects in western snowy plover habitat are not anticipated to be louder than the sound of crashing waves at high tide. Noise produced during installation of the construction access bridge would be generated from the bottom of the project area and would be buffered from western snowy plover habitat by dense willow riparian vegetation and adjacent hills.

No long-term indirect impacts are anticipated to occur from the proposed project. Short-term direct impacts could include noise and lighting effects from bridge construction. Large dunes are present between the project site and potential open beach nesting habitat. However, night lighting during bridge replacement operations may adversely affect nesting western snowy plovers. Night lighting from the project area could illuminate western snowy plovers nests on a beach west of the project area exposing the adult, chicks, and eggs to nocturnal predators.

Recovery of the Western Snowy Plover
The recovery plan for western snowy plover focuses on: (1) increasing population numbers distributed across the range of the western snowy plover; (2) conducting intensive ongoing management for the species and its habitat and developing mechanisms to ensure management in perpetuity; and (3) monitoring western snowy plover populations and threats to determine success of recovery actions and refine management actions.

The proposed action will not affect implementation of the VAFB INRMP and is therefore neutral as to task (2). The proposed action does have the potential to affect tasks (1) and (3) – increasing population numbers and monitoring the western snowy plover within the action area. With respect to task (1), the action area is within location CA–84, as defined in the recovery plan, and has been identified as a breeding and wintering site for western snowy plover. The proposed action will not render the action area as unsuitable for breeding or wintering western snowy plovers because the habitat will not be removed. With respect to task (3), the Air Force and UPRR propose to monitor the effects on western snowy plovers night lighting and modify its activities to avoid or minimize those effects to western snowy plovers.

The proposed project will not affect the overall recovery goals as described in the recovery plan because location CA–84, as defined in the recovery plan, will continue to serve its function as a breeding and wintering site for the western snowy plover.

California Red-Legged Frog
The proposed bridge replacement and removal actions would not occur within standing or flowing water where California red-legged frogs are likely to occur. However, California red-legged frogs could enter the riparian and upland works areas of the project site. Furthermore, sedimentation, and accidental spills of toxic or contaminated materials could enter the standing or flowing water.

California red-legged frogs have been found up to 400 feet from water in riparian vegetation, and may disperse through uplands. Therefore, despite the Air Force’s intention to avoid impacts to

suitable wetland habitat for California red-legged frogs, project activities outside of the standing or flowing water have the potential to adversely affect California red-legged frogs. Movement of equipment and people near the creek could crush and injure or kill California red-legged frogs. To minimize impacts to this species, the Air Force would have a qualified biologist familiar with the California red-legged frog monitor activities within areas determined sensitive for this species. If a California red-legged frog is encountered, a Service-approved biologist will relocate the California red-legged frog to the nearest suitable habitat outside of the project area. This will reduce the chances of injury or mortality due to the movement of machinery or foot traffic, but it is unlikely to eliminate it.

Relocating California red-legged frogs out of harm's way may reduce injury or mortality from equipment, foot traffic, or ground disturbance; however, injury or mortality of individuals may occur as a result of improper handling, containment, or transport of individuals or from releasing them into unsuitable habitat (e.g., where exotic predators are present). Observations of diseased and parasite-infected amphibians are now frequently reported. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up infections of disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to localities containing species which have had little or no prior contact with such pathogens or parasites. Use of a Service-approved biologist would reduce or prevent improper handling, containment, or transport of California red-legged frogs.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or upland habitat to a degree where California red-legged frogs are injured or killed. The release of sediments or toxic materials into California red-legged frog aquatic habitat would be minimized by the implementation of the general BMPs, which includes measures to minimize or avoid the release of sediments or contaminants into California red-legged frog aquatic habitat.

Given the Air Force's efforts to avoid direct and indirect effects to California red-legged frog aquatic habitat, and the additional measure to avoid affecting individual California red-legged frogs in upland areas, we conclude that few California red-legged frogs would be affected by project activities. Overall, the low number of individual California red-legged frogs we think would be affected means that the proposed action is not likely to substantially reduce the numbers, reproduction, or distribution of the California red-legged frog. Any effects are likely to be temporary and masked by future reproduction by the species and recovery of disturbed habitat.

Recovery of the California Red-Legged Frog

Because the action area is within a recovery unit with "high recovery status," the proposed bridge replacement is not likely to reduce the potential contribution of the action area to the conservation of the California red-legged frog. In other words, the populations of California red-legged frog in the recovery unit are considered plentiful and many of those are of high quality.

Overall, the effects to the species and its habitat would be relatively minor and temporary, so we anticipate that the proposed project will not diminish the species' ability to recover.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Because the entire base is a Federal installation, we are not aware of any non-Federal actions that are reasonably certain to occur in the action area.

CONCLUSION

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Air Force's proposal to issue an access agreement to UPRR to replace the railroad bridge over San Antonio Creek on VAFB is not likely to jeopardize the continued existence of the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, or California red-legged frog.

We have reached these conclusions based on the following reasons:

1. The Air Force and UPRR have proposed measures to minimize the potential adverse effects of project activities on California least terns, unarmored threespine stickleback, tidewater gobies, El Segundo blue butterflies, western snowy plovers, and California red-legged frogs;

2. The project is generally small in area and of short duration so the effects are not likely to interfere with the species' numbers or distribution;

3. No California least terns, unarmored threespine stickleback, tidewater gobies, western snowy plovers, or California red-legged frogs are likely to be killed or injured during project activities;

4. Although California least tern and western snowy plover breeding, foraging and roosting within the action area may be affected, the habitat supporting these behaviors will not be eliminated; and

5. Recovery opportunities for the California least terns, unarmored threespine stickleback, tidewater gobies, El Segundo blue butterflies, western snowy plovers, and the California red-legged frogs will not be compromised because the proposed project, as modified by proposed conservation measures, should not reduce the reproduction, numbers, or distribution of the California least terns, unarmored threespine stickleback, tidewater gobies, El Segundo blue

butterflies, western snowy plovers, and the California red-legged frogs to the point where it would reduce appreciably the likelihood of these species survival and recovery.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary and must be undertaken by the Air Force for the exemption in section 7(o)(2) to apply. The Air Force has a continuing duty to regulate the activity covered by this incidental take statement. If the Air Force fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Air Force must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

California Least Tern
We anticipate that California least terns present on the beach at San Antonio Creek during project activities may be exposed by night lighting to nocturnal predators. As a result of the night lighting, nocturnal predators may kill or injure California least tern adults, chicks, or eggs. We cannot determine the precise number of California least terns that may be taken due to the fluctuating number of birds present from one season to the next.

Unarmored Threespine Stickleback
We anticipate that no take of unarmored threespine stickleback would occur if the minimization measures proposed by the Air Force and UPRR are effective. However, if sedimentation or contaminants are not restricted from entering San Antonio Creek, then some level of take is anticipated. The actual number of unarmored threespine stickleback that may be taken cannot be accurately predicted because of their small size and varying abundance in a given location. Because we are unable to reasonably anticipate the actual number of unarmored threespine stickleback that would be taken by the proposed project, we are including within the Terms and Conditions a measure that defines the limit at which we believe consultation should be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion

indicate that adverse effects to unarmored threespine stickleback would likely be low given the nature of the proposed action.

Tidewater Goby
We anticipate that no take of tidewater gobies would occur if the minimization measures proposed by the Air Force and UPRR are effective. However, if sedimentation or contaminants are not restricted from entering San Antonio Creek, then some level of take is anticipated. The actual number of tidewater gobies that may be taken cannot be accurately predicted because of their small size and varying abundance in a given location. Because we are unable to reasonably anticipate the actual number of tidewater gobies that would be taken by the proposed project, we are including within the Terms and Conditions a measure that defines the limit at which we believe consultation should be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to tidewater gobies would likely be low given the nature of the proposed action.

El Segundo Blue Butterfly
We anticipate that the some El Segundo blue butterflies could be subject to take in the form of harm, injury, and mortality. Project actions that damage, destroy, or remove coast buckwheat plants could result in injury or mortality of individual El Segundo blue butterflies because this species spends the vast majority of its life in close association with its host plant. Removing the host plant, or otherwise damaging it to a point that the plant would not provide the adequate life-supporting attributes for El Segundo blue butterflies could harm individual El Segundo blue butterflies to the point of injury by significantly impairing essential behavioral patterns, including breeding, feeding, and sheltering. In addition, actions that involve soil excavation within occupied habitat could result in mortality or injury of diapausing pupae. However, because of their cryptic nature, fluctuations in abundance from one generation to the next and from one flower head to another, and the potential of injury and mortality from other sources, detecting dead or injured El Segundo blue butterflies as a result of the proposed actions would be very difficult.

We cannot reasonably estimate the number of El Segundo blue butterfly that may be taken (i.e., we do not know the number of individuals in surrounding areas or how often they may be killed or injured). Therefore, we have used the reasonable and prudent measures and terms and conditions of this incidental take statement to establish a threshold that, if met, would require the Air Force to re-initiate consultation. The reinitiation threshold is in two parts, based upon the take of individuals and the loss of host plants as a surrogate for individuals taken.

Western Snowy Plover
We anticipate that western snowy plovers present on the beach at San Antonio Creek during project activities may be exposed by night lighting to nocturnal predators. As a result of the night lighting, nocturnal predators may kill or injure western snowy plover adults, chicks, or eggs. We cannot determine the precise number of western snowy plovers that may be taken due to the fluctuating number of birds present from one season to the next.

California Red-legged Frog

We anticipate that California red-legged frogs could be subject to take in the form of injury and mortality. Although the bridge spans the creek, California red-legged frogs have been found away from water in adjacent dense riparian vegetation, therefore, because project activities will occur in riparian habitat, California red-legged frogs could be subject to take from the proposed activities. We assume some frogs would be capable of moving out of harm's way, but some may not be detected and could be killed or injured.

Similar to the El Segundo blue butterfly, we cannot reasonably estimate the number of California red-legged frogs that may be taken because we do not know the number of individuals in surrounding areas or how often they may be killed or injured. Therefore, we have used the reasonable and prudent measures and terms and conditions of this incidental take statement to establish a threshold that, if met, would require the Air Force to re-initiate consultation.

REASONABLE AND PRUDENT MEASURES

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog during the project activities analyzed in this biological opinion:

1. The Air Force must ensure that the level of incidental take of California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog that occurs during project implementation is commensurate with the analysis contained herein.

2. The Air Force must implement measures to minimize the loss of host plants for the El Segundo blue butterfly, and to reduce the potential for injury or mortality of California least terns, unarmored threespine stickleback, tidewater gobies, western snowy plovers, and California red-legged frogs.

TERMS AND CONDITIONS

To be exempt from the prohibitions in section 9 of the Act, the Air Force must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

The following terms and conditions implement reasonable and prudent measure 1:

1.1 The Air Force must develop and implement a monitoring plan to determine the level of incidental take of California least terns, unarmored threespine stickleback, tidewater gobies, El Segundo blue butterflies, western snowy plovers, and California red-legged frogs associated with the project activities in the action area. The monitoring plan must include a standardized mechanism for project personnel to report any observations of

dead or injured listed animals to the Service-approved biologist. The Air Force must collect information obtained through monitoring to include in the project completion report to the Service that is required by this incidental take statement and described in the "Reporting Requirements" section below.

1.2 The Air Force must notify the Ventura Fish and Wildlife Office immediately if one (1) western snowy plover or California least tern is injured or killed as a result of the proposed activities. We will then review the project activities to determine if additional protective measures are needed. Project activities may continue during this review period, provided that all protective measures proposed by the Air Force and the terms and conditions of this biological opinion have been, and continue to be, implemented.

1.3 If ten (10) unarmored threespine stickleback or ten (10) tidewater gobies are found dead or injured during the bridge replace construction period, the Air Force must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities may continue during this review period, provided that all protective measures proposed by the Air Force and the terms and conditions of this biological opinion have been, and continue to be, implemented.

1.4 Generally, El Segundo blue butterfly are not common anywhere they are observed, and any found dead or injured may indicate that more individuals have been similarly affected but not detected. If one (1) adult or larva of the El Segundo blue butterfly is found killed or injured due to project activities, the Air Force must notify the Ventura Fish and Wildlife Office immediately. If a second adult or larval El Segundo blue butterfly is found killed or injured by project activities, the Air Force must reinitiate formal consultation with the Service. In instances where the amount or extent of incidental take is exceeded, any operations causing such take should cease pending reinitiation.

1.5 Because we also anticipate take of the El Segundo blue butterfly as a result of the loss of host plants (coast buckwheat), we also hereby establish a take threshold based upon the number of plants removed. Although the average coast buckwheat plant may have 300 flower heads and each flowerhead can support one adult butterfly, the density of adult El Segundo blue butterflies is likely to be much lower. Based upon research by Pratt (pers. comm. 2007), we anticipate that each host plant could support one adult El Segundo blue butterfly, although not all of them are likely to support one butterfly at the moment they are removed (most butterflies will move off if disturbed). Therefore, if 1,250 seacliff buckwheat plants are removed during the project activities, the Air Force must reinitiate formal consultation with the Service. Once this limit is reached, any actions causing the loss of additional host plants should cease pending reinitiation.

1.6 Based on the measures to avoid effects to California red-legged frog breeding habitat and the limited possibility of adversely affecting a California red-legged frog while working in riparian vegetation, if one (1) adult or one subadult California red-legged frog is found

killed or injured due to project activities, the Air Force must notify the Ventura Fish and Wildlife Office immediately. If a second adult or subadult California red-legged frog is found killed or injured due to project activities, the Air Force must reinitiate consultation with the Service. Any operations causing such take should cease pending reinitiation.

The following terms and conditions implement reasonable and prudent measure 2:

2.1 The Air Force must request our approval of any biologist who will conduct activities related to this biological opinion at least 15 days prior to any such activities being conducted. A qualified biologist(s) is more likely to reduce adverse effects based on their expertise with the covered species. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. Authorization of Service-approved biologists is valid for this consultation only.

2.2 California red-legged frogs must be relocated from all areas where project activities would occur near riparian or aquatic habitat and that may result in injury or mortality of these individuals. California red-legged frogs may only be captured by hand or dip net and transported in buckets separate from other species. When capturing and removing California red-legged frogs, the Service-approved biologist(s) must minimize the amount of time that animals are held in captivity. California red-legged frogs must be maintained in a manner that does not expose them to temperatures or any other environmental conditions that could cause injury or undue stress.

2.3 Term and Condition 2.2 has the potential to cause the transfer of chytrid fungus between drainages. Therefore, to avoid transferring disease or pathogens between aquatic habitats during the course of surveys and handling of California red-legged frogs, the Service-approved biologist(s) must follow the Declining Amphibian Population Task Force's Code of Practice. A copy of this Code of Practice is enclosed. You may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care must be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

REPORTING REQUIREMENTS

The Air Force must provide a written report to the Service within 90 days following completion of the proposed project. The report must state the impacts to habitat for the El Segundo blue butterfly (i.e., loss of host plants). The report must also disclose the number of California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog killed or injured, describing the circumstances of the mortalities or injuries if known. The report must also document the number and size of any California red-legged frogs relocated from the action area, the date and time of relocation, and a description of relocation sites. The report must contain a brief discussion of any problems encountered in implementing minimization measures, results of biological surveys, California least tern and western snowy plover monitoring and sighting records, and any other pertinent

information. We encourage you to submit recommendations regarding modification of or additional measures that would improve or maintain protection of listed species, while simplifying compliance with the Act.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Upon locating a dead California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog initial notification must be made to the Ventura Fish and Wildlife Office by facsimile at (805) 644-3958 immediately and in writing at the letterhead address within 3 working days. Notification must include the date, time, and location of the carcass; cause of death, if known; and any other pertinent information.

Care must be taken in handling injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis. The finder of injured specimens has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed, unless to remove it from the path of further harm or destruction. Should any listed species survive injury, the Service must be contacted regarding their final disposition.

The remains must be placed with educational or research institutions holding the appropriate State and Federal permits, such as the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, (805) 682-4711, extension 321).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Air Force should continue conducting surveys for El Segundo blue butterflies in any areas at VAFB that contain coast buckwheat, to refine our knowledge of the subspecies' distribution.

2. The Air Force should work with the Service towards the implementation of recovery actions identified in the respective recovery plans for the California least tern, unarmored threespine stickleback, tidewater goby, El Segundo blue butterfly, western snowy plover, and California red-legged frog.

REINITIATION NOTICE

This concludes formal consultation on the effects of the Air Force's proposed authorization of the Narlon Bridge replacement project. Reinitiation of formal consultation is required if: (1) the

amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Chris Dellith of my staff at (805) 644-1766, extension 227.

Sincerely,

Roger P. Root

Roger P. Root
Acting Field Supervisor

Enclosure

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Appendix A. Avoidance and Minimization Measures

Standard Minimization Measures

The following Minimization Measures are recommended to prevent erosion and minimize impacts to San Antonio Creek and listed aquatic species:

1. Equipment and vehicles shall be cleaned of weed seeds prior to use in the project area to prevent the introduction of weeds. If equipment or vehicles move from one watershed to another on base, wheels, undercarriages, and bumpers will be cleaned prior to traveling. If no nearby wash facility or means to collect on site and dispose of rinse water to a sewer is available, equipment vehicles may be air blasted on site.
2. The edge of riparian vegetation will be shown on construction plans and boundaries of the work area will be shown on construction plans.
3. Construction fencing shall be placed along the outer edge of action area to protect the dune scrub and riparian habitat from incidental impacts.
4. During construction, riparian vegetation will be left undisturbed along San Antonio Creek channel banks in all areas.
5. Clearing and grubbing would occur outside of the bird nesting season. Riparian vegetation in the work area will be cut, with roots and two inches of stem remaining to allow plants to re-grow when construction is complete, and to provide permanent erosion control.
6. An environmental monitor shall be present during mowing, clearing and grubbing activities (pruning and mowing), crane pad construction (earth moving activities), and during vegetation removal. The environmental monitor shall document compliance with all best practices and environmental compliance items for the project. The environmental monitor shall be qualified to move wildlife from the project areas as needed.
7. Appropriate best management practices shall be utilized at the site to prevent sediment pollution from entering San Antonio Creek. Erosion control measures shall include both temporary and permanent protection, including but not limited to installation of silt fence, straw wattles, erosion control fabrics, and hydroseed. A Storm Water Pollution Prevention Plan will be prepared and implemented by qualified practitioners.
8. No diversion or dewatering is proposed within the live channel.
9. A dewatering plan for drilled shaft operations will be prepared prior to construction. All project-related dewatering actions during drilled shaft operations and prior to casing fill will only occur during daylight hours. Wet spoils removed from the drill holes will be contained in above-ground, bermed structures that prevent dirty water from entering the creek. Water will be pumped into a container such as a Baker tank, or equivalent. Water and/or non-toxic dust palliative may be used for dust control. If excess water is captured, it will be tested for water quality per Regional Water Quality Control Board Region 3 standards. If filtered water quality is at or above San Antonio Creek water quality, water may be discharged to the creek in a manner that does not increase turbidity in the creek (e.g. through a vegetated filter). Biological monitoring may include additional patrols of banks and isolated pools and turbidity testing in San Antonio Creek.
10. All hazardous materials required to operate and maintain construction equipment will be properly used in accordance with manufacturer’s specifications.

11. The contractor will follow an approved spill prevention plan, including procedures to ensure that all equipment is properly maintained and free of leaks and all necessary repairs incorporate proper spill containment.
12. Hazardous materials will be properly stored and managed in secured areas located outside of the San Antonio Creek riparian corridor.
13. Mobile equipment will be staged, repaired, and maintained at least 500 feet outside the San Antonio Creek riparian corridor. Large equipment such as cranes will be staged adjacent to the bridge, outside of the live stream. Fueling of equipment will be conducted in pre-designated areas, outside of the live stream. Spill containment materials will be placed around the equipment before refueling. Standing equipment (e.g. cranes) will be outfitted with drip pans and hydrocarbon absorbent pads.
14. Stationary equipment operating within the riparian area will be placed on protective mats to prevent contamination of the creek bed.
15. Night lighting required for pile construction (e.g. drilling operations) will be limited to areas that buffer light from reaching foredune habitat west of the project (e.g. place lights below bridge) to minimize impacts to federally listed birds.
16. Preconstruction surveys for nesting western snowy plover and California least tern would be conducted from 1 March to 30 September by a Service approved biologist to determine if these federally listed birds are nesting on beach or dune habitat west of the Narlon Bridge. If either species is found to be nesting, a qualified biological monitor will be present during night lighting operations to monitor effects of night lighting.
17. If it is necessary to refuel or repair equipment within the riparian corridor, a qualified biologist will be present to document protection of water quality and biological resources.
18. All temporary disturbed areas, including the access roads, will be restored (at a minimum) to the original condition.
19. Disturbed riparian areas will be planted with willow live-stakes and blackberries planted 6 feet on-center where willows have not naturally resprouted. Live stake planting will occur between November 1 and January 30 during the year following construction. The riparian edge will be reseeded per the restoration plan.
20. Disturbed dune scrub vegetation will be seeded with at least six species from the following mix (as local material is available), and may include additional seeds collected in the area:

Dune scrub seed mix

Species	**Lbs/Acre**
Lotus scoparius	4.0
Achillea millefolium	1.0
Camissonia cheiranthifolia	1.0
Eriophyllum confertiflorum	1.0
Ericameria ericoides	1.0
Eschscholzia californica (seeds collected from nearby VAFB dune scrub)	1.5
Lupinus chamissonis	2.0
Vulpia microstachys	8.0
Artemisia californica	0.2
Gnaphalium californicum	0.1

Mimulus aurantiacus aurantiacus	0.1

Coast buckwheat seeds will be added to the dune scrub seed mix on VAFB property at a rate of four (4) pounds per acre. Coast buckwheat seeds will be sourced from VAFB or will be collected from VAFB by a Service-approved biologist.

Nesting Habitat Minimization Measures

Migratory non-game native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory non-game birds (as listed under the Federal MBTA). If avoidance of construction during the nesting bird season is not practicable in potentially affected areas, the following BMP is proposed:

MM-1. Within one week of ground disturbance activities, if work occurs between March and August, nesting bird surveys shall be conducted. If construction activities must be conducted between March and August, nesting bird surveys shall take place within one week of habitat disturbance. If surveys do not locate nesting birds, construction activities may be conducted. If nesting birds are located, no construction activities shall occur within 15 feet of nests until chicks are fledged. VAFB biologists may be consulted regarding reduction of set-backs from nests on their property, in the event that the species nesting is tolerant of human disturbance. Reduction in the setback would be determined on a case-by-case basis. A pre-construction survey report shall be prepared upon completion of the survey. The report shall discuss fencing or flagging of the buffer zone and make recommendations on additional monitoring requirements**.** A map of the project site and nest locations shall be included with the report.

Aquatic Species Protection

MM-2. Water quality parameters will be measured prior to the commencement of the project in a manner that minimizes adverse impacts to the unarmored threespine stickleback, tidewater goby, and California red-legged frog.

MM-3. A contingency plan will be developed for the recovery and salvage of unarmored threespine stickleback, tidewater goby, and California red-legged frogs in the event of a local toxic spill or accidental dewatering of their respective habitats.

MM-4. All project activities that may affect the California red-legged frog, unarmored threespine stickleback, tidewater goby, or their respective habitats must be monitored by a Service-approved biologist.

California Red-legged Frog Protection and Minimization Measures

MM-5. Qualified biologists will brief all project personnel prior to participating in construction activities. At a minimum, the briefing will include a description of the project components and techniques, a description of the listed species occurring in the project

area, and the general and specific measures and restrictions to protect the species during implementation of the project.

MM-6. Prior to start of construction activities, install exclusionary silt fencing to adequately exclude California red-legged frog from the project area during active construction. These fences may be opened during periods of no-construction (e.g. on weekends) to prevent entrapment of California red-legged frog.

MM-7. Service-approved biological monitor(s) shall be present on site during all construction activities occurring in the riparian zone. Prior to the start of construction activities in the riparian zone each day, biologist(s) will survey the work sites for California red-legged frog, look under parked vehicles and heavy equipment frequently (especially every morning before work starts). California red-legged frogs captured during surveys or construction activities will be relocated to the nearest suitable habitat outside of the project area.

MM-8. All trash shall be removed from the site daily or secured in a predator-resistant container to avoid attracting predators to the site.

El Segundo Blue Butterfly Minimization Measures

MM-9. Where coast buckwheat occurs, vegetation maintenance will be conducted prior to construction, after larvae have fallen into the soil for the pupal stage of its life cycle.

MM-10. Coast buckwheat will be replanted on VAFB property to replace and enhance habitat for El Segundo blue butterfly.

The Declining Amphibian Populations Task Force Fieldwork Code of Practice

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized *(e.g.*, boiled or treated) water before leaving each work site.

2. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond, wetland, or riparian area.

3. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp" Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the “delicates” cycle.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.

5. When amphibians are collected, ensure that animals from different sites are kept separately and take great care to avoid indirect contact (*e.g.*, via handling, reuse of containers) between them or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected and disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials and fluids should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions. For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK.
E-mail: DAPTF@open.ac.uk
Fax: +44 (0) 1908-654167

Jessica Griffiths

From: YORK, DARRYL L GS-13 USAF AFSPC 30 CES/CEIEA <darryl.york@us.af.mil>
Sent: Thursday, April 18, 2019 1:54 PM
To: Jessica Griffiths
Subject: FW: [Non-DoD Source] Re: [EXTERNAL] Biological Opinion for the Narlon Railroad Bridge Replacement Project (8-8-12-F-52)
Signed By: darryl.york@us.af.mil

Follow Up Flag: Follow up
Flag Status: Flagged

From: Diel, Christopher <christopher_diel@fws.gov>
Sent: Wednesday, April 17, 2019 4:10 PM
To: Tipton, Heather <heather_tipton@fws.gov>; YORK, DARRYL L GS-13 USAF AFSPC 30 CES/CEIEA <darryl.york@us.af.mil>; Jennifer Strotman <jennifer_strotman@fws.gov>
Cc: Lena Chang <lena_chang@fws.gov>
Subject: Re: [Non-DoD Source] Re: [EXTERNAL] Biological Opinion for the Narlon Railroad Bridge Replacement Project (8-8-12-F-52)

Darryl,

Per your March 15th email, the Union Pacific Railroad (UPRR) is proposing to begin replacement of the Narlon Railroad Bridge over San Antonio Creek on north Vandenberg Air Force Base (VAFB) in late 2019. We previously consulted on this project and issued a biological opinion (8-8-12-F-52; 2012-F-0526) on August 29, 2013. Since that time, UPRR has revised the project description to reflect changes to project design, implementation, and duration. The Air Force believes that the revised project activities would have fewer impacts to listed species than those in the original project description, and would not require reinitiation of the biological opinion.

The revised project description for replacement of the Narlon Railroad Bridge includes the following notable changes:

1) The replacement bridge length would be decreased from 760 feet to 720 feet.

2) New steel towers on existing footings would be used to support the new bridge rather than drilling new footings and anchoring new concrete columns. Temporary supports may be installed under the existing bridge spans during bridge change-out.

3) The existing access bridge would remain in place rather than removed. Two temporary construction access bridges, placed to span the riparian zone, would be constructed to allow crane access and would be entirely removed upon completion of construction. Fill would no longer for necessary for temporary access bridges.

4) The temporary concrete batch plant has been removed from the project description.

5) An additional staging area (1.53 acres), located south of the bridge within the "Narlon Bridge Project Site," would be used for storage of equipment and materials. Fill may be required to level the surface.

6) The size of, and/or activity within, the remaining proposed staging areas would be as follows:

a. Within the "Narlon Bridge Project Site," the staging area southwest of the bridge (1.4 acres, unchanged) would be used for equipment and materials storage. This area would be graded (maximum cut depth of 22 feet), with temporary shoring as required.

b. The "Narlon Station Staging Area" would be decreased from 10.8 acres to 4.6 acres and used for stockpiling bridge parts.

c. The "Rail Garrison Staging Area" would be increased from 0.6 acre to 1.5 acres (still within the existing paved area) and used for a temporary office, equipment staging, and materials storage. Equipment and materials may be loaded on a spur line adjacent to the staging area and moved by rail south to Narlon Bridge. The UPRR right-of-way may be used as an access road between the staging area and the bridge (approximately 1.4 miles total), and right-of-way vegetation (approximately 4 acres total) may be mowed.

d. The "Tangair Staging Area" would be decreased from 6.5 acres to 1.93 acres and used for spoils or material storage. The spur track south of the staging area (on VAFB property) may be used for storing materials in rail cars.

7) Vegetation adjacent to Watt Road and unimproved roads to and through the bridge site would be mowed (up to 6 feet on each side; up to 0.2 acre total) to allow large equipment access. No new permanent widening would occur.

8) Expected project duration is reduced from 2 years to 14 months.

Additional detailed information regarding revised project activities was provided in the memo attached your March 15th email.

As a result of these proposed changes, the revised project is expected to temporarily affect an additional 0.04 acre of arroyo willow riparian habitat for a total of 1.84 acres on VAFB, as well as 0.7 acre of heavily disturbed riparian habitat with the managed UPRR right-of-way under the bridge. The amount of habitat for the El Segundo blue butterfly (*Euphilotes battoides allyni*) temporarily affected by the revised project would decrease by 3.62 acres, for a total of 22.78 acres of occupied butterfly habitat. In addition, updated surveys for coast buckwheat (*Eriogonum parviflorum*), host plant for the butterfly, indicate that fewer buckwheat would be temporarily affected by the revised project – 1,036 buckwheat were found during 2018/2019 surveys within the revised project area, compared to 1,250 buckwheat found during 2013 surveys.

After reviewing the revised project description, the activities and effects analyzed in the existing biological opinion, and the statuses of the species, we conclude that the proposed changes to the Narlon Railroad Bridge Replacement Project would not require reinitiation of the biological opinion. Please be aware that all relevant avoidance and minimization measures, reasonable and prudent measures, terms and conditions, and reporting requirements remain in effect. If you have any questions or concerns, please feel free to contact me.

Sincerely,

Christopher J. Diel

Assistant Field Supervisor
U.S. Fish & Wildlife Service, Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003
805/677-3366

---------- Forwarded message ---------
From: **YORK, DARRYL L GS-13 USAF AFSPC 30 CES/CEIEA** <darryl.york@us.af.mil>
Date: Mon, Apr 15, 2019 at 12:51 PM
Subject: RE: [Non-DoD Source] Re: [EXTERNAL] Biological Opinion for the Narlon Railroad Bridge Replacement Project (8-8-12-F-52)
To: Tipton, Heather <heather_tipton@fws.gov>

Heather:

Following are answers to your questions. Please let me know if this is what you needed.

1. Yes, the latest buckwheat surveys cover the entirety of all areas within the Action Area--all 22.78 acres of the proposed Action Area were surveyed, including disturbed habitat within the ROW and all areas of planned disturbance along Watt Road. There are no proposed work areas that were not surveyed for buckwheat, so there would not be any undocumented impacts to buckwheat.
2. VAFB has conducted many years of ESBB surveys in the area, and those survey results indicate that we should consider the entirety of the Action Area to be potentially occupied ESBB habitat. The 2013 BO evaluated an Action Area of 26.4 acres of potentially occupied ESBB habitat. The revised Action Area is 22.78 acres of potentially occupied ESBB habitat. Therefore, the current project would impact 3.62 fewer acres of ESBB habitat. Below is a table illustrating where buckwheat currently occurs within the action area. Note that there will be no coastal scrub impacted or removed at the Tangair Staging Area (it is unvegetated), so no buckwheat will be impacted. Unfortunately, the 2012 BA does not specify how the 1,250 buckwheat plants identified within the Action Area at the time were distributed, so I'm not sure how useful this information is for comparing the current revised project to the previous project.

Project Location	# of buckwheat
Rail Garrison Staging Area	257
Narlon Station Staging Area	14

Narlon Bridge Project Site	745
Watt Road	20
	1036

3. Yes, all avoidance and minimization measures laid out in the 2013 BO will be implemented.

Let me know if you need any additional information.

Best,

Darryl

From: Tipton, Heather <heather_tipton@fws.gov>
Sent: Wednesday, April 10, 2019 2:25 PM
To: YORK, DARRYL L GS-13 USAF AFSPC 30 CES/CEIEA <darryl.york@us.af.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL] Biological Opinion for the Narlon Railroad Bridge Replacement Project (8-8-12-F-52)

Hi Darryl,

I just have a few questions/clarifications I hope will be easily answered:

1. Did the latest buckwheat surveys (conducted in 2018/2019) include all areas within the revised action area as outlined in Table 1 of the March 7, 2019 memo? Specifically, the memo states that the recent surveys found 1036 buckwheat in "areas of dune scrub where vegetation removal is planned." Were "disturbed" areas were included in surveys? Does additional buckwheat occur within proposed work areas that could be affected by activities other than veg removal?
2. Could we please get some additional info regarding 1) where buckwheat occur within the revised action area, 2) the ESBB occupancy status of these areas, 3) if occupancy varies, the number of plants by area, and 4) how, if at all, this differs from the conditions analyzed in our 2013 BO (or you could send the 2012 BA if it has info to help me address this question). My focus is identifying whether more occupied habitat will be affected under the revised project as compared to the original (as I mentioned, I don't have the BA and the BO doesn't clearly state whether all expected impacts were to known occupied habitat).

3. Can you please confirm that all avoidance and minimization measures included in the original project description (see Appendix A of the 2013 BO) will still be implemented?

Thanks,

Heather

Heather Tipton

U.S. Fish and Wildlife Service

South Coast Division, Ventura Fish & Wildlife Office

phone: 805-677-3326

heather_tipton@fws.gov

On Fri, Mar 15, 2019 at 4:50 PM YORK, DARRYL L GS-13 USAF AFSPC 30 CES/CEIEA <darryl.york@us.af.mil> wrote:

> Chris/Lena/Heather:
>
> The Union Pacific Railroad (UPRR) is proposing to finally start replacement of the Narlon Bridge over San Antonio Creek in late 2019. However they have changed their original project design since 2013. Attached is a revised Project Description prepared by their consultants (Althouse and Meade) outlining changes from the original design and how those changes will impact sensitive resources. In this document (pg 8) is a "Narlon BO Amendment Comparison Table" that does a really nice job of comparing the text from the 2013 BO with the current project description.
>
> After a thorough review of this document and multiple meetings with UPRR and their consultants we don't believe these project changes rise to the level of a reinitiation. However, after you have an opportunity to review the attachment we would like to discuss how we need to move forward.
>
> Please let me know if you have any questions.
>
> Thx

> Darryl
>
> Darryl York
>
> Chief, Conservation Branch
>
> 30 CES/CEIEA
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> 1028 Iceland Ave., Bldg 11146
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APPENDIX D. SHPO DOCUMENTATION

State of California • Natural Resources Agency Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION Lisa Ann L. Mangat, *Director*
OFFICE OF HISTORIC PRESERVATION
Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
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calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

July 25, 2019

Reply in Reference To: USAF_2013_0617_001

Lieutenant Colonel Jason M. Aftanas
Commander, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

Re: Section 106 Consultation for Narlon Bridge Replacement Project, Vandenberg AFB (USAF letter of June 13, 2019 and e-mail of July 19, 2019)

Dear Colonel Aftanas:

The United States Air Force (USAF) is continuing its consultation with the State Historic Preservation Officer (SHPO) on the above-cited undertaking in accordance with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. § 306108), as amended, and its implementing regulation found at 36 CFR Part 800.

The USAF proposes to issue a license to the Union Pacific Railroad (UPRR) allowing them to use VAFB lands as a temporary construction area during the implementation of the Narlon Bridge replacement project. The bridge was constructed in 1896 and the steel superstructure has corroded and deteriorated to the point that continued use poses a safety risk for passengers and freight. The SHPO initially reviewed and commented on the proposed undertaking in a letter dated January 15, 2014. The ongoing consultation process was paused so UPRR could address constructability issues.

As documentation for its determination of effect, the USAF submitted a cultural resources survey report prepared by Christopher Ryan (USAF) and Josh Smallwood (Center for Environmental Management of Military Lands) and dated June 2019. A records review of the VAFB's cultural resources records, previous pedestrian surveys, and recent pedestrian surveys and field-testing conducted in November of 2016 and between November of 2018 and January 2019 identified the following status:

Trinomial Numbers	Status of cultural resources
CA-SBA-707	The USAF has determined that this site is eligible for listing on the National Register of Historic Places (NRHP) under criterion D. Fencing will be installed along the existing access road, which traverses the site to exclude construction activities and personnel.
CA-SBA-708	The USAF has not evaluated this site for its potential for listing on the NRHP. However, the USAF will

	consider the site eligible for the purposes of the proposed undertaking, although none of the contributing elements is located in the APE. Fencing will be installed to exclude construction activities and personnel from the potentially significant portion of the site.
CA-SBA-1709H	The USAF has determined that this site is not eligible for listing on the NRHP under any of the criteria.
CA-SBA-2165H	The USAF has not evaluated this site for its potential for listing on the NRHP. However, the USAF will consider the site eligible for the purposes of the proposed undertaking, although none of the contributing elements is located in the APE. Fencing will be installed to exclude construction activities and personnel from the potentially significant portion of the site.
CA-SBA-3733H	The USAF has determined that this site is not eligible for listing on the NRHP under any of the criteria.

Both the submitted report and the letter from the USAF described fully the adequacy of the field-testing and pedestrian surveys and the rationale for the determinations of eligibility.

On June 11, 2019, the USAF initiated consultation with Mr. Freddie Romero of the Santa Ynez Band of Chumash Indians in regards to this proposed undertaking. In an e-mail dated July 19, 2019, the USAF stated that Mr. Romero said specifically for the Narlon Bridge replacement project that he had no issues with the project as described, but did request that he be contacted if any cultural material (inadvertent discovery) is encountered during the project. The USAF will notify Mr. Romero in the event of an inadvertent discovery of cultural material.

Based on the records review, the pedestrian surveys, and the tribal consultation, the USAF has determined that a finding of No Adverse Effect to Historic Properties is appropriate for this proposed undertaking. The USAF has requested the SHPO to review and comment on that determination and the identification of the APE. After reviewing the information submitted by the USAF, the SHPO has the following comments:

1) The SHPO has no objections to your identification and delineation of the area of potential effects pursuant to 36 CFR Parts 800.4 (a)(1) and 800.16(d);
2) The SHPO concurs that CA-SBA-1709H and CA-SBA-3733H are not eligible for listing on the NRHP under any of the criteria; and
3) The SHPO does not object to your Finding of No Adverse Effect to Historic Properties, as described above, pursuant to 36 CFR Part 800.5(c)(1).

Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, the USAF may have additional future responsibilities for this

undertaking under 36 CFR Part 800. Should cultural artifacts be encountered during ground disturbing activities, please halt all work until a qualified archaeologist can be consulted on the nature and significance of such artifacts.

If you have any questions or concerns, please contact Ed Carroll of my staff at (916) 445-7006 or Ed.Carroll@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

APPENDIX E. CCC DOCUMENTATION

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY GAVIN NEWSOM, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
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Th11a

Filed:	2/26/19
3 Months:	5/26/19
6 Months:	8/26/19
Staff:	M. Delaplaine-SF
Staff Report:	4/24/19
Hearing Date:	5/9/19

STAFF REPORT: REGULAR CALENDAR

Consistency Certification No.:	**CC-0003-19**
Applicant:	**Union Pacific Railroad**
Location:	Mile Post (MP) 291.33, Union Pacific Coast Line, San Antonio Creek, Vandenberg Air Force Base, Santa Barbara County
Project Description:	Replacement of existing Narlon Bridge rail crossing of San Antonio Creek
Staff Recommendation:	Concurrence

SUMMARY OF STAFF RECOMMENDATION

The Union Pacific Railroad (UPRR) proposes to replace Narlon Bridge, which provides rail access across San Antonio Creek on northern Vandenberg Air Force Base in Santa Barbara County. The existing bridge is over 120 years old and its steel supports have deteriorated, threatening the integrity of the bridge. Replacing the bridge is needed to maintain vital commercial rail transport and continued public travel on Amtrak's Pacific Surfliner and Coast Starlight rail lines.

The replacement bridge would be built using the existing concrete bridge footings, which would enable the project to avoid permanent effects on wetlands, environmentally sensitive habitat, and water quality, although it would cause temporary effects during construction, for up to one year.

CC-0003-19 (UPRR)

Adverse effects on environmentally sensitive habitat (ESHA), wetlands, water quality, and cultural resources would be avoided where feasible, and otherwise minimized, with temporary impacts on environmentally sensitive habitat area (ESHA) would be mitigated. Because the duration of the impacts would be up to one year, the staff recommends, and UPRR has agreed, to provide greater than its original commitment for 1:1 mitigation (which was, as originally submitted, to consist of restoration of temporarily disturbed areas).

With the measures included and agreed to in discussions between UPRR and Commission staff, the staff recommends the Commission find the project consistent with all Coastal Act policies except 30240(a). Despite the fact that the impacts would be temporary, the project is nevertheless located within an ESHA but is not a "use dependent on the resources" as required under Section 30240(a). However, the staff also recommends the Commission find that not allowing the project to proceed would be inconsistent with the wetlands, water quality, public access and recreation, and air quality/energy consumption policies of the Coastal Act, because it would prevent benefits from accruing to coastal resources that are inherent in the project and mandated by the policies of the Coastal Act. Those benefits include the maximization of existing and future public access, the facilitation of public transit and the minimization of vehicle miles traveled, the improvement of air and water quality by reducing traffic congestion, and the avoidance of adverse wetlands and water quality impacts if the bridge were to degrade to the point where parts or all of it were to fall into San Antonio Creek (or into the surrounding sensitive riparian habitat).

The staff therefore recommends the Commission find the project creates a conflict between the resource-dependent use and habitat protection elements of the ESHA policy of the Coastal Act (Section 30240(a)) on the one hand, and the wetlands, water quality, public access, and energy conservation policies of the Coastal Act (Sections 30233, 30231, 30232, 30210, 30213, 30252, and 30253) on the other. The staff recommends the Commission resolve this conflict through the conflict resolution policy, Section 30007.5, and that, with the avoidance, minimization and mitigation measures included, authorization of this project represents a resolution of this conflict which is, "on balance, most protective of significant coastal resources."

The project would not adversely affect public access and recreation, wetlands, water quality, or cultural resources. A Native American cultural monitor will be present for any ground disturbing activities to monitor for unanticipated cultural resource impacts.

The staff therefore recommends that the Commission **concur** with this consistency certification. The standard of review is Chapter 3 of the Coastal Act. The motion to concur is on **page 4** of this report.

CC-0003-19 (UPRR)

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Exhibit 3 – Photos of Existing Bridge
Exhibit 4 – Bridge Cross Section, Cut and Fill Plans and Acreages
Exhibit 5 – Habitat Impact Schematic and Acreages
Exhibit 6 – Temporary Bridges and Pilings
Exhibit 7 – Environmental Best Management Practices
Exhibit 8 – Alternatives Considerations
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CC-0003-19 (UPRR)

I. APPLICANT'S CONSISTENCY CERTIFICATION

The Union Pacific Railroad (UPRR) has certified that the proposed activity (CC-0003-19) complies with the California Coastal Management Program (CCMP) and will be conducted in a manner consistent with that program.

II. MOTION AND RESOLUTION

Motion:

*I move that the Commission **concur** with consistency certification CC-0003-19.*

Staff recommends a **YES** vote on the motion. Passage of this motion will result in an agreement with the certification and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

Resolution:

*The Commission hereby **concurs** with consistency certification CC-0003-19 by UPRR on the grounds that the project is consistent with the enforceable policies of the California Coastal Management Program.*

III. FINDINGS AND DECLARATIONS

A. PROJECT DESCRIPTION

The Union Pacific Railroad (UPRR) proposes to replace Narlon Bridge, the existing deteriorating San Antonio Creek bridge crossing on Vandenberg Air Force Base (VAFB) in Santa Barbara County (**Exhibits 1 & 2**). The bridge was originally installed in 1896 and is 720 ft. long. The replacement bridge would be the same length, and UPRR would use similar materials to those in existing bridge for construction. UPRR would retain the existing concrete bridge footings, (thereby avoiding a number of adverse effects on wetlands, environmentally sensitive habitat, and water quality).

The project would include new walkways and handrails, and a new wing-wall would be installed at the north abutment where the existing wing-wall has failed. Temporary supports, and minor grading (up to 15 sq. ft each) to support temporary placement of timber mats may be needed to support the bridge during construction. In the "unlikely event" of a damaged concrete foundation, additional structural support may be proposed as reinforcement. Several level pads will be temporarily constructed to accommodate cranes, one on each side of the creek (**Exhibits 2 & 4**). Temporary construction access bridges will be installed to allow the 300 ton cranes to cross the creek in a manner elevated above, and thus minimizing, effects on riparian and creek habitats (**Exhibit 6**).

Several off-site (but nearby) construction staging areas are proposed: (1) Tangair Staging Area (1.93 acres); (2) Narlon Station Staging Area (4.6 acres), and (3) Rail Garrison Staging area)(1.5 acres) (**Exhibit 8**). Construction would take one year, with bridge replacement scheduled to occur in 2020.

B. OTHER AGENCY APPROVALS AND CONSULTATIONS

Department of the Air Force
UPRR has applied to the Air Force for permission to use VAFB land for staging areas, and VAFB roads for construction equipment access. The Air Force is also preparing an Environmental Assessment under the National Environmental Policy Act (NEPA) for the activity.

U.S. Fish and Wildlife Service (USFWS)
The Air Force received a Biological Opinion in 2013 from the USFWS for a more extensive project which would have involved replacing the concrete footings. The Air Force is continuing to coordinate with USFWS for this revised design that retains the existing concrete footings.

Federal Aviation Administration (FAA)
UPRR is coordinating with the FAA under 14 CFR, Part 77, which requires notification to the FAA for structures being constructed in the vicinity of navigable airspace (in this case, airspace around Tangier Field on VAFB).

Santa Barbara Air Pollution Control District (APCD)
UPRR is coordinating with the Santa Barbara APCD concerning whether any authorizations are needed for its activities, including possible asbestos removal.

Central Coast Regional Water Quality Control Board (RWQCB)
UPRR is coordinating with the RWQCB concerning the need for Waste Discharge Requirements (WDRs) for the activity.

State Historic Preservation Office (SHPO)
The Air Force is coordinating with SHPO concerning compliance with National Historic Preservation Act (NHPA) Section 106 requirements.

Tribal Consultation
The Air Force has consulted with the Santa Ynez Band of Chumash Indians. The Commission staff has coordinated with the Santa Ynez Band of Chumash Indians, the Northern Chumash Tribal Council, and the Coastal Band of the Chumash Nation.

CC-0003-19 (UPRR)

C. ENVIRONMENTALLY SENSITIVE HABITAT AREAS

Coastal Act Section 30240 states:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Two habitat types affected by the proposed bridge reconstruction have the potential to qualify as environmentally sensitive habitats as defined in the Coastal Act (Section 30107.5): arroyo willow riparian habitat, and central dune scrub. The arroyo willow riparian habitat adjacent to San Antonio Creek provides habitat for three federally listed species: the California red-legged frog (*Rana draytonii),* unarmored three-spine stickleback (*Gasterosteus aculeatus williamsoni)* and tidewater goby (*Euchclogobius newberryi).* The central dune scrub provides habitat for Coast buckwheat (*Eriogonum parvifolium),* which hosts the El Segundo blue butterfly *(Euphilotes battoides allyni),* and several other sensitive plant species. The Commission finds these habitats constitute ESHA.

UPRR agrees that habitats qualify as ESHA, other than the land area immediately surrounding the bridge footprint, which has been highly disturbed, and has been mowed and managed for over 100 years (see photos, **Exhibit 3**). UPRR also asserts that both bridge maintenance and public safety require the continuing mowing and management of this strip, as long as the bridge is functioning and needed. The Commission agrees with UPRR concerning this "managed" habitat. Otherwise, for the non-managed habitat, impacts to ESHA would be limited to temporary impacts, and UPRR provides the following chart showing acreages of temporary impacts that would occur to the non-highly and continually-disturbed ESHA:

TABLE 2. PROPOSED HABITAT IMPACTS WITHIN THE NARLON BRIDGE ACTION AREA

Habitat	Permanent Impacts	Temporary Impacts (acres)**
Riparian	0	1.84
Central Dune Scrub	0	11.55
Managed Vegetation (Riparian)	0*	0.70
Managed Vegetation (Central Dune Scrub)	0*	3.25
Total	**0**	**17.34**

*If footing repair is necessary, up to 0.005 acres within the managed ROW would be permanently impacted
** 5.44 acres of Anthropogenic habitat (roads, railroad tracks, etc.) within the Action Area is not included in this table

The temporary impacts would last up to one year in duration, and the habitats would be restored following completion of the bridge replacement.

Thus, aside from areas historically and continually disturbed, the project would temporarily affect 1.84 acres of riparian arroyo willow habitat and 11.55 acres of central dune scrub habitat. While all ESHA impacts are defined as temporary by UPRR, the Commission has historically considered wetland and ESHA disturbances up to a year to warrant mitigation and be treated, for mitigation purposes, similar to permanent impacts.

These habitats would be affected in two ways – the more serious impacts would occur from ground disturbance: (i.e., grading level pads, and installing piles to support the temporary construction bridges). Lesser impacts would occur from mowing vegetation and from shading by the temporary construction bridges. Some minor amount of additional mowing or grading may be needed to slightly widen and facilitate large vehicle access along the shoulders of the unpaved access road (Watt Road) leading to the staging areas. **Exhibit 5** depicts the locations and lists the precise acreages of ESHA impacts in the various project sub-areas.

The arroyo willow riparian impacts would total 1.84 acres, resulting from vegetation mowing, shading from the temporary construction bridge, and fill (**Exhibit 9**). Actual fill in arroyo willow riparian habitat would be very limited and would total 0.0078 acres of that total, caused by pile placement: 108 two-ft.-diameter piles, totaling 339 sq. ft. of footprint. (No work is proposed in San Antonio Creek itself.)

The central dune scrub impacts would total 11.55 acres of impact, 2.12 acres of which would be due to grading for crane pads, equipment laydown, and road shoulder widening. The remainder of central dune scrub impacts would be due to vegetation mowing (9.43 acres).

The breakdown for the grading activities and acreages in the central dune scrub habitats are as follows:

Cut Fill Location (All w/in Dune Scrub)	**VAFB Percent (approximate)**	**Acres Cut/Filled**	***VAFB***	***UPRR - Managed***
SW laydown	95%	1.12	*1.064*	*0.056*
NW Crane Pad	55%	0.17	*0.0935*	*0.0765*
Widened shoulder (fill)	0%	0.45	*0*	*0.45*
SE Crane Pad	25%	0.2	*0.05*	*0.15*
NE Crane Pad	33%	0.18	*0.0594*	*0.1206*
		2.12	***1.2669***	***0.8531***
			Subtotals	

The disturbances have been limited to the minimum necessary to complete the project, and all temporary disturbances would be restored to pre-project conditions and with native species appropriate for the central dune and riparian habitats. The Commission staff has requested substantiation that the ESHA impacts could not be lessened, to which UPRR has responded:

CC-0003-19 (UPRR)

UPRR minimized the 11.55 acre of impact by staging operations and changeouts within the proposed Action Area boundaries. There is no way to accomplish the project to a smaller footprint. They increased the number of change-out work windows from one to possibly 6 or 9 to reduce the area required for staging bridge parts and equipment during the change-out operations. Change-outs are expensive, and fewer is more cost effective, if all the pieces can be laid out for construction in that work window.

The project construction and operations will use the managed vegetation habitat within the Action Area.

Proximity to change-out operations is the reason other managed habitats are not being used beyond the actions areas indicated on the map. Beyond the Narlon Bridge, the distance to materials would be too far for the reach of cranes.

Rail Garrison is a developed part of VAFB, which is why the project is staging on that asphalt surface rather than increasing the project footprint near the bridge. Note: Construction operations would be more convenient to have the whole operation near the bridge. A larger staging area would have significantly increased the footprint of the project on native habitats (ESHA).

Moreover, no less environmentally damaging feasible alternatives are available to further lessen sensitive habitat impacts. The Commission has generally considered bridge replacements "in kind" to represent the least environmentally damaging alternative, because other alternatives would usually involve greater disturbance. In the subject case, UPRR initially anticipated it would need to replace the existing concrete bridge supports, and its original proposal thus would have involved a more damaging alternative than the proposed project using the existing supports. Attachment 6 to UPRR's consistency certification (**Exhibit 8**) describes the alternatives considered and explains why they would be more environmentally damaging; these alternatives consist of: (1) Replacement of concrete support structures, which would result in permanent adverse wetland and ESHA impacts; (2) Cellular fill full replacement with "Con-Span" openings, which would entail replacing the existing, relatively open design with a more closed "wall-type" design with five arched openings, and which would also involve permanent wetland and ESHA impacts; and (3) Bridge replacement in "one continuous changeout period," which would shorten the project's duration but would entail noticeably greater staging area habitat impacts. In addition, the Commission notes that the "No Project" alternative would itself involve more extensive adverse effects on coastal resources, as is discussed in the Conflict Resolution Section of this report below.

UPRR's submittal includes a Vegetation Restoration and Monitoring Plan, which documents baseline conditions, provides native species lists, and commits to: (1) use of local stock wherever practicable, (2) planting schedules, (3) maintenance and monitoring measures, (4) invasive plant species monitoring and removal, (5) performance standards and success criteria, (6) reporting requirements, and (7) an adaptive management component in the event success criteria are not fully met after the 5-Year monitoring period.

Upon reviewing UPRR's original plan, and working with the Commission staff's senior ecologist, the Commission staff informed UPRR that, due to the one-year duration of the temporary impacts, additional mitigation is required for areas affected for approximately one year, based on past Commission decisions and to enable the Commission to find that ESHA would be adequately protected. The requested mitigation ratios are 3:1 for areas graded or filled, and 2:1 for areas mowed. (The Commission staff's ecologist indicated 1:1 should be sufficient for construction bridge shading impacts, which would be minor, given the height of the temporary bridges above the riparian willows. Riparian shading impacts would total 0.62 acres.)

UPRR has agreed to these ratios, and has agreed to submit an Additional Mitigation Plan that will expand restoration activities to include this additional acreage for invasive species removal, which would total approximately 18 acres in addition to the area originally committed to being restored. (If UPRR can reconfigure project components to reduce the acreage and/or duration of impacts, the restoration requirements could, with Executive Director agreement, be correspondingly reduced.) This Additional Mitigation Plan would be submitted to the Executive Director, for his review and concurrence, prior to commencement of construction, and it will identify appropriate locations in need of restoration due to the extent of invasive species. The restoration would consist of removal of invasive species, generally considered in this coastal region to be veldt grass and iceplant, and would include performance and measures needed to achieve its success, including re-treatment if initial removal is not successful, and monitoring for at least 5 years. This additional mitigation may be provided by funding invasive species removal off-site on a South Central Coast restoration site subject to approval by the Executive Director. UPRR has also agreed that all monitoring reports under the existing and additional mitigation plans will be provided to the Commission staff.

UPRR has also incorporated a number of avoidance, minimization, and monitoring measures to assure that impacts would be minimized and successfully restored. These include:

Nesting Habitat Best Management Practices

- Nesting Birds. All construction will be avoided, to the greatest extent possible, during the southern California bird nesting season which is February 15 through August. If construction must occur during this time, no more than 14 days prior to commencement of construction activities, a qualified biologist, approved by the Executive Director, will conduct a preconstruction survey for the presence of nesting birds. If an active nest of any Federal or State-listed threatened or endangered bird species, bird species of special concern, or any species of raptor is identified within 300 feet of construction activities (within 500 feet for raptors) during such preconstruction surveys, or is otherwise identified during construction, UPRR will notify all appropriate State and Federal agencies, including the Commission staff, within 24 hours, and will develop an appropriate action plan specific to each nest occurrence that will be consistent with any recommendations of those agencies. UPRR will notify the Executive Director in writing within 24 hours of identifying such a nest and consult with the Executive Director regarding the determinations of the State and Federal agencies. Measures to be considered would include, but not be limited to, modifying construction activities to

avoid, minimize, and mitigate impacts to nesting birds, such as through implementing buffer zones around nests, installing sound blocking BMPs, limiting the duration of construction activities, and/or re-locating construction-related machinery and activity.

If active nests (nests with eggs or chicks) of common species are located within 300 feet of construction activities, the qualified biologist will establish an appropriate avoidance buffer ranging from 50 to 300 feet based on the species' biology and the current and anticipated disturbance levels occurring in vicinity of the nest. The objective of the buffer will be to reduce nest disturbance for common bird species. All buffers will be marked using high-visibility flagging or fencing, and, unless approved by the qualified biologist, no construction activities will be allowed within the buffers until the young have fledged from the nest or the nest fails. A qualified biologist will monitor all work within 300 feet of the nest. The biologist will immediately cease all project activity if the nesting birds show any signs of disturbance or distress.

Aquatic Species Best Management Practices

- Water quality parameters will be measured prior to the commencement of the project in a manner that minimizes adverse impacts to the unarmored threespine stickleback, tidewater goby, and California red-legged frog (CRLF).
- A contingency plan will be developed for the recovery and salvage of unarmored threespine sticklebacks, tidewater goby, and CRLFs in the event of a local toxic spill or accidental dewatering of their respective habitats.
- All project activities that may affect the CRLF, unarmored threespine stickleback, tidewater goby, or their respective habitats must be monitored by a USFWS-approved biologist.

California Red-legged Frog Best Management Practices

- Qualified biologists will brief all project personnel prior to participating in construction activities. At a minimum, the briefing will include a description of the project components and techniques, a description of the listed species occurring in the project area, and the general and specific measures and restrictions to protect the species during implementation of the project.
- Prior to start of construction activities, exclusionary silt fencing will be installed to adequately exclude CRLF from the project area during active construction. These fences may be opened during periods of no-construction (e.g. on weekends) to prevent entrapment of CRLF.
- USFWS-approved biological monitor(s) shall be present on site during all construction activities occurring in the riparian zone. Each day, prior to the start of construction activities in the riparian zone, biologist(s) will survey the work sites for CRLF and look under parked vehicles and heavy equipment frequently (especially before work starts in the morning).

Additionally, a USFWS-approved biologist (approved under the project's Biological Opinion) or one with valid 10(a)(1)(A) permits for the CRLF, shall be on-call to relocate CRLF. CRLF captured during surveys or construction activities will be relocated to the nearest suitable habitat outside of the project area.

- All trash shall be removed from the site daily or secured in a predator-resistant container to avoid attracting predators to the site.

El Segundo Blue Butterfly Best Management Practices

- Where there is coast buckwheat, vegetation maintenance will be conducted prior to construction, after larvae have fallen into the soil for the pupal stage of their life cycle.
- Coast buckwheat will be replanted on VAFB property to replace and enhance habitat for the El Segundo Blue Butterfly (ESBB).

Finally, the Commission staff requested information on whether the existing bridge contains bat roosting. Conversations with VAFB elicited indications that the structure was unlikely to be suitable for bat roosting, given its general design (i.e., the steel structure) and its height. However while VAFB has conducted surveys in the general area of the project, it has not specifically surveyed the bridge itself. The Commission staff subsequently requested that UPRR conduct such a bridge-specific survey, prior to construction. UPRR has agreed to perform such survey, and if bats are found, to consult further with the Commission staff and State and Federal resource agencies on any measures warranted to protect roosting bats.

The Commission agrees with UPRR that the project has been designed in a manner rendering it the least environmentally damaging feasible alternative. With the above measures, including the commitment to provide greater than 1:1 mitigation in accordance with the above ratios, the Commission finds that the project would not result in permanent adverse impacts to ESHA, and that with mitigation and restoration agreed to, would in the long-term be compatible with the continuance of ESHA.

Nevertheless the project remains inconsistent with Section 30240, because it is not a "use dependent on" ESHA. Therefore, the only way the Commission could concur with this consistency certification would be if it finds the project consistent with the Coastal Act through the "conflict resolution" provision contained in Section 30007.5.

As discussed in **Sections III. D and E** of this report, not allowing the project to proceed would be inconsistent with the wetlands, water quality, public access and recreation, and air quality/energy consumption policies of the Coastal Act, because it would prevent benefits from accruing to coastal resources that are inherent in the project and mandated by the policies of the Coastal Act. Those benefits include the maximization of existing and future public access, the facilitation of public transit and the minimization of vehicle miles traveled, the improvement of air and water quality by reducing traffic congestion, and the avoidance of adverse wetlands and water quality impacts if the bridge were to degrade to the point where parts or all of it were to fall into San Antonio Creek (or into the surrounding sensitive riparian habitat). Thus, the project creates a conflict between the allowable use test of the ESHA policy of the Coastal Act (Section 30240 on the one hand, and the wetlands, water quality, public access, and energy conservation policies of the Coastal Act (Sections 3023330231, 30232, 30210, 30213, 30252, and 30253) on the other. In the concluding section of this report (**Section III. G**), the Commission will provide further analysis concerning the resolution of these conflicts.

CC-0003-19 (UPRR)

D. WETLANDS AND WATER QUALITY

Coastal Act Section 30233 states:

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
>
> *(l) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
>
> *(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
>
> *(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*
>
> *(4) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*
>
> *(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
>
> *(6) Restoration purposes.*
>
> *(7) Nature study, aquaculture, or similar resource dependent activities.*

Coastal Act Section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Coastal Act Section 30232 states:

> *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

No work is proposed in San Antonio Creek, and the pilings in arroyo willow riparian were addressed in the previous section of this report. To protect water quality and San Antonio Creek, UPRR states:

> *During all construction activities, erosion control measures will be implemented to avoid sediment entering San Antonio Creek. All storage of equipment and materials will be confined to upland ….*

These measures include preparation of a Storm Water Pollution Prevention Plan (SWPPP), restoration plans for sensitive habitats and wetlands, and incorporation of Best Management Practices (BMPs) for erosion and sediment control, non-stormwater (wastewater) management, spill prevention and control, vehicle and equipment fueling and maintenance, solid waste management, and stockpile management.

The Best Management Practices to protect habitat and water quality are contained in **Exhibit 7**. They include (1) equipment and vehicle cleaning and refueling measures; (2) mapping, fencing and avoidance practices; (3) avoiding impacts to bird nesting; (4) erosion control measures; (5) monitoring; (6) using mats to protect ground areas from heavy equipment; (7) dewatering plans for any unanticipated excavation below the water table, to be reviewed by the RWQCB; (8) limits on use of hazardous materials and implementation of spill prevention plans; (9) limiting night lighting; (10) preconstruction surveys for sensitive species; and (11) restoration of all disturbed areas in accordance with the Restoration Plan, and using local stock whenever feasible.

With these measures, the Commission finds the project would avoid wetland fill and would meet wetland, water quality, and spill prevention policies of the Coastal Act (Sections 30233, 30231 and 30232). In addition, as explained in the Conflict Resolution Section of this report below, to not authorize the proposed bridge repairs would be inconsistent with Coastal Act Sections 30233, 30231 and 30232 because it would entail significant adverse water quality, wetlands, and sensitive habitat effects in and surrounding San Antonio Creek, including but not limited to the unarmored three-spine stickleback (*Gasterosteus aculeatus williamsoni),* a federally listed species for which this creek is one of only two areas of essential habitat (the other is in the Santa Clara watershed is Los Angeles County), and is a species which the U.S. Fish and Wildlife considers to be "threatened with extinction throughout all or a significant portion of its range." (FWS BO 8-8-12-F-52)

The Commission further finds that Coastal Act Sections 30233, 30231 and 30232 include affirmative language mandating approval *("The biological productivity and the quality of coastal waters … shall be maintained and, where feasible, restored …*" and "*Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided …"*) to

protect coastal water quality, and if bridge repairs and reconstruction were not allowed, water quality resources at and adjacent to the San Antonio Creek area would not be maintained, restored, and protected. As discussed in the previous section of this report, the project creates a conflict between Coastal Act policies, which will, in the concluding section of this report (**Section III. G**), be resolved in a manner most protective of significant coastal resources.

E. PUBLIC ACCESS, RECREATION, AND TRANSIT

Coastal Act Section 30210 states:

> *In carrying out the requirements of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Coastal Act Section 30213 states in part:

> *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred . . . .*

Coastal Act Section 30252 states in part:

> *The location and amount of new development should maintain and enhance public access to the coast by (1) facilitating the provision or extension of transit service . . .*

Coastal Act Section 30253 states in part:

> *New development shall do all of the following: …*
>
> *(d) Minimize energy consumption and vehicle miles traveled.*

This portion of northern Vandenberg AFB is not accessible to the public, other than the use of the UPRR rail corridor for the AMTRAK Surfliner public rail service. The project would thus result in no adverse effects on public access and recreation. Conversely, a failure to replace the Narlon Bridge would adversely affect public access and recreation, both directly by eliminating a popular public rail line service that provides unique coastal views and a number of direct coastal stops throughout southern California, and indirectly as well, due to the fact that public use of that rail service reduces the number of private cars on the region's highways. The Narlon Bridge serves two popular, coastal-access-related, Amtrak routes: the Pacific Surfliner and Coast Starlight rail lines, which provide spectacular and unique coastal views, as well as a number of direct stops at coastal destinations, including Surf (on Vandenberg Air Force Base), Santa Barbara, Carpinteria, Ventura, San Clemente, Oceanside, and Solana Beach.

The indirect benefits of reducing automobile and truck traffic (as well as longer rail trips) would also benefit air quality and energy consumption, as well as reduce greenhouse gas emissions that contribute to sea level rise and exacerbate coastal erosion. The Commission therefore finds the project consistent with the public access, transit, and energy minimization policies of the Coastal Act. In the Substantive File Documents appendix to this report the staff has listed a large number of rail transit improvements for which the Commission has adopted similar findings about the benefits to coastal resources from authorizing rail construction activities (primarily, "SANDAG" bridge replacements and "double-track" projects). The SANDAG rail lines, like UPRR's line, transport both public and commercial freight users.

F. CULTURAL RESOURCES

Coastal Act Section 30244 states:

> *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

UPRR and the Air Force have analyzed the cultural sensitivity of the project area and concluded that known cultural resources would not be affected. Five archaeological sites were identified as within the area of potential effect (CA-SBA-707, CA-SBA-708, CA-SBA-1709H CA-SBA-2165H, and CA-SBA-3733H).[1] Three of the sites were determined not to be affected, and two would be protected with fencing and avoidance by construction activities. The Air Force is coordinating with SHPO and has also consulted with the Santa Ynez Band of Chumash Indians. In addition, the Commission staff has coordinated with the Santa Ynez Band of Chumash Indians, the Northern Chumash Tribal Council, and the Coastal Band of the Chumash Nation. To date, no Tribal concerns have been communicated to Commission staff. UPRR states that a Native American cultural monitor will be present for any ground disturbing activities to monitor for unanticipated cultural resource impacts. With this commitment, and the above avoidance measures, the Commission finds the project consistent with Section 30244 of the Coastal Act.

G. CONFLICT BETWEEN COASTAL ACT POLICIES

As discussed in **Section III.C.** above, the proposed project is inconsistent with the requirement of Section 30240(a) of the Coastal Act, which limits uses in ESHA to uses "dependent upon the resources." Also as discussed in **Section III.C, D, and E** above, to not authorize the project would conflict with several Coastal Act policies. In these types of situations, the Commission relies on the Legislative direction provided in Sections 30007.5 and 30200(b), which acknowledge that conflicts can occur between one or more Coastal Act policies, and if conflicts do occur, how they should be resolved. These policies provide:

[1] UPRR Narlon Cultural Resources Summary and History for CCC, Althouse and Meade, April 24, 2019

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Section 30200(b):

> *Where the commission or any local government in implementing the provisions of this division identifies a conflict between the policies of this chapter, Section 30007.5 shall be utilized to resolve the conflict and the resolution of such conflicts shall be supported by appropriate findings setting forth the basis for the resolution of identified policy conflicts.*

Section 30007.5:

> *The Legislature further finds and recognizes that conflicts may occur between one or more policies of the division. The Legislature therefore declares that in carrying out the provisions of this division such conflicts be resolved in a manner that on balance is the most protective of significant coastal resources. In this context, the Legislature declares that broader policies which, for example, serve to concentrate development in close proximity to urban and employment centers may be more protective, overall, than specific wildlife habitat and other similar resource policies.*

The Commission has developed a seven-part test it uses as assistance in determining whether a conflict between policies has occurred, and if so, how it can be resolved "in a manner which on balance is the most protective of significant coastal resources." The Commission has summarized these seven steps as follows:

1) The project, as proposed, is inconsistent with at least one Chapter 3 policy;
2) The project, if denied or modified to eliminate the inconsistency, would affect some coastal resource(s) in a manner inconsistent with at least one other Chapter 3 policy that affirmatively requires protection or enhancement of that resource(s);
3) The project, if approved, would be fully consistent with the policy that affirmatively mandates resource protection or enhancement;
4) The project, if approved, would result in tangible resource enhancement over existing conditions;
5) The benefits of the project are not independently required by some other body of law;
6) The benefits of the project must result from the main purpose of the project, rather than from an ancillary component appended to the project to "create a conflict"; and,
7) There are no feasible alternatives that would achieve the objectives of the project without violating any Chapter 3 policies.

Applying Section 30007.5

Each of the above steps is explained in greater detail below, followed by how each applies to the proposed project:

1) The project, as proposed, is inconsistent with at least one Chapter 3 policy:

For the Commission to apply Section 30007.5, a proposed project must be inconsistent with an applicable Chapter 3 policy. As discussed in **Sections III.C** above, the temporary construction activities needed to replace the bridge must be located within central dune scrub ESHA. Construction activity for bridge replacement work is not a "resource-dependent" use, as required under with Section 30240.

2) The project, if denied or modified to eliminate the inconsistency, would affect coastal resources in a manner inconsistent with at least one other Chapter 3 policy that affirmatively requires protection or enhancement of those resources:

A true conflict between Chapter 3 policies arises when a proposed project is inconsistent with one or more policies, but denial or modification of the project would also be inconsistent with at least one other Chapter 3 policy. Further, the inconsistency that would be caused by denial or modification must be with a policy that affirmatively mandates protection or enhancement of certain coastal resources. A Commission objection to the proposed bridge replacement would result in adverse coastal resource effects, including: (1) loss of significant public access and recreation opportunities afforded by the popular Amtrak Surfliner and Coast Starlight rail lines, which provide spectacular and unique coastal views to portions of the coast that are not publicly accessible or viewable in any other way, as well as a number of direct coastal access destinations throughout southern California; (2) environmental hazards raised by potential bridge failure in the absence of the proposed replacement, including environmental damage to San Antonio Creek and associated sensitive habitats; (3) adverse air quality, water quality, greenhouse gas emissions, and excessive energy use, which would occur if users of the rail line needed to convert to automobile and truck transport, or significantly longer alternative rail corridors. UPRR states:

> *Direct rail travel between San Luis Obispo and Santa Barbara is 119 rail miles. Train travel from San Luis Obispo to Santa Barbara would need to go through Sacramento, to Barstow, through Los Angeles, and back up to Santa Barbara, a route that covers over 1,000 miles.*
>
> *If rail transport is not available between San Luis Obispo and Santa Barbara due to bridge failure or outage, surface road transport would add more than 1,000 commercial trucks per week and 1,000 cars (at 2 persons/car/day), or 7,000 cars per week x 4 weeks or about 32,000 vehicle trips per month. Alternative rail travel would route trains via Sacramento, through the Central Valley, across the Tehachapi Range to Barstow, in order to connect to Los Angeles.*
>
> *Amtrak runs 6 trains per day across the Narlon Bridge. Freight (long-haul loads) uses the rail 2 times per week, plus local haulers use the rail 2 times per week. Each freight train provides the equivalent of approximately 250 commercial truck trips per train. Between San Luis Obispo and Santa Barbara, Amtrak runs Coast Starlight (1 north and 1 south-bound), and Pacific Surfliner (2 per day north and south-bound). The Coast Starlight runs from Seattle through Portland, Sacramento, to Los Angeles.*

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> *The Pacific Surfliner provides more than 2,000 seats taking people from San Luis Obispo to San Diego in 5 hours 45 minutes.*
>
> *Due to the limited transportation options, Pacific Surfliner trains have been extremely busy, with demand exceeding available seating capacity. In fact, the State of California has asked Union Pacific Railroad to add two more Amtrak trains to this subdivision each day (personal communication with Javier Sanchez, Union Pacific Railroad's Manager of Track Maintenance).*

The Commission finds that the project cannot be modified to avoid the inconsistency, and that to object to the project would be inconsistent with the wetlands, water quality, public access and recreation, and air quality/energy consumption policies of the Coastal Act, because it would prevent benefits from accruing to coastal resources that are inherent in the project and mandated by the policies of the Coastal Act. Those benefits include the maximization of existing and future public access, the facilitation of public transit and the minimization of vehicle miles traveled, the improvement of air and water quality by reducing traffic congestion, and the avoidance of adverse wetlands and water quality impacts if the bridge were to degrade to the point where parts or all of it were to fall into San Antonio Creek (or into the surrounding sensitive riparian habitat).

3) The project, if approved, would be fully consistent with the policy that affirmatively mandates resource protection or enhancement:

For denial of (or objection to) a project to be inconsistent with a Chapter 3 policy, the proposed project would have to protect or enhance the resource values for which the applicable Coastal Act policy includes an affirmative mandate. That is, if denial of (or objection to) a project would conflict with an affirmatively mandated Coastal Act policy, approval of the project would have to conform to that policy. If the Commission were to interpret this conflict resolution provision otherwise, then any proposal, no matter how inconsistent with Chapter 3, which offered a slight incremental improvement over existing conditions relevant to a single policy could result in a conflict that would allow the use of Section 30007.5. The Commission concludes that the conflict resolution provisions were not intended to apply to such minor incremental improvements.

As discussed previously in Step 2 above, the proposed project would not only protect against significant adverse effects to, but would affirmatively promote, public access, recreation, and transit, water quality, and air quality, and is therefore fully consistent with Coastal Act Sections 30210, 30213, 30252, 30231, 30232, and 30253.

4) The project, if approved, would result in tangible resource enhancement over existing conditions:

This aspect of the conflict between policies may be looked at from two perspectives – either approval of (or concurrence with) the project would result in improved conditions for a coastal resource subject to an affirmative mandate, or denial or modification of the project would result in the degradation of that resource. As discussed in Step 2 above, authorization of the proposed bridge replacement would maintain public access, recreation, and transit opportunities in the region, would protect water quality in San Antonio Creek through replacement of rusted bridge

components and implementation of construction best management practices, and by replacing a 125+-year-old bridge at the end of its design life and before collapse of the structure into the river. Approval (or concurrence) would improve, or at least maintain, public transportation and freight service, which will help reduce automobile congestion, reduce automobile vehicle miles traveled and the corresponding non-point source emissions, and minimize energy consumption and vehicle miles traveled.

5) The benefits of the project are not independently required by some other body of law:

For benefits of a project to yield a conflict, those benefits that would cause objection to the project to be inconsistent with a Chapter 3 policy cannot be those that the project proponent is already being required to provide pursuant to another agency's directive or under another body of law. In other words, if the benefits would be provided regardless of the Commission's action on the proposed project, the project proponent cannot seek authorization of an otherwise un-authorizable project on the basis that the project would produce those benefits. In essence, the project proponent does not get credit for resource enhancements that it is already being compelled to provide. In this case, the benefits of the project would not be provided in the absence of the Commission's authorization of this project.

6) The benefits of the project must result from the main purpose of the project, rather than from an ancillary component appended to the project to "create a conflict":

A project's benefits to coastal resources must be integral to the project purpose. If a project is inconsistent with a Chapter 3 policy, and the main elements of the project do not result in the cessation of ongoing degradation of a resource the Commission is charged with enhancing, the project proponent cannot "create a conflict" by adding to the project an independent component to remedy the resource degradation. The benefits of a project must be inherent in the purpose of the project. If this provision were otherwise, project proponents could regularly append tangential elements to their otherwise unauthorizable projects to "create conflicts" and then request that the Commission use Section 30007.5 to approve the unauthorizable projects. The conflict resolution provisions of the Coastal Act could not have been intended to foster such an artificial and easily manipulated process, and were not designed to barter amenities in exchange for project approval.

The main purpose of the proposed project is to maintain rail capacity, which would, as discussed above, maintain public access, recreation, and transit opportunities, and protect water and air quality through the provision of continued rail service to and along southern California coastal cities and towns. The benefits of the project result directly from the main purpose, and not from any ancillary component. Thus this factor is satisfied as well.

7) There are no feasible alternatives that would achieve the objectives of the project without violating any Chapter 3 policies:

Finally, a project does not present a conflict among Chapter 3 policies if at least one feasible alternative would meet the project's objectives without violating any Chapter 3 policy. Thus, an alternatives analysis is a condition precedent to invocation of the conflict resolution approach. If there are alternatives available that are consistent with all of the relevant Chapter 3 policies, then the proposed project does not create a true conflict among those policies. As discussed on pages

8-9 above, there are no feasible less damaging alternatives that would enable the bridge to be replaced in a manner that would reduce ESHA affects or avoid the need for temporary uses in ESHA.

Existence of a Conflict Between Chapter 3 Policies
Based on the above, the Commission finds that the proposed project presents a conflict between the resource-dependent use and habitat protection elements of Section 30240(a) on the one hand, and the mandates of Sections 30210, 30213, 30252, 30231, 30232, 30233, and 30253 on the other, a conflict that must be resolved through application of Section 30007.5, as described below.

Conflict Resolution
After establishing a conflict among Coastal Act policies, Section 30007.5 requires the Commission to resolve the conflict in a manner that is on balance most protective of coastal resources. In this case, the proposed project would result in a non-resource dependent use occurring within ESHA, thus making it inconsistent with the Coastal Act Section 30240. However, objecting to the project because of its inconsistency with the ESHA policy would result in significant adverse effects to public access, recreation and transit, water quality, and air quality due the inability to maintain rail service over Narlon Bridge. Objection to the project would thus be inconsistent with the affirmative policies of Sections 30210, 30213, 30252, 30231, 30232, 30233 and 30253 to protect and maintain public access, recreation and transit, water quality, wetlands, and air quality. The Commission finds that the impacts on coastal resources from not carrying out the project would be more significant and adverse than impacts stemming from the project's location within ESHA, which would be addressed by the avoidance, minimization, and mitigation measures incorporated into the project. The actual impacts to ESHA will be temporary in nature, and the non-resource dependent use that is proposed in ESHA is necessary in order to continue providing rail service that has been in operation in this location for approximately 125 years. The Commission therefore concludes that the project would, on balance, be most protective of significant coastal resources, consistent with Coastal Act Section 30007.5. As such, it is consistent with Chapter 3 as a whole, and the Commission therefore concurs with the consistency certification.

SUBSTANTIVE FILE DOCUMENTS

1. UPRR Consistency Certification CC-0003-19, Althouse and Meade, February 22, 2019.
2. UPRR Wetland Delineation for Narlon Bridge Replacement, Althouse and Meade, December 2018.
3. UPRR Vegetation Restoration and Monitoring Plan for Union Pacific Railroad, Santa Barbara Subdivision Milepost 291.33, Narlon Bridge Replacement Project, Althouse and Meade, January 2019.
4. UPRR Biological Assessment, Narlon Bridge Replacement Project, Althouse and Meade, September 17, 2012.Wetland Delineation
5. U.S. Fish and Wildlife Service (USFWS) Biological Opinion 8-8-12-F-52, August 29, 2013.
6. UPRR Narlon Cultural Resources Summary and History for CCC, Althouse and Meade, April 24, 2019.
7. CC-0001-18 (SANDAG, Eastbrook to Shell Double Track, San Diego County)'
8. CC-0002-14/PWP-6-NCC-13-0203-1 (SANDAG/Caltrans), North Coast Corridor Public Works Plan/Transportation and Resource Enhancement Plan (NCC PWP/TREP), San Diego County.
9. NCC PWP/TREP Amendment No. PWP-6-NCC-16-0001-1.
10. CC-0001-17 (SANDAG), San Dieguito River Bridge Replacement and Double Track Project, San Diego County.
11. CC-0004-15 (SANDAG), San Elijo Lagoon Bridge Replacement and Double Track Project, San Diego County.
12. CC-0003-15 (SANDAG), San Diego River Railroad Bridge Replacement and Double Track Project, San Diego County.
13. CC-0006-14 (NCTD), San Dieguito River Railroad Bridge, Scour Repair Project, San Diego County)
14. CC-048-12 (SANDAG), San Onofre to Las Pulgas Double Track Project, San Diego County.
15. CC-009-12 (SANDAG), San Onofre-Pulgas Double Track Project.
16. CC-056-11 (SANDAG), Sorrento Valley Double Track Project, San Diego County.
17. CC-052-10 (SANDAG), Sorrento Valley Double Track project, San Diego County.
18. CC-075-09 (NCTD), Agua Hedionda Railroad Bridge and Double Track Project.
19. CC-055-05 (NCTD), Bridge replacement, Agua Hedionda Lagoon.
20. CC-052-05 (NCTD), Santa Margarita River double tracking project, Camp Pendleton.
21. CC-004-05 (NCTD), O'Neill to Flores double track project, Camp Pendleton.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY GAVIN NEWSOM, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION

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WWW.COASTAL.CA.GOV

May 10, 2019

LynneDee Althouse
Althouse and Meade, Inc.
Biological and Environmental Services
1602 Spring St.
Paso Robles, CA 93446

Re: **CC-0003-19**, Consistency Certification, Union Pacific Railroad, Narlon Bridge Replacement, San Antonio Creek, Vandenberg Air Force Base, Santa Barbara Co.

Dear Ms. Althouse:

On May 9, 2019, by a unanimous vote, the California Coastal Commission concurred with the above-referenced Consistency Certification, finding that the activity was consistent with the enforceable policies of the California Coastal Management Program.

If you have any questions, please feel free to call me at (415) 904-5289.

Sincerely,

MARK DELAPLAINE
Manager, Energy, Ocean Resources,
and Federal Consistency Division

cc: Ventura District
Vandenberg Air Force Base (Tracy Curry-Bumpass)

APPENDIX F. RWQCB DOCUMENTATION

Appendix F will be added at a later date.

APPENDIX G. USACE DOCUMENTATION

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
60 SOUTH CALIFORNIA STREET, SUITE 201
VENTURA, CALIFORNIA 93001-2598

February 28, 2019

SUBJECT: Determination of Need for Department of the Army Permit

Darryl York
Vandenberg Air Force Base
30 CES/CEIEA 1028 Iceland Avenue
Vandenberg Air Force Base, California 93437

Dear Mr. York:

I am responding to your request (File No. SPL-2019-00184-TS) dated February 25, 2019, for clarification whether a Department of the Army permit is required for the Narlon Bridge Replacement project (Corps File No. SPL-2019-00184-TS) located on Vandenberg Air Force Base at San Antonio Creek, near the city of Lompoc, Santa Barbara County, California (lat/long: 34.790026, -120.610938).

The Corps' evaluation process for determining if you need a permit is based on whether or not the proposed project is located within or contains a water of the United States, and whether or not the proposed project includes an activity potentially regulated under Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act. If both conditions are met, a permit would be required.

Based on the preconstruction notification form and the jurisdictional determination dated December 2018, it appears the Narlon Bridge Replacement project site contains water(s) of the United States (i.e., San Antonio Creek) pursuant to 33 CFR Part 325.9. I have also determined the proposed work would not involve a discharge of dredged or fill material and therefore, would not be regulated under Section 404 of the Clean Water Act; and would not involve work or structures in or affecting navigable waters and therefore, would not be regulated under Section 10 of the River and Harbor Act, if the activity is performed in the manner described in your application. Notwithstanding this determination, your proposed project may be regulated under other Federal, State, and local laws.

If you have any questions, please contact me at (805) 585-2146 or via e-mail at theresa.stevens@usace.army.mil. Thank you for participating in the Regulatory Program. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

STEVENS.THERESA.1369246700

Digitally signed by STEVENS.THERESA.1369246700
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=STEVENS.THERESA.1369246700
Date: 2019.02.28 11:33:48 -08'00'

Theresa Stevens, Ph.D.
Senior Project Manager
North Coast Branch
Regulatory Division

Cf: LynnDee Althouse, Althouse and Meade, Inc.

APPENDIX H. FIBER OPTICS CONTINGENCY PLAN

Fiber Optics Contingency Plan

for

Union Pacific Railroad, Santa Barbara Subdivision

Milepost 291.33: Narlon Bridge Replacement Project

Vandenberg Air Force Base, Santa Barbara County, California

Prepared for

Union Pacific Railroad
Steve Cheney, Director M/W - Environmental
1400 Douglas Street, Stop 0910
Omaha, NE 68179-0910

by

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES
1602 Spring Street
Paso Robles, CA 93446
(805) 237-9626

September 2019

1025.004

Prior to construction of the eastern temporary trestle bridge, precise identification of existing buried fiber optic cables will be conducted by fiber optics location instruments or may be "potholed" by the bridge contractor with a rubber-tired excavator or backhoe. Adjustments may be made to the precise location of the temporary trestle bridge pile to avoid impact to fiber optic cables during construction.

Temporary cables will be placed along the edge of ROW prior to construction of the temporary eastern trestle bridge. (See Figure 2-1 from the Narlon Bridge Environmental Assessment [EA] for reference.) After vegetation is mowed to pre-construction elevation (approximately 4 inches in the riparian zone), temporary fiber optic cables (contingency cables) will be placed above-ground, along the east side of the bridge staging area to protect communication utilities during bridge replacement operations. Eight 1.25-inch fiber ducts will be laid on top of mowed vegetation except where they require protection across the access roads. To protect fiber optic cables from construction traffic, ducts will be placed in steel conduit within the upper foot of the roadbed where conduit will be covered with additional base material (4 to 12 inches) and overlaid with steel plates. In order to cross San Antonio Creek, ducts will be hung on two 12-inch diameter 15-foot poles, one on each side of the creek, anchored with guy wires. A rubber-tired mini-excavator would be used to dig 7-foot-deep post holes, while the guy wires will be anchored by ground screws which would be screwed in by hand. Fiber will be blown through the ducts and connected to existing hand-holes at each end of the Action Area. This action is expected to take two weeks to complete.

Temporary ducts laid on the ground will connect to existing buried hand-holes at the north and south end of the bridge. Temporary hand-hole connections in the Action Area require excavation up to 4 feet below the soil surface in upland areas adjacent to hand-holes that have been repeatedly disturbed since 1986, and most recently in 2016 by fiber relocations conducted by AT&T and Level III. Temporary connections to hand holes located on the coastal side of the railroad ROW will be drilled under the tracks, between the ties, within ballast and disturbed track bed. Connections adjacent to the hand-holes on the west side of the tracks will be also require excavation up to 4 feet below soil surface.

Placement and connection of temporary cables will be conducted by fiber optic contractor(s) authorized by the fiber carriers to conduct this work. The activity will require work trucks and equipment (e.g., a backhoe for access to the hand-holes) within the Action Area on the north and south sides of the bridge.

After construction of the Narlon Bridge is complete, and the trestle bridges are removed, the fiber optic carriers will verify that no damage was done to buried fiber optic cables, and temporary cable and all temporary cable support structures (ducts, wooden poles, etc.) will be removed.

If the fiber cables are damaged during construction, new cable would be bored under the creek after construction is complete. If a directional bore is required, this action is expected to take up to eight weeks.

Prior to a directional bore, the WDR permit with the Regional Water Quality Control Board (RWQCB) would be amended. The process for amendment would commence within a month of damage detected to the fiber conduit. A frac-out plan would be prepared for a directional bore operation, and an amendment submitted to the RWQCB and VAFB for review and approval.

The new fiber optics cable reel would be delivered to the bridge site via Umbra Road. The delivery vehicle would follow the path along Rail Garrison Spur to the UPRR ROW shown in Figure 1-2

of the EA. The reel would be staged on the north side of the bridge in the vicinity of the crane pad location indicated on Figure 2-1 in the EA. The boring rig would be staged on the south side of the creek on or upslope from the access roadway. All drill spoils would be contained on site. All spoils contaminated with bentonite or other slurry materials would be hauled off site to an appropriate landfill. Near the hand-holes, along the disturbed ROW, new fiber conduits would be trenched in an alignment close to the existing underground alignment, then connected to hand-holes on each side of the tracks.

All proposed soil disturbance actions are within the Narlon Bridge Action Area. All disturbed areas would be remediated pursuant to the approved project restoration plan and subject to the same SWPPP conditions as the remainder of the Narlon Bridge project.

Fiber materials may be stored in a secure fenced area located at the Tangair Staging Area located south of the Narlon Bridge. Other materials or equipment may be stored at the Rail Garrison Staging Area located at the terminus of Umbra Road, north of the Narlon Bridge.

APPENDIX I. RESTORATION PLAN

Vegetation Restoration and Monitoring Plan

for

Union Pacific Railroad, Santa Barbara Subdivision

Milepost 291.33: Narlon Bridge Replacement Project

Vandenberg Air Force Base, Santa Barbara County, California

Prepared for

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Cover Page: Union Pacific Railroad's Narlon Bridge and the surrounding riparian and dune scrub habitat. View northwest on May 21, 2011.

1 INTRODUCTION

This Vegetation Restoration and Monitoring Plan (Plan) provides recommendations to restore central dune scrub (scrub) and arroyo willow riparian (riparian) habitats impacted by the Union Pacific Railroad (UPRR) Narlon Bridge replacement project (Project) located in the Santa Barbara Subdivision at Mile Post (MP) 291.33. A steel bridge spans San Antonio Creek with pier piles (footings) located in both managed scrub and riparian habitats (Photo 1). The proposed year-long bridge replacement Project will occur in the managed Right-of-Way (ROW) of UPRR property. Vandenberg Air Force Base (VAFB) property adjacent to the Project is proposed to be used as staging activities during Project construction which will result in temporary impacts to dune and riparian habitats. Additionally, temporary impacts to scrub habitat are anticipated along discrete shoulders of VAFB access roads. Existing bridge footings will be used for construction and no permanent impacts are planned within the riparian corridor.

Temporarily impacted habitats will be restored to their original condition or better (1:1 mitigation ratio). No permanent impacts are planned. Restoration actions will commence upon completion of the Project, expected in fall of 2020. Native vegetation establishment is the primary restoration technique which will stabilize disturbed soils and restore temporarily impacted habitats.

TABLE 1. RESPONSIBLE PARTIES.

The Project proponent, lead agency/property owner, and restoration/biological consultant.

Project Proponent	Restoration and Biological Consultants	Lead Agency/Property Owner
Union Pacific Railroad 1400 Douglas Street, STOP 0910 Omaha, NE 68179-0910 Contact: Steve Cheney (402) 544-3227 slcheney@up.com	Althouse and Meade, Inc. 1602 Spring Street Paso Robles, CA 93446 Contact: LynneDee Althouse (805) 237-9626 lynnedee@alt-me.com	Vandenberg Air Force Base 30 CES/CEIEA 1028 Iceland Avenue Vandenberg, CA 93437-5242 Contact: Darryl York (805) 605-8684 darryl.york@us.af.mil or Luanne Lum (805) 606-5299 luanne.lum@us.af.mil

2 OBJECTIVE

The objective of this Plan is to restore the habitats that are temporarily impacted by Project activities. Areas to be restored are collectively identified as the Restoration Site (RS).

1. The natural central dune scrub (scrub) and arroyo willow riparian (riparian) habitats on VAFB property will be restored to their original condition or better at a 1:1 mitigation ratio.
2. The managed scrub and riparian habitats on UPRR's ROW will be restored with native scrub and riparian species, appropriate for a managed habitat, and consistent with federal standards for vegetation on railroad property on or immediately adjacent to the roadbed (49 CFR § 213.37).
3. The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) Notice of Termination conditions for final soil stabilization will be met. This Plan will complement the Storm Water Pollution Prevention Plan (SWPPP) mandated by the CGP.

3 SITE PROTECTION AND FINANCIAL ASSURANCE

A security bond (or equivalent) will be established in the amount of $125,000 per acre of VAFB scrub and riparian habitats temporarily impacted by Project activities. The security bond (e.g. performance bond) will ensure sufficient funds are available to cover the costs associated with the repair and maintenance of the Restoration Site. The bond will involve three parties: the bonding company, UPRR, and VAFB. Implementation of the Plan shall be carried out by the Restoration Specialist familiar with scrub and riparian habitats on California's Central Coast. The security bond (or equivalent) will be unencumbered after the Restoration Site performance standards have been met, and VAFB and RWQCB accept the restoration as complete.

4 PROJECT INFORMATION

4.1 Project Location

The Project is located on the northwestern Santa Barbara County coast, approximately 15 miles southwest of Santa Maria, California on VAFB property and UPRR ROW. Approximate coordinates for the center of the Project site are N 34.790038/ W 120.610898 in the Casmalia United States Geological Survey (USGS) 7.5-minute quadrangle. The approximate elevation range is 25 to 88 feet above mean sea level (Figure 1; Section 11).

4.2 Project Description

The Project is anticipated to temporarily impact approximately 2.54 acres of riparian and 14.80 acres of scrub habitats (Restoration Site; Figure 2). Temporary project impacts within the UPRR ROW will occur within a managed area (e.g. vegetation maintenance; Photos 2 and 3) and will consist of 0.7 acres riparian and 7.85 acres scrub habitat (UPRR RS). Some locations within the ROW have been actively manipulated and managed for over 100 years while other areas have required less frequent management. On VAFB property, temporary impacts would occur to 1.84 acres of riparian and 6.95 acres of scrub habitat (VAFB RS; Photos 4 and 5). Temporary impacts will include mowing scrub habitat in staging areas and at discrete points along VAFB access roads, particularly curves to be navigated with long-bed trailers (Photo 6).

If an unplanned repair is required to a bridge footing, up to 0.005 acre of riparian or scrub habitat within the UPRR ROW could be permanently impacted due to footing repair. Although very unlikely (less than 10 percent probability per UPRR engineers), this impact would occur within the routinely managed UPRR ROW, therefore no mitigation is proposed. All other impacts will be temporary (approximately one year between disturbance and restoration).

The UPRR RS occurs within the ROW and may require continued UPRR vegetation maintenance for safety reasons. Therefore, the restoration objective is to provide erosion control and establish native riparian and scrub species that can tolerate the routine vegetation maintenance necessary in the ROW. The VAFB RS will be restored to pre-project conditions, or better.

4.2.1 Habitat Types

Central dune scrub (referred to as scrub) is dominated by occasional mock heather (*Ericameria ericoides*) and coast buckwheat (*Eriogonum parivfolium*) shrubs scattered in patches. The herbaceous layer is dominated by the invasive species, perennial veldt grass (*Erharta calycina*), with patches of ice plant (*Carpobrotus edulis*). Special status plant species are present in this habitat, including San Luis Obispo monardella (*Monardella undualata* ssp. *undulata*), California spineflower (*Mucronea californica*), and Blochman's ragwort (*Senecio blochmaniae*).

The arroyo willow riparian habitat (referred to as riparian) is composed of a dense canopy of arroyo willow (*Salix lasiolepis*) and contains patches California blackberry (*Rubus ursinus*) poison hemlock (*Conium maculatum*). Special status plant species black flowered figwort (*Scrophularia atrata*) is present in this habitat.

4.3 Restoration Project Purpose

The goal of this Plan is to provide guidance for the restoration of the natural (VAFB RS) and managed (UPRR RS) habitats impacted by Project activities to conditions consistent with their previous and future management strategies, as well as to meet the CGP Notice of Termination conditions for final soil stabilization. VAFB's temporarily impacted scrub and riparian habitats listed in Table 2 will be restored to equal size, quality, and composition as to pre-project habitat. UPRR's ROW managed scrub and riparian habitats will be restored to equal size with species that can persist and thrive in the UPRR ROW where vegetation maintenance (brush clearing) is routinely conducted. Restoration activities will occur onsite, where the temporary impacts occur.

TABLE 2. PROJECT TEMPORARY IMPACTS.

Approximate temporary impacts to habitats within VAFB and UPRR Restoration Sites (RS).

Habitat Type	Temporary Impacts (Acres)
UPRR RS	
Arroyo Willow Riparian (managed)	0.70
Central Dune Scrub (managed)	7.85
Total	**8.55**
VAFB RS	
Arroyo Willow Riparian	1.84
Central Dune Scrub	6.95
Total	**8.79**
Restoration Site Total	**17.34**

5 RESTORATION WORK PLAN

5.1 Phase 1: Baseline Conditions and Plant Propagation

Timing: Immediately upon approval of the Plan by regulatory agencies.

5.1.1 Baseline Conditions and Reference Site Sampling

Document baseline conditions in Restoration Site (Figure 2) prior to Project activities by conducting quadrat habitat monitoring and photo monitoring, as described in Section 7.3 Performance Standards Monitoring. Identify suitable locations for riparian and scrub habitat Reference Sites consistent with the baseline conditions in the VAFB RS of the Restoration Site. Four quadrat monitoring locations will be randomly sampled within each Reference Site, consistent with the methods provided in Section 7.3.1 Vegetation Monitoring. Baseline conditions and Reference Site sampling is recommended to be conducted in 2019.

5.1.2 Seed Mixes

Recommended seed mixes for each habitat type are provided in Tables 3, 4, and 5. Shrub species will be excluded from the seed mix within the managed UPRR RS and are denoted by an asterisk (*). A Restoration Specialist and/or qualified biologists will conduct seasonal site visits to collect seed from native plants on North Base and within the Project Site prior to temporary impacts. Multiple site visits will be necessary to collect ripe seed from a wide variety of species. Collected seed will be provided to a qualified plant propagation specialist to produce container stock (Section 5.1.3), included the Restoration Site hydroseeding seed mixes or hand broadcasted in instances where species have narrow microhabitat requirements and/or are sensitive species. Locally sourced seed will also be purchased from a native seed supplier.

The erosion control seed mix will be applied on disturbed soil (e.g., staging and active work areas where soil is exposed) in Year 1 to provide vegetative cover required for Stormwater Pollution Prevention Plan compliance and allow for a Notice of Termination to be filed regarding stormwater management. Scrub and riparian seed mixes will be applied following construction activities within areas that received minor disturbance or contain native plants where additional native cover is required.

TABLE 3. EROSION CONTROL SEED MIX

The recommend initial seed mix to establish grasses in Restoration Site, organized alphabetically by scientific name with synonyms provided in brackets for taxa with recent nomenclature changes. Common name and recommended seed pounds per acre provided.

Scientific Name	Common Name	Lbs/Acre
Hordeum vulgare	Common barley (UC603)	40.0
Triticale sp.	Sterile wheat-rye hybrid	20.0

TABLE 4. SCRUB SEED MIX.

The recommend seed mix for the scrub habitats in the Restoration Site, organized alphabetically by scientific name with synonyms provided in brackets for taxa with recent nomenclature changes. Common name and recommended seed pounds per acre provided. Shrub species identified with an asterisk will be excluded from the UPRR RS seed mix. Other native seeds collected during 2019 and 2020 may be included in this mix, as available.

Scientific Name	Common Name	Lbs/Acre
Achillea millefolium	Common yarrow	1.0
Acmispon glaber [*Lotus scoparius*]	Deerweed	2.0
Acmispon maritimus [*Lotus salsuginosus*]	Coastal lotus	2.0
*Artemisia californica**	California sagebrush	2.0
Calystegia macrostegia ssp. *cyclostegia*	Coast morning glory	1.0
Camissoniopsis [*Camissonia*] *cheiranthifolia*	Beach evening primrose	1.0
Corethrogyne [*Lessingia*] *filaginifolia*	California aster	1.0
Croton californicus	California croton	1.0
Cryptantha muricata	Prickly popcorn flower	1.0
*Ericameria ericoides**	Mock heather	2.0
*Eriogonum parvifolium**	Coast buckwheat	TBD
Eschscholzia californica	California poppy	2.0
Festuca [*Vulpia*] *microstachys*	Annual fescue	4.0
Gnaphalium californicum	California everlasting	2.0
Heterotheca grandiflora	Telegraph weed	1.0
Hordeum vulgare	Common barley (UC603)	10.0
Horkelia cuneata ssp. *cuneata*	Horkelia	1.0
Layia platyglossa	Coastal tidytips	0.5
Lupinus chamissonis	Silver bush lupine	2.0
*Mimulus aurantiacus aurantiacus**	Bush monkeyflower	2.0
Phacelia ramosissima	Shrubby phacelia	0.5
Plantago erecta	California plantain	4.0
Verbena lasiostachys	Common vervain	1.0

TABLE 5. RIPARIAN SEED MIX

The recommend seed mix for the scrub habitats in the Restoration Site, organized alphabetically by scientific name with synonyms provided in brackets for taxa with recent nomenclature changes. Common name and recommended seed pounds per acre provided. Shrub species identified with an asterisk will be excluded from the UPRR RS seed mix. Other native seeds collected during 2019 and 2020 may be included in this mix, as available.

Scientific Name	Common Name	Lbs/Acre
Achillea millefolium	Common yarrow	1.0
Acmispon [*Lotus*] *heermannii*	Heermann's lotus	3.0
Artemisia douglasiana	Mugwort	2.0
*Baccharis salicifolia**	Mulefat	2.0
Elymus [*Leymus*] *condensatus*	Giant wild-rye	3.0
Elymus [*Leymus*] *triticoides*	Creeping wild rye	4.0
Epilobium ciliatum	Fringed willowherb	0.5
Hordeum brachyantherum	Meadow barley	4.0
Trifolium obtusiflorum	Creek clover	3.0
Trifolium willdenovii	Tomcat clover	2.0

5.1.3 Plant Container Stock

The Restoration Specialist will verify that plant materials specified in the Plan are readily available from local stock or contract a native plant nursery/qualified native plant horticulturist with at least six months in advance of projected planting date, to propagate the necessary plant container stock. Where practicable, container stock shall be propagated from local seed or propagules obtained within the San Antonio Creek watershed in order to conserve the genetic resource of the existing local populations. The propagation medium shall either contain a portion of local soil (e.g. fifty percent) or be designed to imitate the drainage and water-holding capacity of the native soil. Inoculation with local topsoil or mycorrhizal fungi is highly recommended if local soil is not used in potting media. Local topsoil may be collected prior to excavation, within the Project Site in areas proposed to be graded.

5.2 Phase 2: Re-vegetation and Herbicide Application

During restoration implementation the Restoration Specialist will monitor work activities, progress and consult with the restoration workers to follow appropriate restoration techniques and Plan specifications. The Restoration Specialist or a biologist will provide training regarding protected biological resources and target weeds for all workers who implement or maintain the Restoration Site.

Timing: To occur over a two-year time period. Activities will take place during the fall once soil moisture is high. Seed mixes and plant container stock shall be applied/installed at the specified time and locations.

The CGP requires that inactive construction areas be stabilized within 14 days. Seed applied during the dry season will be irrigated as needed to achieve germination and vegetation establishment. If construction or demolition is completed during the dry season, and/or it is not feasible to water, disturbed soil areas shall be stabilized with temporary soil cover, such as hydraulic mulch or US Composting Council (USCC) certified and plastic-free compost, as needed to prevent erosion and meet CGP requirements. Seeding then must take place as close to the beginning of the rainy season as possible.

5.2.1 Hydroseeding

Initial re-vegetation will use the Erosion Control Seed Mix (Table 3) which will establish sterile annual grasses and native perennial grasses throughout the entire Restoration Site. The sterile annual grasses germinate quickly, provide soil stabilization, and erosion control. A broadleaf selective herbicide will be applied to the Restoration Site in Year 1, to control broadleaf weeds and the Erosion Control Seed Mix does not include broadleaf species for this reason.

A second hydroseeding application will occur after Year 1 using the Scrub Seed Mix and Riparian Seed Mix developed for the revegetation of disturbed habitats of the Restoration Site (Tables 4 and 5). Each seed mix includes native species that are effective early colonizers and/or are common in their respective scrub and riparian habitats.

Seed mixes will be applied as a hydromulch and will include wood fiber mulch at a minimum rate of 3,000 lbs/acre, fertilizer, soil conditioner, a binding agent, and mycorrhizal inoculum. Small disturbance areas, such as along the VAFB access road, may be seeded by hand broadcast-seed techniques, as determined by the Restoration Specialist. On slopes greater than 2:1 (gradient 1:2 or 50%), it may be better to use a 12-month longevity biodegradable bonded fiber matrix or flexible growth medium in addition to hydroseeding. Otherwise, on slopes greater than 2:1 (gradient 1:2 or 50%), install 100% biodegradable coir or straw/coir erosion control blankets (no jute net, no plastic netting) in addition hydroseeding. Install blankets over the seed. Selection of EC blankets to be appropriate to the slope. For example, blankets for slopes between 2:1 and 1:1 shall be Type A, double net with straw and coir fiber core. No synthetic fibers may be used in the blankets.

5.2.2 Hand Broadcasting Seed

Hand broadcasting of scrub seed mix (Table 4) will occur in the Restoration Site where hydroseeding is determined to be unnecessary for soil stabilization (e.g. small impacts to scrub habitat along VAFB access road from road widening). Native plant seed collected onsite, prior to Project impacts will be hand broadcasted in suitable location for each species, with special care taken to identify appropriate locations for the hand broadcasting of sensitive plant species seeds. The optimal time to hand broadcast is immediately before a rainfall event. If not, seeds may be raked in.

5.2.3 Herbicide Application

To managed weedy non-native forbs, a selective broadleaf herbicide application is recommended in the spring and/or fall of Year 1. Herbicide application should be timed to occur after the hydroseed application of the Erosion Control Seed Mix and prior to the hydroseed application of the Scrub and Riparian Seed Mixes and Plant Installation. Herbicide application will be

implemented by a Certified Pesticide Applicator (CPA) and will follow herbicide application regulations. Multiple applications may be required to effectively control weedy species.

5.2.4 Plant Installation

Riparian habitat restoration in VAFB RS and the UPRR RS will utilize installation of native, locally sourced plant materials. Riparian habitat in the VAFB RS will be restored to conditions similar to the adjacent arroyo willow riparian habitat through the collection and installation of arroyo willow cuttings and the installation of native container stock (Table 6). Willow cuttings shall be a minimum of 18 inches long, and shall be planted with approximately ¾ of the cutting in the soil and ¼ exposed. Plant container stock installation and willow cuttings will be installed at a density of 5-feet and 10-feet (maximum) on-center spacing, respectively. Wood mulch will be applied surrounding installed container stock to inhibit weeds, preserve soil moisture, and reduce erosion (approximately 3 inches deep in a 2-foot radius (with a 0.5 ft diameter gap around the plant's stem).

TABLE 6. RIPARIAN PLANT INSTALLATION.

The recommended native plant species for cuttings and container stock installation for the Restoration Site. The table is organized by property manager and then alphabetically by scientific name with common name, container size, propagule type and quantity provided.

Scientific Name	Common Name	Propagule Type	Quantity
VAFB Riparian Cutting Installation			
Salix lasiolepis	Arroyo willow	Cuttings	570
Rosa californica	California wild rose	1-gallon container	320
Rubus ursinus	California blackberry	1-gallon container	650
UPRR ROW Riparian Container Stock Installation			
Rosa californica	California wild rose	1-gallon container	370
Rubus ursinus	California blackberry	1-gallon container	860

5.3 Phase 3: Maintenance and Monitoring

Specification for the implementation of the Maintenance and Monitoring Plans are provided in Section 7.0.

Timing: The Restoration Site will be maintained and monitored for five years or until success criteria have been achieved.

1. *Maintenance Plan*: The Landscape Contractor is responsible for implementation of the Maintenance Plan. The Restoration Site shall be regularly inspected by the Restoration Specialist or qualified biologist, quarterly in Year 1 and 2 after planting and annually thereafter. Refer to Section 7.1 Maintenance Plan.
2. *Weed Management Plan*: Invasive plant species will be removed with hand tools as necessary throughout the maintenance and monitoring period as specified in the Weed Management Plan in Section 7.2 and the Maintenance Plan in Section 7.1. Maintenance crews shall receive supervision and/or training by a biologist or other person experienced

with working in sensitive native habitat. Weeds shall be bagged, removed from site and disposed of properly.

3. *Performance Standards Monitoring*: The Restoration Site shall be monitored annually for five years by the Restoration Specialist or a qualified biologist or until the performance standards are achieved, as specified in Section 7.3 Performance Standards. Monitoring results will be reported annually (Refer to Section 7.4 Reporting).

5.4 Final Cleanup and Project Completion

Timing: Once the plants are successfully installed and performance standards have been met, final cleanup shall include the following items to complete the restoration project.

1. *Remove temporary erosion control measures.* Any remaining temporary, non-biodegradable erosion control measures, such as silt fence, ERTEC fence, and straw wattles shall be removed from the Restoration Site.
2. *Verify mitigation success with VAFB.* Riparian and scrub restoration success on VAFB property shall be completed and verified by the VAFB environmental staff.
   Re-vegetation of the UPRR RS (ROW) will be documented and reported to VAFB.

6 PERFORMANCE STANDARDS

The goal of this Plan is to restore riparian and scrubs habitats temporarily impacted by the Project and meet the CGP's Notice of Termination conditions for demonstration of final soil stabilization. In order to quantify the progress and success of the VAFB RS on an annual basis, project-specific performance standards are outlined in Table 7. Survival rate of installed cuttings and container stock, absolute percent cover of native species, absolute percent cover of vegetation, and percent cover of weed species are the primary performance criteria. Performance criteria for native vegetation and weedy species absolute percent cover will be based on Reference Site monitoring results.

Due to the UPRR RS requiring routine vegetation maintenance (within ROW), this portion of the Restoration Site is not included in the performance standards.

Success rates that are below the stated minimum target for each criterion indicates a need for adaptive management such as plant protection, supplemental water, or weed eradication. An adaptive management strategy for failure to meet the performance standards is provided in Section 8.0. Approximately five years (after completion of installation) the VAFB RS is expected to meet performance criteria.

TABLE 7. PERFORMANCE STANDARDS.

Performance standards are provided for a five-year monitoring period. Native vegetation absolute percent cover, plant installation survival and weedy species cover is the primary performance standard used to determine VAFB RS success, with respect to the Reference Site conditions.

Feature	Performance Criteria and Assessment Method	Year 1	Year 2	Year 3	Year 4	Year 5
Native Vegetative Cover	Assess plant species absolute cover in 100 square meters quadrats (three per habitat type) Aerial photography may also be used as a complement to quadrat sample results.	n/a	15% of Reference Site	30% of Reference Site	50% of Reference Site	>65% of Reference Site
SWPPP Compliance	Assess vegetation absolute cover in 100 square meters quadrats (three per habitat type)	70% of pre-con vegetative cover*				
Plant Installation	Survival Rate	n/a	>85%	>80%	>75%	>70%
Weedy Species Cover	Assess absolute percent cover of invasive species	n/a	200% of Reference Site	200% of Reference Site	150% of Reference Site	120% of Reference Site

* CGP's Notice of Termination conditions for demonstration of final soil stabilization are 70 percent final cover method (no computational proof required) or equivalent stabilization (RUSLE or RUSLE2 method computational proof required).

7 MAINTENENACE AND MONITORING PLANS

The Restoration Site will require routine maintenance, inspections, weed management, and annual monitoring to ensure the achievement of the performance standards. Provided are maintenance, weeds management, and a monitoring plans which specify required actions during the maintenance and monitoring phase of the project.

7.1 Maintenance Plan

The Restoration Specialist or a qualified biologist will monitor Restoration Site to ensure the Restoration Site in on the trajectory to meet the performance standards. The Restoration Site will require routine maintenance which will be the responsibility of the Landscape Contractor. The Restoration Specialist will inspect the Restoration Site quarterly in Years 1 and 2, to ensure maintenance tasks are being implemented per the Plan and identify any potential issues that may interfere with the success of the Restoration Site. Table 8 summarizes maintenance tasks assigned to the Landscape Contractor and provides recommended timing and frequency.

TABLE 8. RESTORATION MAINTENANCE CHECKLIST.

Task	Year 1	Years 2 and 3	Years 4 and 5
Erosion: Check site for erosion issues and condition of erosion control measures **Weed Management:** Inspecting site for weeds and removing by hand **Pest Management:** Inspect and treat site for invertebrates and disease/fungi **Litter/Vandalism:** Inspect site and clean up any trash or vandalism	Monthly	Bimonthly (every two months, year-round)	Quarterly (every three months, year-round)
Mulch: Check mulch and add, as necessary **Tree and Shrub Maintenance:** Prune or trim trees and shrubs, as necessary **Remediation:** Identifying and replacing dead plants	Annually (once a year, in fall)		

Maintenance shall include reseeding, watering and mulching as needed to establish self-sustaining vegetation and prevent bare soil spots. The total bare spots shall not exceed 30 percent of pre-construction vegetative condition and shall not be in areas subject to significant erosion. Seeded areas shall be adequately watered to achieve germination and permanent vegetation establishment.

Maintenance shall include repairing and protecting slopes and ditches from surface erosion; maintaining the performance of the erosion control materials and protecting installed areas from traffic.

Seed applied during the rainy season (15 November – 30 April) which has failed to germinate after 21 days shall be re-seeded and mulched. Seed applied during the dry season (May – October) which has failed to germinate after 45 days shall be re-seeded and mulched.

Seeded areas shall be inspected by the Landscape Contractor no more than 21 days after planting and no more than 7 days after the first rain. Follow-up inspections shall occur between 30 and 60 days after the first inspection and every 30 to 60 days thereafter. The Landscape Contractor will furnish a record describing the findings for product failure, maintenance work performed, recommendations for repair and products replaced.

7.2 Weeds Management Plan

Weed control and management is a crucial for the successful restoration of natural habitats. Weed species known to invade and displace native vegetation will be targeted for controlled and management in the Restoration Site.

7.2.1 Definitions and Regulatory Background

In general terms, a "weed" is a plant growing where it is not wanted, often tending toward overgrowth and out competing desired plants. Regulations Definitions and an overview of pertaining to weedy plant species in California is provided.

The Federal Noxious Weed Act (Act) (7 CFR 360) defines a "noxious weed" as "any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind which is of foreign origin, is new to or not widely prevalent in the U.S., and can directly or indirectly injure crops, other useful plants, livestock, poultry or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health." This Act also defines "undesirable plants" as "species classified as undesirable, noxious, harmful, exotic, injurious, or poisonous under state or federal law, but not including species listed as endangered by the Endangered Species Act, or species indigenous to the area where control measures are to be taken." Plant species on the FNWL are not present in the Restoration Site.

The California Department of Food and Agriculture (CDFA) noxious weeds list focuses on plants that may potentially threaten the success of agricultural operations. The CDFA Code defines a "noxious weed" as "any species of plant that is, or is liable to become, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, which the director, by regulation, designates to be a noxious weed" (CDFA 2016) The CDFA rating for noxious weeds and pest, as follows:

- **List A** indicates a species that is either not known in California or present in a limited distribution that allows for possible eradication. A-rated species are prohibited from entering the State, and if found, the State can require eradication, quarantine, containment or other actions to prevent establishment and/or spread of the species.

- **List B** indicates a pest of limited distribution in California. State enforcement is limited to actions for containment, such as in nurseries. County Agricultural Commissioners can require eradication, containment, suppression or other control of the species.

- **List C** indicates a pest species of widespread distribution in California. If found, these species may be subject to efforts to slow spread or suppress growth, at the discretion of the County Agricultural Commissioner (CDFA 2016).

The California Invasive Plant Council (Cal-IPC) invasive plant inventory focuses on non-native species that threaten natural areas and wildlands. Cal-IPC defines an "invasive non-native plant that threatens wildlands" as species that "1) are not native to, yet can spread into, wildland ecosystems, and that also 2) displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes" (Cal-IPC 2018). Cal-IPC ranks invasive plants as follows:

> **High -** These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
>
> **Moderate –** These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
>
> **Limited –** These species invasive but their ecological impacts are minor on a statewide level... Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.
>
> **Alert –** An Alert is listed on species with High or Moderate impacts that have limited distribution in California but may have the potential to spread much further.
>
> **Watch –** These species have been assessed as posing a high risk of becoming invasive in the future in California (Cal-IPC 2018).

7.2.2 Weedy Species in the Vicinity of the Restoration Site

Biological surveys conducted in the Restoration Site and vicinity from 2004 through 2018 document several weedy species, some of which are abundant. Table 9 lists weed species present in the Restoration Site that are on the CDFA Noxious Weeds List, the Cal-IPC Invasive Plant Inventory, or both, and a general description of their distribution. No federally listed noxious weed species were detected in the Restoration Site. Table 9 lists weeds that require control followed by naturalized and widespread species that would only require control if plants displace native species in the Restoration Site.

TABLE 9. WEEDY PLANT SPECIES

Scientific name, common name, weed rating from CDFA (CDFA 2016), Cal-IPC (Cal-IPC 2018), and distribution of each weed is provided. Weed species that are recommended to be controlled are provided in the top bracket followed by naturalized weed species.

Scientific Name Common Name	Weed Rating (Cal-IPC / CDFA)	Distribution
Weeds to be Controlled		
Carduus pycnocephalus Italian thistle	Moderate / List C	Occasional.

Scientific Name Common Name	Weed Rating (Cal-IPC / CDFA)	Distribution
Carpobrotus edulis Ice plant	High / --	Common on sand in dune scrub habitat.
Centaurea melitensis Tocolote	Moderate / --	Occasional.
Centaurea solstitialis Yellow-star thistle	High / --	Occasional.
Cirsium vulgare Bull thistle	Moderate / --	Uncommon in riparian habitat.
Conicosia pugioniformis Narrow-leaved ice plant	Limited / --	Common on dune sands in scrub habitat.
Conium maculatum Poison hemlock	Moderate / --	Common in the riparian habitat.
Ehrharta calycina Purple veldt grass	High / --	Abundant in the dune scrub habitat.
Foeniculum vulgare Fennel	High / --	Uncommon in disturbed areas.
Hirschfeldia incana Perennial mustard	Moderate / --	Occasional on dune sands.
Mesembryanthemum crystallinum Ice plant	Moderate / --	Common on dune sands in scrub habitat.
Salsola tragus Russian thistle	Moderate / List C	Occasional in disturbed areas and scrub habitat.
Silybum marianum Milk thistle	Limited / --	Uncommon in riparian habitat.
Naturalized and Widespread Weeds – Control as Needed		
Avena fatua Wild oat	Moderate / --	Occasional.
Bromus diandrus Ripgut brome	Moderate / --	Occasional.
Bromus hordeaceus Soft chess brome	Limited / --	Uncommon.
Bromus madritensis ssp. *rubens* Red top brome	High / --	Uncommon.
Erodium cicutarium Redstem filaree	Limited / --	Occasional.
Festuca [*Vulpia*] *myuros* Rattail fescue	Moderate / --	Uncommon.
Festuca perennis [*Lolium multiflorum*] Italian ryegrass	Moderate / --	Uncommon.
Hypochaeris radicata Rough cat's-ear Asteraceae	Moderate / --	Uncommon.
Medicago polymorpha California burclover	Limited / --	Uncommon.
Polypogon monspeliensis Annual beardgrass	Limited / --	Uncommon.

Scientific Name Common Name	Weed Rating (Cal-IPC / CDFA)	Distribution
Rumex acetosella Sheep sorrel	Moderate / --	Uncommon.
Rumex crispus Curly dock	Limited / --	Uncommon.
Schismus arabicus Mediterranean grass	Limited / --	Uncommon.

7.2.3 Weed Management Objectives

The Restoration Site performance standards includes a criterion for the cover of weedy species to remain below a threshold (Section 6.0 Performance Standards, Table 7). Weedy species should be documented, monitoring and managed as necessary during the maintenance and monitoring phase; prioritizing on the species listed as "To Be Controlled" in Table 9 and early detection of new invaders. Weed control and management will be implemented frequently to prevent an establishment of large infestation taking hold of the Restoration Site (Refer to Maintenance Plan Section 7.1; Table 8).

7.2.4 Weed Management Methods

Weed management techniques may vary depending on the habitat, species, extent of infestation, density, and presence or absence of sensitive biological resources. Mechanical (hand tools) removal of weedy species will be the preferred methods for control. All weed plant materials will be bagged, removed from site and disposed of properly.

Chemical control (herbicides) may be considered for control if the Restoration Site succumbs to a detrimental weed infestation. A licensed Pest Control Advisor (PCA) will be contracted to develop and implement herbicide treatment, if necessary. Herbicide application must comply with federal, state, and local regulations.

7.3 Performance Standards Monitoring Plan

Performance standards monitoring will be implemented annually by a qualified biologist during peak growing season (e.g. spring, usually April or May) of each monitoring year. The following methods will be implemented to assess the status of the Restoration Site. Results for the VAFB RS will be evaluated with respect to the performance criteria. Results for the UPRR RS will reported as information.

7.3.1 Vegetation monitoring- quadrat sampling

Vegetation monitoring shall be implemented annually during peak growing season, usually March or April. Three sampling quadrats (100 square meters, e.g.10-meter by 10-meter) will be randomly established in each habitat type (refer to Section 4.3, Table 2 for habitat types) in the Restoration Site (12 sampling locations). Monitoring will document species richness, plant species absolute percent cover and substrate cover (e.g. bare ground, litter, etc.). Reference sites will be established in undisturbed habitat for each habitat type immediately adjacent to temporarily impacted areas.

Vegetation monitoring within reference sites will use the same methodology as described above. Monitoring results will be used to assess the VAFB RS with respects to the Performance Standards.

7.3.2 Plant installation survival

Annual monitoring will count the number of surviving willow cuttings and installed container stock. If counting the number of installed plants becomes impracticable, measure the absolute percent cover of the installed plants within the plots. General observation data such as average height and plant vigor will be recorded.

7.3.3 Soil Stability

Inspect soil for rills and erosion. If signs of soil instability or erosion are present photo document, estimate percent area affected, and take approximate measurements of problem area.

7.3.4 Photo Monitoring

Permanent photo points will be established at the Restoration and Reference Sites by a qualified biologist prior to implementation of restoration activities, to document baseline conditions. At least eight (8) photo points will be established throughout the Restoration Site (two photos minimum in each habitat type) and four (4) photos in the Reference Site (two in each habitat type). Photographs from designated points will be taken at annually and will be included in the monitoring reports.

7.3.5 General Site Conditions

Assess site condition for issues such as trash, erosion, vandalism, or pests. Include a general description of the vegetation condition, biological resources observed, and whether the Restoration Site is on target to meet the annual performance standards. If the Restoration Site is not expected to meet the performance standards, document any issues and suggestions for adaptive management implementation.

7.4 Reporting

The annual monitoring report will summarize all data collected during the previous monitoring periods and be provided to VAFB and UPRR annually by October 15 of each monitoring year. The Restoration Specialist of qualified biologist will indicate whether the Restoration Site is expected to meet Year 5 performance standards. If the VAFB RS is not expected to meet the performance standards, an adaptive management strategy will be implemented immediately (Section 8.0). If Year 5 performance standards are met, the final monitoring report will include a notice of project completion. If the VAFB RS does not meet the required performance standards by Year 5, a remediation plan will be prepared, and annual maintenance and monitoring of the Restoration Site will continue until success is achieved.

8 ADAPTIVE MANAGEMENT

If performance standards are not met during each monitoring year, the monitoring report shall indicate the source(s) of the problem(s) and an adaptive management plan shall be implemented. The monitoring report shall indicate additional steps that would lead to success of the Restoration Site in the following year (e.g. supplemental water, re-seeding, plant installation weed management, erosion control measures, plant protection). Adaptive management recommendations will be provided to UPRR and/or VAFB and the designated landscape contractor as soon as practicable following each monitoring site visit.

Annual monitoring site visits shall indicate whether the Restoration Site is expected to meet Year 5 final performance standards. If the performance standards for Year 5 are not expected to be met, the project biologist shall provide details on problem areas and make recommendations for remediation.

Should the Restoration Site fail to meet the performance standards outlined in this document by Year 5, the Restoration Specialist shall prepare a remediation report outlining the work that would need to be implemented for Restoration Site success such as including re-planting, installation of irrigation, maintenance, and continued monitoring. The site shall be maintained as prescribed in the remediation plan and monitored annually until primary performance standards are met and the Project mitigation obligation to is fulfilled.

9 REFERENCES

[A&M] Althouse and Meade, Inc. 2012. Biological Assessment for the Union Pacific Railroad (UPRR) SBAR 291.33 Narlon Bridge Replacement Project. September.

[Cal-IPC] California Invasive Plant Council. 2018. California invasive plant inventory. Berkeley, CA.

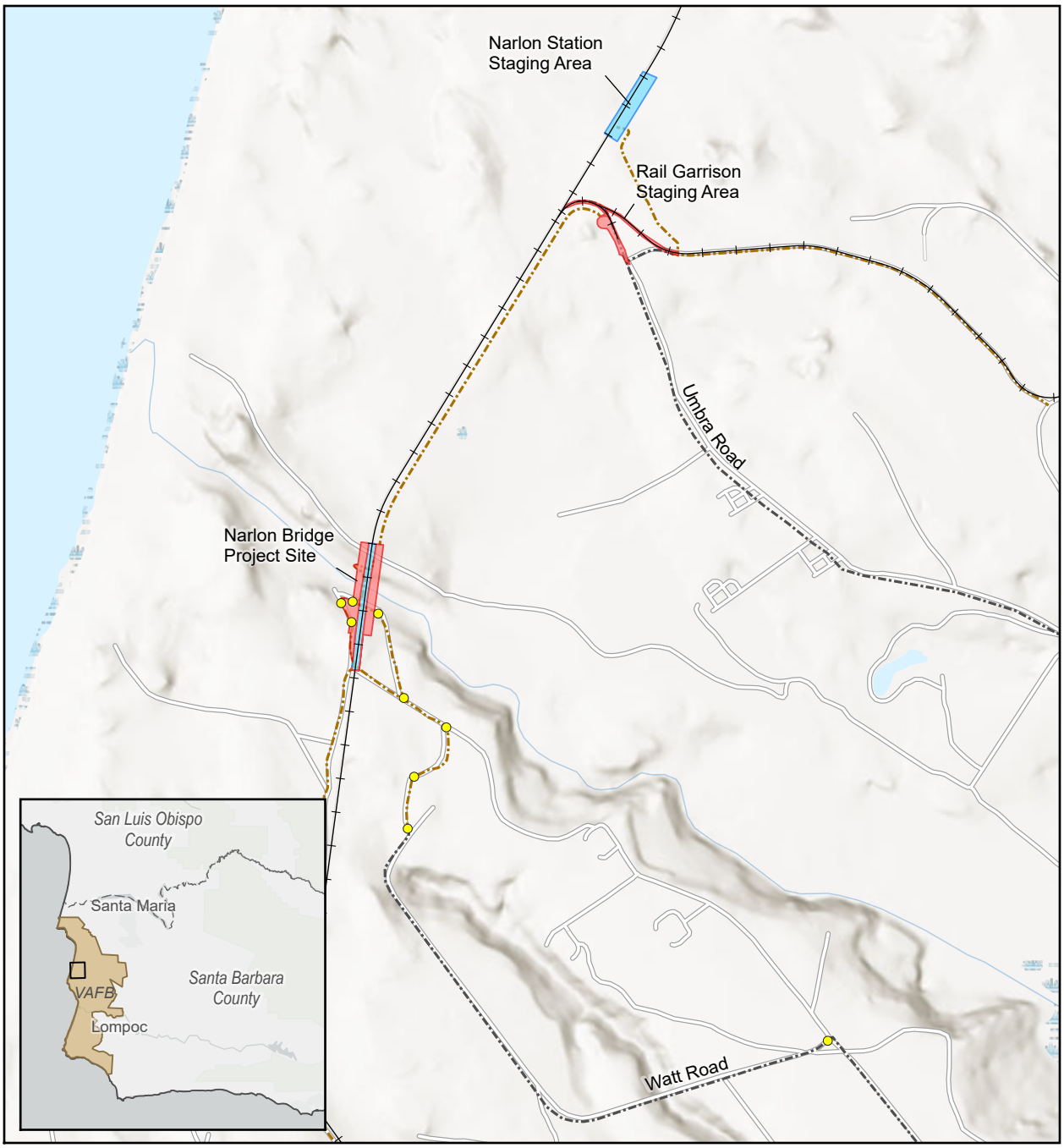
[CDFA] California Department of Food and Agriculture. 2016. California noxious weeds. [accessed 2018 Oct 15]. https://www.cdfa.ca.gov/plant/IPC/encycloweedia/weedinfo/.a/.

Federal Railroad Administration, Dept. of Transportation. 49 CFR § 213.37. Available online at https://www.govinfo.gov/content/pkg/CFR-2010-title49-vol4/pdf/CFR-2010-title49-vol4-sec213-37.pdf.

10 FIGURES

- **Figure 1. Project Location**
- **Figure 2. Restoration Site**

Figure 1. Project Location and Habitat Restoration Areas



Legend

- Mowing at Curves For Vehicle Access
- Railroad
- Existing Paved Road
- Existing Unpaved Road

Project Areas

- UPRR Property (8.55 acres)
- VAFB Property (8.79 acres)

N

0 1,000 2,000 3,000 Feet

Union Pacific Railroad - Narlon Bridge Replacement
Map Center: 120.60352°W 34.7908°N
Santa Barbara County, California

Basemap: Esri World Topographic

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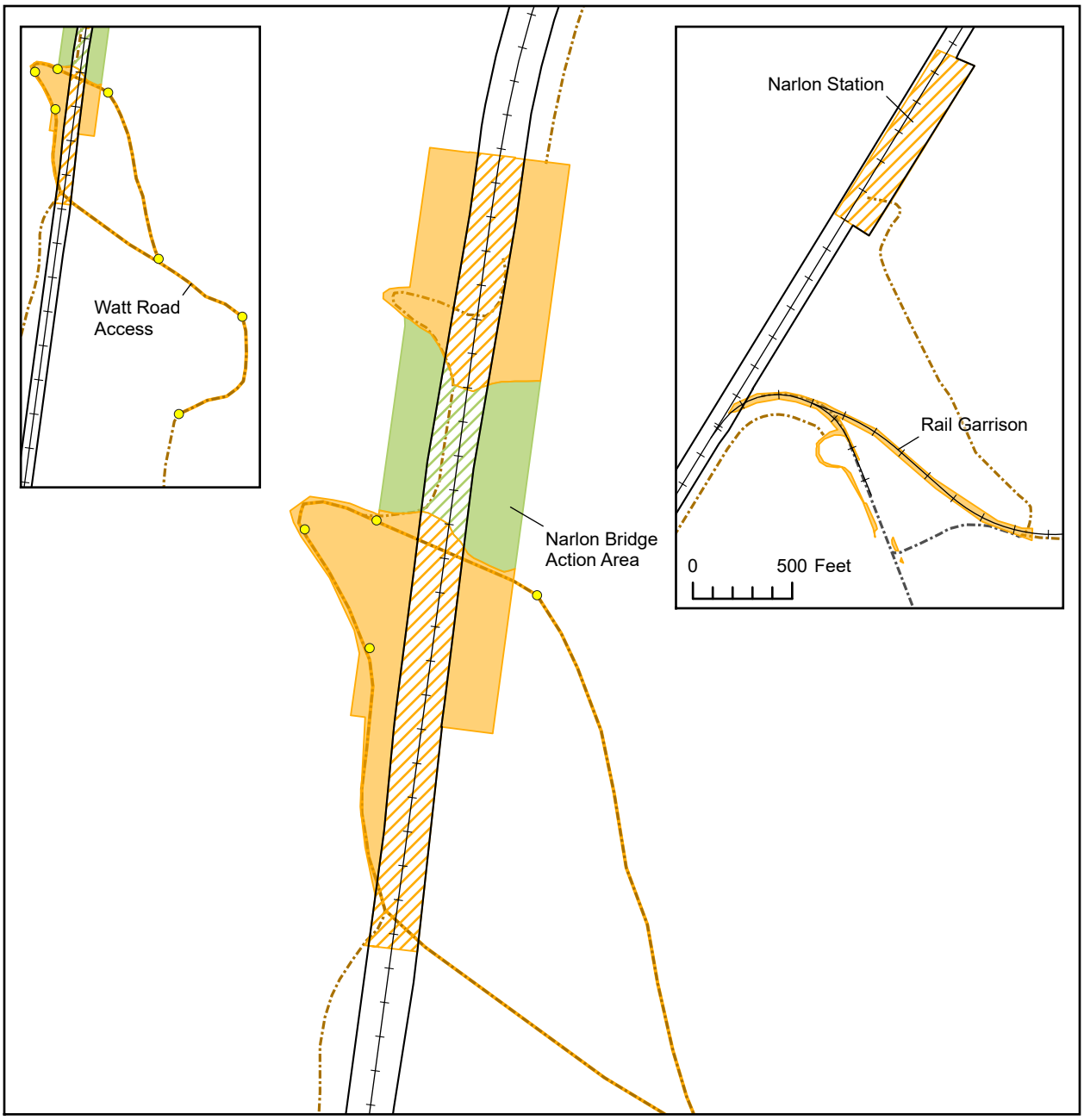
Map Updated:
February 11, 2019 03:47 PM by MMP

Figure 2. Habitat Map



Legend

Restoration Sites

VAFB Property

- Arroyo Willow Riparian (1.84 acres)
- Central Dune Scrub (6.95 acres)

UPRR Property

- Managed Arroyo Willow Riparian (0.70 acres)
- Managed Central Dune Scrub (7.85 acres)

- Mowing at Curves For Vehicle Access
- UPRR Right of Way
- Railroad
- Existing Paved Road
- Existing Unpaved Road

N

0 200 400 600 Feet

Union Pacific Railroad - Narlon Bridge Replacement
Map Center: 120.61031°W 34.78942°N
Santa Barbara County, California

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Map Updated:
February 11, 2019 03:48 PM by MMP

11 PHOTOGRAPHS

Photo 1. Project location for Narlon bridge replacement. Narlon Bride spans San Antonio Creek. View north, October 22, 2016.

Photo 2. Managed central dune scrub habitat in the UPRR ROW. View east, October 22, 2016.

Photo 3. Managed arroyo willow riparian habitat in the UPRR ROW. View south, October 22, 2016.

Photo 4. View of dense arroyo willow riparian habitat on VAFB property. View north, October 22, 2016.

Photo 5. Central dune scrub habitat on VAFB property. View east, October 22, 2016.

Photo 6. Coastal dune scrub habitat between Watt Rd. and the bridge may be temporarily impacted due to road widening. View southeast, October 22, 2018.

APPENDIX J. ADDITIONAL MITIGATION PLAN

ALTHOUSE AND MEADE, INC.
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www.althouseandmeade.com

UPRR Narlon Bridge Additional Mitigation CCC-003-19

Vandenberg Air Force Base, Santa Barbara County, CA

October 15, 2019

UNION PACIFIC RAILROAD SANTA BARBARA SUBDIVISION MILEPOST 291.33 – ADDITIONAL MITIGATION PLAN

Coastal Consistency Certification No. CC-003-19 concurred with replacement of the Narlon Bridge over San Antonio Creek on Vandenberg Air Force Base (VAFB) in Santa Barbara County. The Narlon Bridge Replacement Project ("Project") would temporarily impact environmentally sensitive habitat during construction, for up to one year. This plan provides for invasive species removal plus revegetation in addition to the restoration and revegetation originally described in the Vegetation Restoration and Monitoring Plan included with the Environmental Assessment (EA). It is possible that some areas originally described in the EA as impacted may instead be protected during construction, which could reduce restoration requirements, with California Coastal Commission (CCC) Executive Director agreement.

1 SUMMARY

This conceptual plan identifies appropriate locations on the Wall Beach coastal terrace in need of restoration due to the extent of invasive species (Additional Mitigation Plan). The restoration would consist of removal of invasive species, which in this coastal region are primarily veldt grass (*Ehrharta calycina*) and ice plant (*Carpobrotus edulis*). This plan includes performance criteria and measures needed to achieve its success, including re-treatment if initial removal is not successful, and monitoring for at least 5 years.

The CCC requested an additional 18 acres of mitigation to compensate for habitat impacts lasting up to one year resulting from Project activities. UPRR proposes to double the mitigation effort on one 10-acre property. The required additional time and plant material installation efforts is expected to provide a higher quality habitat than simple weed eradication. We propose 10 acres of ice plant removal plus 10 acres of planting, a total 20-acre effort that is much more time-consuming and expensive compared to 18 acres of weed spraying. This effort is expected to provide 10 acres of coastal terrace habitat on a trajectory to native shrub cover, beneficial for native bees, butterflies, and birds.

2 MITIGATION CONCEPT

2.1 Mitigation Requirements

The CCC requested environmentally sensitive habitat area (ESHA) mitigation ratios for dune scrub of 3:1 for areas graded or filled and 2:1 for areas mowed. UPRR anticipates that no more than 15 acres of ESHA would be mowed and approximately 1.4 acres of ESHA would be temporarily impacted by cut/fill operations during proposed Project activities. The Project work area would be restored and/or revegetated as per the Vegetation Restoration and Monitoring Plan (see EA Appendix I). Additional mitigation would therefore be required on an additional 15 plus 2.8 acres, or approximately 18 acres. The CCC stated that weed abatement would be an acceptable form of mitigation.

In June 2019, VAFB environmental staff requested that areas treated for invasive species (ice plant) removal by UPRR contractors also be planted with native dune scrub species to replace the dead ice plant over time. This request more than doubled the cost of weed abatement for 18 acres of additional mitigation area. Therefore, UPRR proposes to eradicate ice plant (three treatments with herbicide) from 10 acres of dune scrub habitat and implement native shrub restoration (plant locally sourced seedlings) on that 10 acres for an additive treatment, equivalent to or better than 20 acres of weed eradication. Species to be planted would be selected based on their presence on VAFB coastal terraces on similar soils (see Section 2.2). The Additional Mitigation Area (AMA) would be treated for ice plant eradication in Year 1 (fall/winter 2019/2020), planted with native shrubs in Year 2 (fall/winter 2020/2021), maintained and monitored in Years 3 to 5, with spot-application and hand-pulling of weeds during those maintenance years.

2.2 Proposed Additional Mitigation Location

The proposed area for additional mitigation is a 10-acre plot (Additional Mitigation Area; AMA) located north of Wall Beach, bordered by Beach Road on the east and the Pacific Ocean on the west (Figure 1 and Figure 2). To the north are areas which are either being currently restored or are proposed for restoration by VAFB. The habitat is central dune scrub, though it has been thoroughly invaded by ice plant and veldt grass—proposed mitigation area is very poor habitat quality. There are a few scattered native shrubs, including coyote brush (*Baccharis pilularis*). Underlying soils are Oceano sand (2 to 15 percent slopes) (Figure 3).

2.3 Baseline Study and Monitoring Methods

Prior to weed reduction, percent cover of veldt grass and iceplant, thickness of iceplant mats and locations of native shrubs will be measured and mapped within the AMA. If approved for use by VAFB Range Operations, a drone survey using a DJI Matrice 200 drone (or equivalent) will be used to document baseline conditions at the landscape and sub-plot scales. The AMA will be subdivided into 10 sub-plots of approximately one acre each. Sub-plots will be used to identify portions of the AMA that are performing well or are under-performing.

2.3.1 Vegetative Cover

Native and non-native vegetation cover will be sampled using randomly placed plots. Sampling plots will consist of two 10-meter transect tapes, placed as a cross (100 square meter plot). The

cross-transects will be oriented so the 5-meter legs correspond with the four cardinal directions. Random locations for plots within each two-acre sub-area will be determined by software tools such as the Sampling Design Tool for ArcGIS developed by the Biogeography Branch of NOAA or a similar tool. An equal number of plots will be established in each two-acre sub-plot.

To assess vegetation cover, ten point-intercept samples will be collected at regular intervals from each 100 square meter plot cross-transect. A rod or pin will be placed perpendicular to the ground at each sample point. At the intercept of the pin the native or non-native plant species will be recorded. If no plant is present, then either bare ground or dry plant litter will be recorded. Absolute cover[1] can exceed 100 percent, if more than one strata (i.e., herb and shrub) is sampled at one point.

2.3.2 Species richness

Species richness[2] will be evaluated by counting the total number of native species within each two-acre sub-plot. Each two-acre sub-plot will be searched for native species by walking transects in a zig-zag pattern. Biologists will use tracking devices on their GPS units to record their pattern across each sub-plot. The results of the species richness surveys will be used to establish an inventory of native and nonnative plant species recorded within the AMA.

2.3.3 Photo-monitoring

Photographs will be collected during the baseline study and during each of the annual spring monitoring events to visually document the weed reduction and native species restoration process. Photos will be taken from the same angle each year: Two at each of the four corners of the AMA. and four in each of the cardinal directions from the center of the AMA. Four additional photos will be collected during spring monitoring events to generally document site conditions.

2.4 Phased Treatments and Schedule

The baseline study is scheduled to occur in the fall/winter 2019/2020. Phase 1, weed treatment, would start in the late winter/spring, anticipating three herbicide application events in Year 1. Phase 2, native plant installation and maintenance, would begin following the third herbicide application in the winter of 2021 when soil is moist.

Phase 1 would involve a minimum of three selective herbicide applications to chemically treat 10 acres of ice plant over a one-year period: spring, early fall, and following winter during a dry period. Applications would be made by ATV to avoid spraying the few native shrubs present among acres of ice plant. No spraying would occur when wind speeds exceed 8 mile per hour. Preferably, spray with appropriate size droplets at low wind velocities (3 to 7 mph) to avoid drift to non-target plants. Spot treatments would be applied during the second and third years, as part of Phase 2, where needed.

[1] Absolute Native Cover (%) = # hits of native species / total # sampling points

[2] Species richness is the count or number of species found within a defined area. Species richness does not evaluate abundance of species.

Phase 2 would involve opening holes in the ice plant thatch and planting seedlings in each hole. Seedlings would be watered by hand through the first summer, as needed. Approximately 857 shrubs per acre would be planted, for a total of 8570 shrubs across the 10-acre mitigation area. Holes would be approximately 12 inches in diameter and seedlings would be one to three years old in plugs, liners, or one-gallon container sizes, as available. Table 1 lists some of the species that may be included in the planting palette, depending on availability of seed.

TABLE 1. PLANTING PALETTE PER ACRE

Scientific Name	Common Name	Percent	Number per Acre	Flowering Seasons	Wildlife Value (from CNPS Calscape)*
Ericameria ericoides	Mock heather	35%	300	Winter Spring, Summer	Moths and butterflies
Eriogonum parvifolium	Coastal buckwheat	40%	343	All year, primarily spring and summer	Bees, moths and butterflies
Lupinus chamissonis	Dune lupine	10%	86	Winter Spring, Summer	Numerous pollinating insects including bees and butterflies.
Artemisia californica	California sagebrush	10%	86	Spring, Summer Fall	California Gnatcatcher, Quail, various other birds, insects including butterflies and moths
Isocoma menziesii	Goldenbush	5%	42	Spring, Summer Fall	Numerous insects, including butterflies
	Total	100%	857		

*Source: https://calscape.org

3 PERFORMANCE CRITERIA

The goal of this plan is to restore central dune scrub via invasive ice plant eradication and replanting of native species. Primary performance criteria will be the percentage of ice plant killed and the percentage survival of planted seedlings and container stock. After 5 years from initial ice plant removal, the additional mitigation site is expected to meet performance criteria. See Table 2 for criteria and monitoring methods.

TABLE 2. PERFORMANCE CRITERIA

Criterion	Metric	Monitoring Method	Target Year 2	Target Year 5
Ice plant kill	Percent dead	See Section 2.3.1 Drone aerial interpretation – use digital segmentation to identify patches of live ice plant to estimate percent kill.	90% dead	95% dead
Species richness	Count	See Section 2.3.2 for count of native species in each acre.	2 native species	4 native species
Native Cover	Percent	See Section 2.3.1, and explanation below	<1%	4%
Seedling survival	Percent live	Count survival within 10% of the project area. Randomly select 10 locations, each 4356 square feet (approximately 400 sq meters). Count survival by species in each planting location. Survey area will cover 43560 square feet for a 10-acre survey area.	75% survival (643 alive/acre); Estimates that over 10-acre site 6430 plants are alive	65% survival (557 alive); Estimates that over 10-acre site, 5570 plants are alive

For native cover, we assume that native shrubs currently occupy less than 1% of the iceplant-dominated AMA. If each seedling grows to 8 inches in diameter (0.33 feet) by Year 2, the aerial extent of that seedling would be 0.34 square feet[3]. If 75 percent survive, the total area covered by seedlings in Year 2 would be 219 square feet, or 0.5 percent native cover in an acre[4]. By Year 5, we expect seedlings have grown to two (2) feet in diameter with a minimum of 65 percent survival, and the area covered by planted material would be 1,749 square feet, or 4 percent native cover[5].

4 MONITORING AND REPORTING CONCEPT

The additional mitigation area will be monitored for two months following each herbicide application, and annually in the spring or early summer (May through June) for five years. Annual reports documenting progress towards performance criteria would be submitted to VAFB for review prior to submittal to CCC each year.

4.1 Data Analysis

Each year, the mean, standard deviation, and standard error will be calculated and provided with the monitoring data for each sub-plot. The mean value for native species cover will be compared with the baseline and performance standards. After three years of data have been collected, a linear

[3] Area = $\pi r^2 = 3.14 * 0.33^2$ estimated for Year 2 per seedling. For Year 5, Area = $3.14 * 1^2 = 3.14$ square feet/seedling

[4] Percent seedling cover at Year 2: 75% of 857 seedlings survive times 0.34 square feet per seedling totals 218.5 square feet. Divide 219 sf by 43857*.65560 sf per acre times 100 percent equals 0.5% seedling cover.

[5] Percent seedling/young shrub cover at Year 5: 65% of 857 seedlings survive (557 total) times 3.14 square feet per seedling

model will be applied to the data to confirm observed trends in vegetation coverage and species richness.

4.2 Reporting

A baseline report will be submitted within three months after this additional mitigation plan concept is approved. The report will include detailed analysis of existing conditions, summary tables of measurements related to vegetative cover and species richness, a list of native and non-native species observed, baseline photographs, aerial photograph and drone interpretation (if drone survey approved by VAFB), and representative site photographs. The report will also include recommended herbicide materials, quantities, detailed means and methods, and schedule to be approved by the Executive Director prior to implementation of Phase 1.

The results of quarterly monitoring inspections, annual spring monitoring and all other mitigation maintenance activities will be provided in an annual report. A total of five annual reports will be prepared and submitted to the Executive Director within the month of November each year and no later than December 15th. The first report will be provided at the end of the calendar year that Phase 1 is implemented. The reports will include a summary of maintenance activities performed to date, weed control activities, findings from vegetation cover and species richness surveys, photo-monitoring results, an assessment of compliance status and recommendations for future work or adaptive management. The fifth annual report will constitute the final report submitted to the Executive Director. The final report will include all elements provided in the previous annual reports described above, as well as photographic evidence of the site prior to and at the completion of the Additional Mitigation. If the final report finds that the Additional Mitigation has in part, or in whole, been unsuccessful a revised or supplemental Additional Mitigation Plan in accordance with Coastal Consistency certification No. CC-0003-19 will be submitted to the Executive Director for review and approval. Remedial measures will be implemented and the monitoring period will be extended in accordance with the revised or supplemental Additional Mitigation Plan until compliance is achieved.

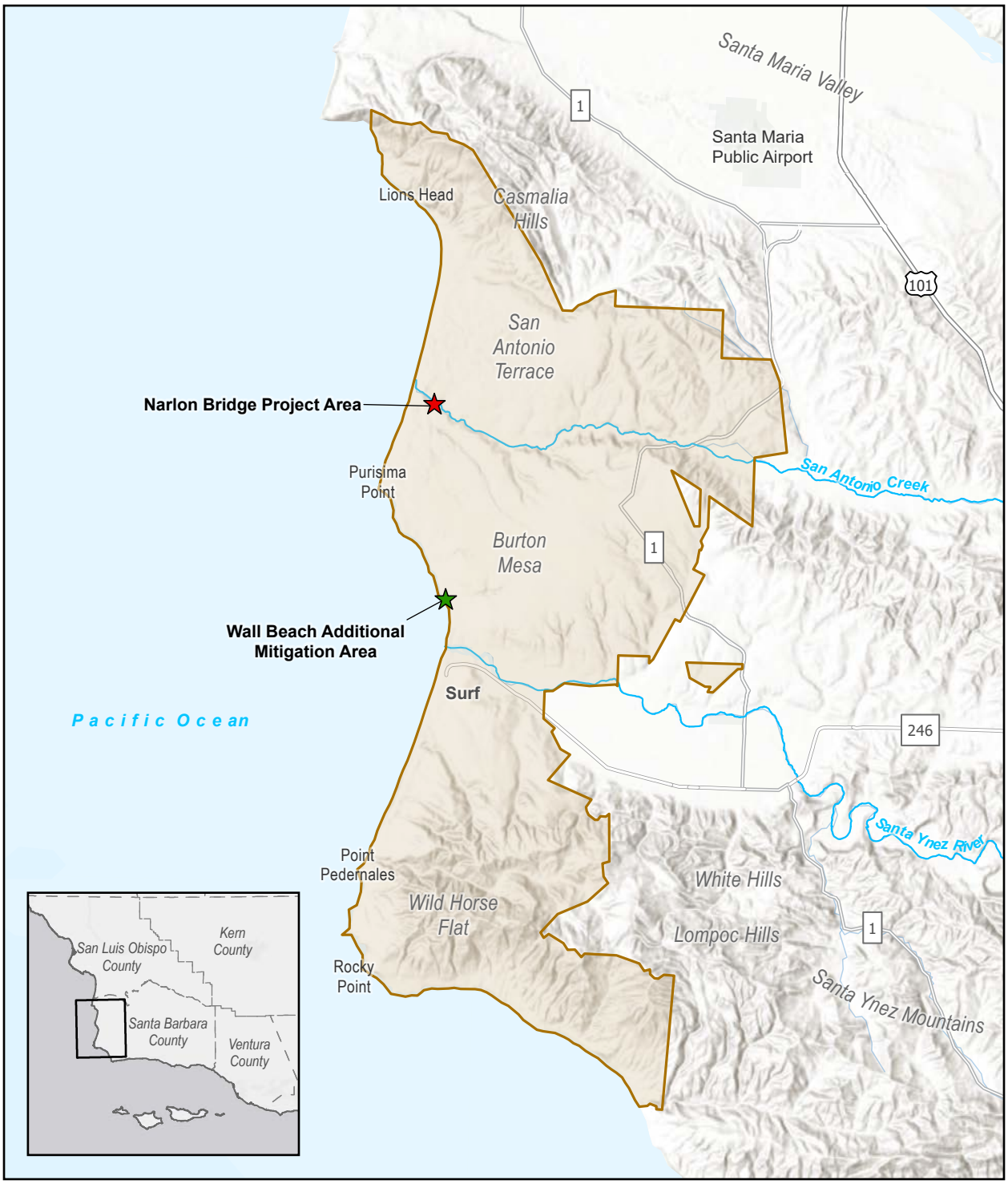
ATTACHMENT 1. FIGURES

Figure 1. Vicinity Map

Figure 2. Aerial Imagery

Figure 3. USDA Soil Survey

Figure 1. Vicinity Map



Legend

★ Additional Mitigation Area ★ Proposed Action Area ▭ Vandenberg Air Force Base

N

0 1 2 3 4 5 Miles

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.57552°W 34.7151°N
Santa Barbara County

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Map Updated:
October 10, 2019 11:11 AM by MMP

Figure 2. Aerial Imagery

Legend

- Union Pacific Railroad
- Proposed UPRR Additional Mitigation Area
- Current VAFB Restoration Area
- Proposed VAFB Restoration Area

N

0 500 1,000 Feet

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.6056°W 34.71554°N
Santa Barbara County, California

Imagery Source: Digital Globe, 2017

ALTHOUSE AND MEADE, INC.
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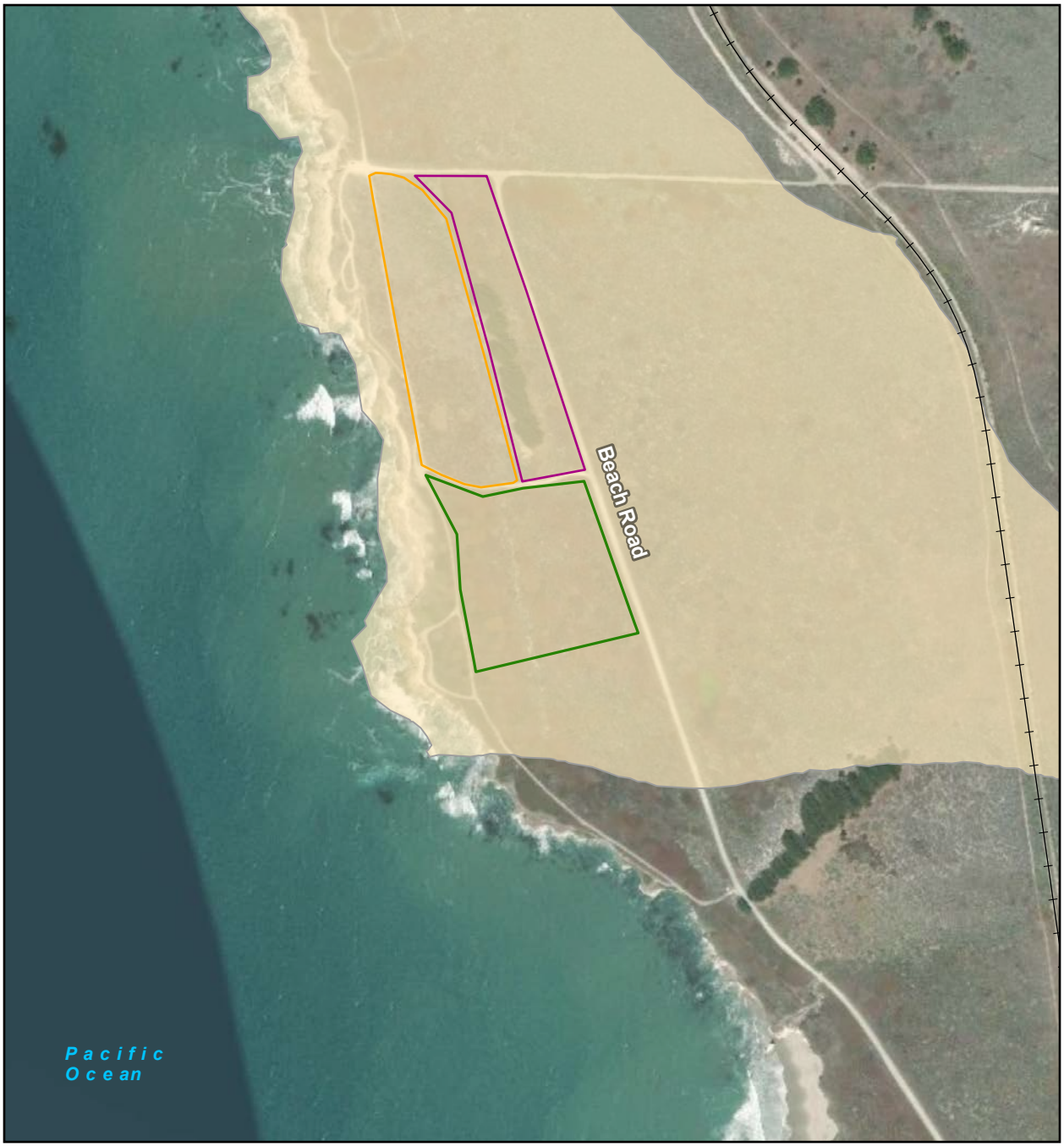
Map Updated:
September 17, 2019 09:46 AM by MMP

Figure 3. United States Department of Agriculture Soil Survey



Legend

- Union Pacific Railroad
- Oceano sand, 2 to 15 percent slopes
- Proposed UPRR Additional Mitigation Area
- Current VAFB Restoration Area
- Proposed VAFB Restoration Area

N

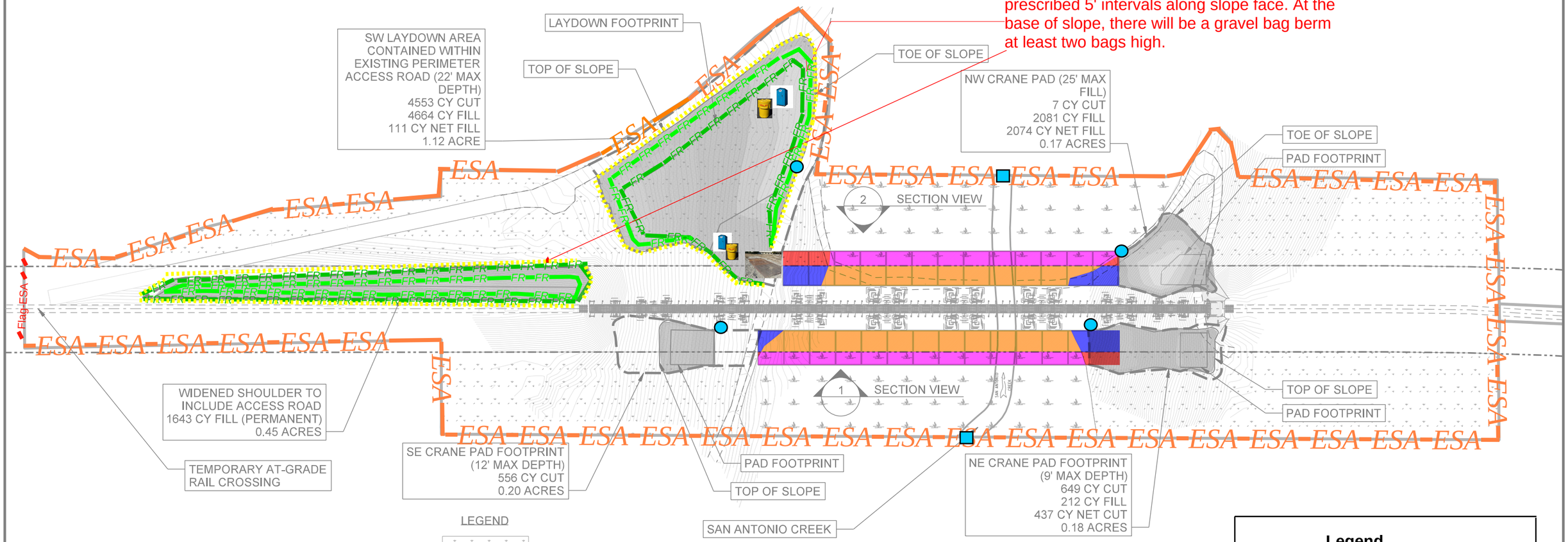
0 500 1,000 Feet

Union Pacific Railroad
Narlon Bridge Replacement
Map Center: 120.6056°W 34.71554°N
Santa Barbara County

Source: USDA NRCS Soil Survey

APPENDIX K. EROSION CONTROL PLAN

Two sets of fiber roll along top edge and at prescribed 5' intervals along slope face. At the base of slope, there will be a gravel bag berm at least two bags high.



LEGEND

- CENTRAL DUNE SCRUB HABITAT BOUNDARY
- ARROYO WILLOW RIPARIAN HABITAT BOUNDARY
- EXISTING CONTOURS
- ACTION AREA
- WATERS OF THE UNITED STATES
- UNION PACIFIC RIGHT OF WAY
- UNION PACIFIC TRACK AND STRUCTURES
- UNPAVED ACCESS ROADS
- GRADING ENVELOPE
- CONTRACTOR SAMPLE CONTOURS (SEE SECTIONS FOR DETAILS)

Important Notes:

At parking location, perimeter controls will be installed.

Contours will be reestablished upon completion of project.

When predictions of 25% chance or greater of rain within 24 hours, all work will cease.

Dust will be controlled by means of water or pallative.

Water Sampling Legend

- Potential Water Sampling Location
- Potential Creek Sampling Location

100 0 100 200
SCALE IN FEET

Legend

- ESA Fencing
- ESA Flagging
- Fiber Roll
- Spill Kit
- Portable Restrooms
- Gravel Bag Berm
- Entrance Exit Controls

Water Pollution Control Drawing

Milepost 291.33: Narlon Bridge Replacement Project

APPENDIX L. SPECIAL-STATUS PLANTS REPORTED FROM THE REGION

APPENDIX L. SPECIAL STATUS PLANTS REPORTED FROM THE REGION

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
1.	**Red Sand-Verbena** *Abronia maritima*	None/None G4/S3? 4.2	February - November	Coastal dunes; <100m sCCo, Sco, ChI; Baja CA	High. Suitable coastal sand dune habitat is present in the Action Area.	No
2.	**Hoover's Bent Grass** *Agrostis hooveri*	None/None G2/S2 1B.2	April - July	Sandy soil in oak woodland habitat; <600 m. Endemic to SLO & SB Counties.	No. Suitable oak woodland habitat is not in the Action Area. Action Area is not within species known range.	No
3.	**Santa Ynez Groundstar** *Ancistrocarphus keilii*	None/None G1/S1 1B.1	March - April	Sandy soils in cismontane woodland and chaparral; 40-130 m. Endemic to Santa Barbara County.	No. Suitable woodland and chaparral habitats are not present in the Action Area.	No
4.	**Aphanisma** *Aphanisma blitoides*	None/None G3G4/S2 1B.2	February - June	Coastal bluff scrub, coastal dunes, coastal scrub, in sand or clay soil; 1-305 m. s CCo, SCo, ChI; Baja CA	Low. Suitable coastal dune habitat is present in the Action Area.	No
5.	**Eastwood's Brittle-Leaf Manzanita** *Arctostaphylos crustacea* ssp. *eastwoodiana*	None/None G4T2/S2 1B.1	March	Maritime chaparral on the La Purisima Ridge, Burton Mesa, and Point Sal areas; 90-365 m. Endemic to Santa Barbara County	No. Action Area is outside of species known range.	No
6.	**La Purissima Manzanita** *Arctostaphylos purissima*	None/None G2/S2 1B.1	November - May	Sandstone outcrops and sandy soil in chaparral;	High. Suitable sand soils are present in the Action Area.	No

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
7.	**Sand Mesa Manzanita** *Arctostaphylos rudis*	None/None G2/S2 1B.2	November - February	Sandy soils, chaparral. <100m. s CCo (Nipomo, Burton Mesa, Pt. Sal, sw SLO, nw SB Counties)	High. Suitable sandy soils are present in the Action Area.	No
8.	**Ocean Bluff Milk-Vetch** *Astragalus nuttallii* var. *nuttallii*	None/None G4T4/S4 4.2	January – Novem0ber	Rocks, coastal bluff scrub, coastal dunes; 3-120 m.	High. Suitable coastal dune habitats are present in the Action Area.	No
9.	**Lompoc Ceanothus** *Ceanothus cuneatus* var. *fascicularis*	None/None G5T4/S4 4.2	February - April	Chaparral on coastal sandy mesas; <400 m. s Cco	No. Suitable chaparral is not present in the Action Area. Action Area is west of species known extent.	No
10.	**Coastal Goosefoot** *Chenopodium littoreum*	None/None G2/S2 1B.2	April - August	Generally sandy soils, dunes; <40m. s CCo	Moderate. Suitable sandy dune habitat is present in the Action Area.	No
11.	**Palmer's Spineflower** *Chorizanthe palmeri*	None/None G4/S4 4.2	April - August	Serpentine; 60-700m. SCoRO (w Monterey, w San Luis Obispo cos.)	No. Suitable Serpentine substrate is not present in the Action Area.	No
12.	**Straight-awned Spineflower** *Chorizanthe rectispina*	None/None G2/S2 1B.3	April - July	Chaparral, dry woodland in sandy soil; 200-600 m. SCoRO	No. Action Area is outside of species known range.	No

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
13.	**Bolander's Water-Hemlock** *Cicuta maculata* var. *bolanderi*	None/None G5T4/S2 2B.1	July - September	Coastal wetlands, marshes and swamps; <200 m. sScV, Cco, Sco	High. Suitable coastal wetland habitat is present in the Action Area. Action Area is downstream of a known occurrence.	No
14.	**Surf Thistle** *Cirsium rhothophilum*	None/Threatened G1/S1 1B.2	April - June	Dunes, bluffs; <20 m. s CCo (s SLO, n SB Counties)	High. Suitable dune habitat is present in the Action Area.	No
15.	**La Graciosa Thistle** *Cirsium scariosum* var. *loncholepis*	Endangered/Threatened G5T1/S1 1B.1	May - August	Marshes, dune wetlands; <50m. s CCo (sw San Luis Obispo, nw Santa Barbara counties)	No. Potentially suitable habitat is present within the Action Area, but surveys by VAFB and A&M staff determined that this species does not occur within the Action Area.	No
16.	**Small-flowered Morning-glory** *Convolvulus simulans*	None/None G4/S4 4.2	March - July	Clay substrates, occ serpentine, ann grassland, coastal-sage scrub, chaparral; 30-875 m.; s SNF, SnFrB, s SCoRO, Sco, ChI, WTR, PR; AZ, Baja CA.	No. Suitable clay or serpentine substrates are not present in the Action Area.	No
17.	**Seaside Bird's-beak** *Cordylanthus rigidus* ssp. *littoralis*	None/Endangered G5T2/S2 1B.1	April - October	Closed-cone coniferous forest, chaparral, coastal scrub, coastal dunes. Sandy, often disturbed sites; 0-215 m. s CCo, CCo	No. Action Area is outside of species known range.	No

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
18.	**Gaviota Tarplant** *Deinandra increscens* ssp. *villosa*	Endangered/Endangered G4G5T2/S2 1B.1	May - October	Grassland and coastal scrub ecotone on coastal terraces from Point Sal south to vicinity of Goleta; w WTR.	No. Surveys by VAFB and genetic analysis of specimens determined that this species does not occur within the Action Area.	No
19.	**Paniculate Tarplant** *Deinandra paniculata*	None/None G4/S4 4.2	(March) April - November	Foothill woodland; 300-500 m. SCoRI (Monterey, SLO counties).	No. Suitable woodland habitat is not present in the Action Area.	No
20.	**Dune Larkspur** *Delphinium parryi* ssp. *blochmaniae*	None/None G4/T2 1B.2	April - June	Coastal chaparral, sand. 0-200 m. s CCo	High. Suitable sandy habitat is present in the Action Area and a known occurrence is in the vicinity of the Action Area.	No
21.	**Vandenberg Monkey Flower** *Diplacus vandenbergensis*	Endangered/None G1/S1 1B.1	April - June	Sandy, often disturbed areas, in cismontane woodland and chaparral on the Burton Mesa, Lompoc; 75-120 m.	No. Action Area is outside of species known range.	No
22.	**Beach Spectaclepod** *Dithyrea maritima*	None/Threatened G1/S1 1B.1	March - May	Sea shores, sandy soils on dunes near the shore; <50 m s CCo, SCo, Baja CA.	High. Suitable dune habitat is present in the Action Area.	No
23.	**Blochman's Dudleya** *Dudleya blochmaniae* ssp. *blochmaniae*	None/None G3T2/S2 1B.1	April - June	Open, rocky slopes, often serpentine or clay soils; <450 m. s CCo, SCo	No. Suitable rocky, serpentine, or clay substrates are not present in the Action Area.	No

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
24.	**Blochman's Leafy Daisy** *Erigeron blochmaniae*	None/None G2/S2 1B.2	June - August	Sand dunes and hills; <30 m. s CCo	High. Suitable sand dune habitat is present in that Action Area.	No
25.	**Lompoc Yerba Santa** *Eriodictyon capitatum*	Endangered/Rare G2/S2 1B.2	May - September	Sandy soils on terraces of closed-cone coniferous forest or chaparral;	No. Suitable forest or chaparral habitats are not present in the Action Area.	No
26.	**Mesa Horkelia** *Horkelia cuneata* var. *puberula*	None/None G4T1/S1 1B.1	February – July (September)	Dry, sandy coastal chaparral; gen 70-700 m. SCoRO, SCo.	No. Suitable chaparral habitats are not present in the Action Area.	No
27.	**Kellogg's Horkelia** *Horkelia cuneata* var. *sericea*	None/None G4T1?/S1? 1B.1	April - September	Old dunes, coastal sand hills; <200 m. CCo	High. Suitable sand dune habitat is present in the Action Area.	No
28.	**Coulter's Goldfields** *Lasthenia glabrata* ssp. *coulteri*	None/None G4T2/S2 1B.1	February - June	Saline places, vernal pools; <1000 m. s SCoRO, SCo, n ChI, PR, w DMoj	No. Suitable vernal pool habitat is not present in the Action Area.	No
29.	**Beach Layia** *Layia carnosa*	Endangered/Endangered G2/S2 1B.1	March - July	On sparsely vegetated, semi-stabilized dunes, usually behind foredunes; 0-75 m. n NCo, CCo	No. VAFB and A&M surveys determined that this species does not occur within the Action Area.	No

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
30.	**Pale-Yellow Layia** *Layia heterotricha*	None/None G2/S2 1B.1	March - June	Alkaline or clay soils, open areas, in pinyon-juniper woodland, grassland; 270-1705 m. Teh, San Joaquin Valley, SCoR, n WTR	No. Appropriate alkaline of clay substrate are not present in the Action Area.	No
31.	**Robinson's Pepper-grass** *Lepidium virginicum* var. *robinsonii*	None/None G5T3/S3 4.3	January - July	Dry, disturbed areas, bottomland, riverbanks, meadows, fields, pastures, cliffs, scrub; <2800 m.	No. Action Area is out of this variety's known range (CCH 2019).	No
32.	**Dunedelion** *Malacothrix incana*	None/None G3G4/S3S4 4.3	(January) April - October	Sandy coastal dunes; <300 m. CCo, Sco	High. Suitable coastal dune habitat is present in the Action Area.	No
33.	**Southern Curly-leaved Monardella** *Monardella sinuata* ssp. *sinuata*	None/None G3T2/S2 1B.2	April - September	Sandy soils, coastal strand, dune and sagebrush scrub, coastal chaparral and woodland; <300 m. Cco, SCoRO, extirpated Sco.	Moderate. Suitable coastal strand dune habitat is present in the Action Area.	No
34.	**Crisp Monardella** *Monardella undulata* ssp. *crispa*	None/None G3T2/S2 1B.2	April – August (December)	Active dunes; <100 m. s CCo (San Luis Obispo and Santa Barbara Counties)	High. Suitable active dune habitat is in the vicinity of the Action Area and a known occurrence overlaps the Action Area.	No
35.	**San Luis Obispo Monardella** *Monardella undulata* ssp. *undulata*	None/None G2/S2 1B.2	May - September	Stabilized dunes, coastal scrub, stabilized sandy soils; <200 m. CCo.	High. Suitable stabilized dunes and coastal scrub habitat is present in the Action Area.	**Yes**

	Common and Scientific Name	Fed/State Status Global/State Rank CRPR	Blooming Period	Habitat Preference	Potential to Occur	Detected within Action Area?
36.	**California Spineflower** *Mucronea californica*	None/None G3/S3 4.2	March - July(August)	Sandy soil in coastal scrub, chaparral; 0-1400 m. CS, SW	High. Suitable sandy soil and coastal scrub habitat are present in the Action Area.	**Yes**
37.	**Gambel's Water Cress** *Nasturtium gambelii*	Endangered/Threatened G1/S1 1B.1	April - October	Marshes, stream banks, lake margins; <1250 m. s CCo, SCo, to Mexico	No. VAFB and A&M surveys determined that this species is not present within the Action Area.	No
38.	**South Coast Branching Phacelia** *Phacelia ramosissima* var. *austrolitoralis*	None/None G5?T3/S3 3.2	March - August	Chaparral, Coastal dunes, coastal scrub, coastal salt marshes and swamps; rocky or sandy. 5-300 m. CCo, SCo, ChI.	Not currently recognized as a valid taxon. Parent taxon *P. ramosissima* is present in the Action Area.	Not applicable
39.	**Hoffmann's Sanicle** *Sanicula hoffmannii*	None/None G3/S3 4.3	March - May	Shrubby coastal hills, pine woodland;often on serpentine or clay, <500m. CCo, SCo, n ChI	No. Suitable substrates are not present in the Action Area.	No
40.	**Black-Flowered Figwort** *Scrophularia atrata*	None/None G2?/S2? 1B.2	March - July	Closed-cone coniferous forest, riparian scrub, dune habitats; in sand, diatomaceous shales, calcareous and other soil types. 10-250 m. s SCoRO	High. Suitable dune and riparian scrub habitats are present in the Action Area.	**Yes**
41.	**Dune (Blochman's) Ragwort** *Senecio blochmaniae*	None/None G3/S3 4.2	May - October	Sand dunes, coastal floodplains;	High. Suitable dune habitat is present in the Action Area.	**Yes**

APPENDIX M. WETLAND DELINEATION

Delineation of Potentially Jurisdictional Wetlands and Waters

for

Narlon Bridge Replacement

Santa Barbara Subdivision Milepost 291.33

Santa Barbara County, California

Prepared for

Union Pacific Railroad Company
Steve Cheney, Sr. Manager of Structures Design
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APPENDIX A – CUSTOM USDA SOIL REPORT

Cover Page: Narlon Bridge view north. November 14, 2017.

List of Acronyms and Abbreviations

CCA	California's Coastal Act
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GPS	Global Positioning System
HUC	Hydrologic Unit Code
NRCS	Natural Resource Conservation Service
NTCHS	National Technical Committee for Hydric Soils
OHWM	Ordinary High Water Mark
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board
SSURGO	Soil Survey Geographic Database
SWRCB	State Water Resources Control Board
TNW	Traditional Navigable Water
U.S.	United States
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WETS	Climate Analysis for Wetlands Tables
VAFB	Vandenberg Air Force Base

Wetland Plant Indicator Status Ratings in Order of Wetland Affinity

OBL	Obligate	Hydrophyte, almost always occur in wetland. Estimated probability >99% to occur in wetlands under natural conditions.
FACW	Facultative Wetland	Hydrophyte, usually occur in wetland, but may occur in non-wetland. Estimated probability >67% to 99% to occur in wetlands under natural conditions.
FAC	Facultative	Equally likely to occur in wetland and non-wetland. Estimated probability 33% to 67% to occur in wetlands under natural conditions.
FACU	Facultative Upland	Non-hydrophyte, usually occurs in non-wetland, but may occur in wetland. Estimated probability 1% to <33% to occur in wetlands under natural conditions.
UPL	Upland	Almost never occur in wetland. Estimated probability <1% to occur in wetlands under natural conditions.
NL	No Listed	Species not included in federal list of wetland indicator plants. Assumed upland for purposes of wetland analysis.

1 Introduction

1.1 Purpose

This report provides a delineation of potential jurisdictional wetland and non-wetland waters according to federal standards on the Union Pacific Railroad Right-of-Way (UPRR ROW) (Study Area) and adjacent Vandenberg Air Force Base (VAFB) property in Santa Barbara County, California for UPRR (Table 1). The purpose of this report is to describe potentially jurisdictional waters and wetlands according to the Clean Water Act (CWA) Section 404, the Porter-Cologne Water Quality Act (State Water Code), and Fish and Game Code Section 1600. This document presents a comprehensive inventory and mapping effort of wetland and non-wetland aquatic resources within the Study Area and provides information for owners, the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), and the Lead Agency in decisions regarding activities in the Study Area. Section 2.0 provides more detail on the regulatory framework and scope of this jurisdictional delineation.

TABLE 1. RESPONSIBLE PARTIES.

Owner/Applicant	Biological Consultant
Union Pacific Railroad Manager of Structures Design 1400 Douglas Street, Stop 0910 Omaha, NE 68179-0910 (402) 544-3227 Steve Cheney, Sr.	**Althouse and Meade, Inc.** 1602 Spring Street Paso Robles, CA 93446 (805) 237-9626 Katie Brown (805) 423-6922 Jacqueline Tilligkeit

1.2 Study Area Location and Extent

The Narlon Bridge Replacement Project is located on UPRR property within VAFB along the northwestern Santa Barbara County coast within the Coastal Zone, approximately 15 miles southwest of Santa Maria, California. The existing railroad bridge crosses San Antonio Creek at 34.790152° N, -120.610903° W (WGS84 datum) within the Casmalia United States Geological Survey (USGS) 7.5-minute quadrangle (Figure 1). The bridge elevation is approximately 88 feet above mean sea level, with San Antonio Creek at approximately 25 feet above mean sea level at this location. This delineation examines a 11.17 acres of land within UPRR ROW and 10.01 acres of surrounding VAFB property (Study Area). The Study Area includes the bridge, 6.90 acres of VAFB land surrounding the bridge, almost a mile of UPRR land along the east side of a mile of track north of the bridge, the Narlon Station staging area (accessed using Perigee Road), the Rail Garrison staging area, and a spur of railroad along Umbra Road. (Figure 2).

1.3 Current Conditions

Narlon Bridge (Figure 2) spans San Antonio Creek approximately 4200 feet upstream of where the Creek flows into the Pacific Ocean and is located on private property (owned by UPRR) surrounded by VAFB. Arroyo willow riparian habitat is present under the bridge along San Antonio Creek and is maintained by Union Pacific. Outside of UPRR ROW, the vegetation is thick with shrubs and weedy vines. In upland areas outside of the riparian zone, habitat consists of disturbed grassy and bare areas interspersed with dune scrub habitat. A VAFB road passes from east to west under the bridge, south of the riparian zone. UPRR maintains a small access road parallel to the tracks for maintenance workers to cross San Antonio Creek by foot or small vehicle using an existing small bridge without requiring disturbance of the wetted channel.

The Rail Garrison connects to a spur track one mile north of Narlon Bridge (Figure 2). Umbra Road ends at the Rail Garrison in a cul-de-sac like parking lot with loading ramps near the spur track. North of the Rail Garrison, the spur track forks and continues along Perigee Road. The surrounding habitat is sparse dune scrub invaded by African veldt grass (*Ehrharta calycina)*.

The track from Narlon Bridge to the Rail Garrison (Exhibits A-2, A-3) runs northeast approximately one mile through open dune scrub largely invaded by African veldt grass. Narlon Station begins approximately 0.25 miles north of the Rail Garrison spur track (Figure 2). An unnamed access road connects Perigee Road to southern end of Narlon Station. An abandoned fence at the property line runs parallel to the tracks, away from wetland habitat east of the tracks.

Wetland habitats shown on the USFWS National Wetland Inventory are shown on Figure 6. Wetlands were not detected in the Study Area north of Narlon Bridge. Wetland habitats are mapped northeast of Rail Garrison, east of Narlon Station, and east of the railroad ROW north of the bridge.

1.3.1 Hydrology

The USGS and United States Department of Agriculture (USDA)-Natural Resource Conservation Service (NRCS) developed nationally consistent watershed boundaries which range from a 2-digit code as the first level of classification (Hydrologic Unit Code [HUC] 2) to a 12-digit code for the most detailed watershed delineation (HUC12). The Study Area is in the Lower San Antonio Creek watershed (HUC12) which is formed in part by the Purisima, Solomon, and Casmalia Hills (Figure 3). San Antonio Creek is a perennial stream which flows through VAFB to the Pacific Ocean, a Traditionally Navigable Water (TNW) (Figure 4). Narlon Bridge spans San Antonio Creek approximately one mile upstream of its confluence with the ocean. Surface water in the portion of the creek within the Study Area is often perennial, but may dry out in the summer during below average rainfall years. Surface flow in the downstream lagoon is typically constrained by a sand berm. The Study Area does not appear to be tidally influenced. Figure 5 shows that the Study Area is dominated by a Zone D floodplain map unit in the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (FEMA 2005). Zone D has a possible but undetermined risk of flooding. The area has likely not been assessed by FEMA because of the data and access restrictions surrounding the air force base.

The Study Area north of Narlon Bridge is within the San Antonio Terrace-Frontal Pacific Ocean watershed which is formed by the Casmalia Hills to the north and is limited to the terrace and a sandy beach along the coastline. This portion of the Study Area occurs in an old dune system where water does not drain into San Antonio Creek but rather into low lying depressions called

dune slacks. These mesic features are common around the Study Area but none are present within UPRR ROW or the Study Area (Figure 6).

1.3.2 Vegetation and Habitats

Arroyo willow (*Salix lasiolepis*) is the dominant canopy species along San Antonio Creek near the bridge. The National Wetland Inventory lists the creek and its associated riparian area as a Freshwater Forested/Shrub Wetland due to the presence of thick willows (Figure 6). Understory vegetation is almost exclusively poison oak (*Toxicodendron diversilobum*). Coyote brush (*Baccharis pilularis*) is also present as a dominant shrub within the UPRR ROW. Union Pacific had cleared vegetation within the Study Area for track maintenance leaving a mulch ground cover and short sprouts of coyote brush and poison oak. Adjacent to the cleared area, willow and California blackberry (*Rubus ursinus*) dominate the riparian habitat.

The dune scrub found at Narlon Station and along the adjacent railroad tracks is characterized by a mixture of evergreen shrubs, including mock heather (*Ericameria ericoides*), coastal goldenbush (*Isocoma menziesii*), California sagebrush (*Artemisia californica*), and coyote bush (*Baccharis pilularis*). Invasive weeds, African veldt grass (*Ehrharta calycina*) and ice plant (*Carpobrotus edulis*), are common within the Study Area.

1.3.3 Soils

Three individual soil map units from the Natural Resource Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) overlap the Study Area: Dune land (DuE), Sandy alluvial land, wet (Sk), and Marsh (Mh) soil map units (Soil Survey Staff 2017).

These soil map units have very different hydrologic characteristics. Dune land soil (DuE) is in hydrologic soil group "A" indicating that this soil has low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Sandy alluvial soil, wet (Sk) is in hydrologic soil group "C" with moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Sk soil is not rated as a hydric soil. Marsh soil (Mh) is in hydrologic soil group "D" with high runoff potential when thoroughly wet. Mh soil is rated as a hydric soil. Water movement through the soil is restricted or very restricted (NRCS 1997).

A custom soil report for the Study Area can be found as Appendix A.

1.3.4 Climate

The Climate Analysis for Wetlands Tables (WETS) for Lompoc (Station ID 045064, 13 miles southeast of Study Area) indicates that average 30-year rainfall is 15.7 inches (Table 2). The 2016-2017[1] rainfall year was above average totaling 20.2 inches (NOAA 2017). Rainfall was well above the WETS range in January and December 2016 (Chart 1). Soil pits were investigated in the middle of November 2017 after an unusually dry October and the first half of November.

[1] Rainfall years range from July to June.

TABLE 2. PRECIPITATION BY MONTH.

Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1971-2000	0.01	0.05	0.25	0.49	1.34	2.16	3.19	3.58	3.38	0.93	0.31	0.04
2016-2017	0.01	0	0	1.07	1.88	2.16	6.31	7.19	0.86	0.36	0.36	0
2017-2018	0	0	0.26	0.04	0.06	--	--	--	--	--	--	--

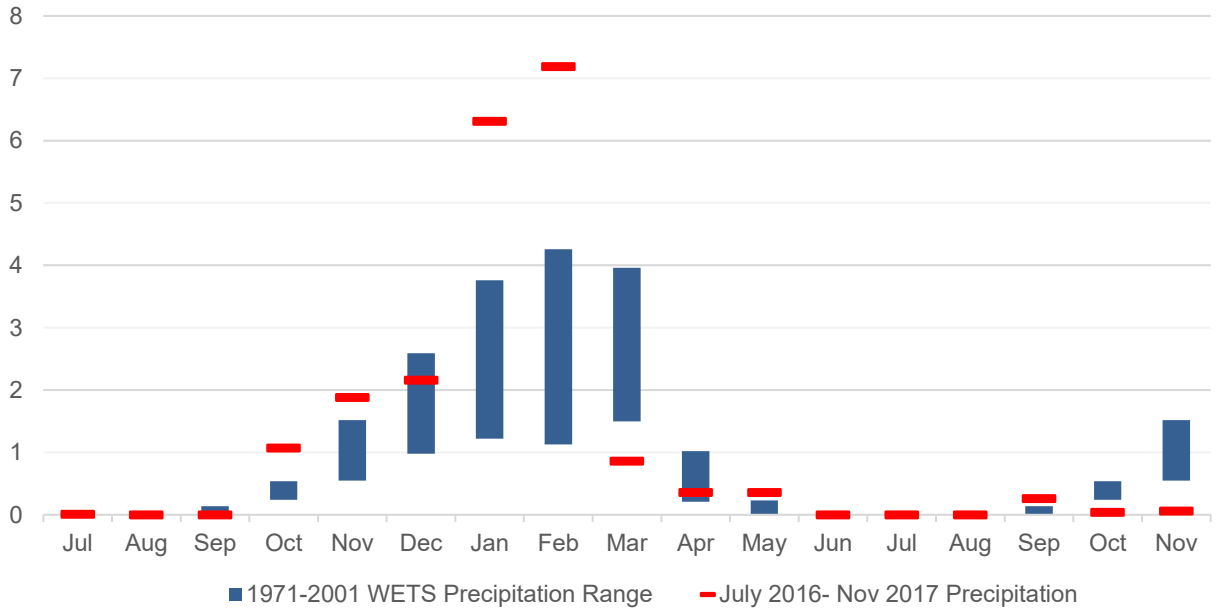


CHART 1. WETS[2] PRECIPITATION AND 2016-2017 RAINFALL YEAR FROM LOMPOC STATION (INCHES).

[2] WETS tables display the average range of precipitation by month by providing a probability analysis.

2 Regulatory Framework

2.1 United States Army Corps of Engineers

Section 404 of the CWA authorizes the USACE to regulate activities that discharge dredged or fill material to wetlands and other waters of the United States. The term "waters of the United States" encompasses resources described by the Environmental Protection Agency (EPA) and the Corps regulations, 40 CFR (Code of Federal Regulations) §230.3(s) and 33 CFR §328.3(a). The geographic limits of relevant federal jurisdiction for non-tidal waters of the U.S. are defined in 33 CFR §328.4(c).

The *Corps of Engineers Wetlands Delineation Manual* (hereafter "1987 Manual"; Environmental Laboratory 1987) defines wetlands (EPA regulations in 40 CFR § 230.3(t); USACE regulations in 33 CFR §328.3(b)). Wetlands are considered "special aquatic sites" under the USACE definition. Special aquatic sites are afforded protection under the CWA (Sections 401 and 404). The 1987 Manual and various regional supplements describe the criteria that must be met to determine the presence of a wetland, the methods used to determine whether they are met, and the geographic extent of wetland areas identified in the field.

The USACE takes jurisdiction over tidal waters per Section 10 of the Rivers and Harbors Act (RHA) as well as Section 404 of the CWA. Unlike the purpose of Section 404, which is to promote clean water, Section 10 was established to prevent obstruction of navigable ocean waters. Section 10 jurisdictional area is limited to the mean high tide line whereas Section 404 jurisdiction of tidal waters extends to the higher high tide line, or the maximum elevation that the tide reaches each year excluding storm surges. To determine tide lines, USACE regulations in 33 CFR §329.12 offers the following guidance:

> *Shoreward limit of jurisdiction. Regulatory jurisdiction in coastal areas extends to the line on the shore reached by the plane of the mean (average) high water. Where precise determination of the actual location of the line becomes necessary, it must be established by survey with reference to the available tidal datum, preferably averaged over a period of 18.6 years. Less precise methods, such as observation of the "apparent shoreline" which is determined by reference to physical markings, lines of vegetation, or changes in type of vegetation, may be used only where an estimate is needed of the line reached by the mean high water.*

Additionally, wetlands that exhibit hydrology, hydric soil, and hydrophytic vegetation (three parameters) are jurisdictional by the standard set forth in the 2008 Arid West Regional Supplement to the 1987 Manual. These areas must also exhibit a significant nexus to a Traditionally Navigable Water (TNW) or be within the 100-year floodplain or within 4000 feet of a jurisdictional water. For non-wetland water features, USACE jurisdiction is limited to the Ordinary High Water Mark (OHWM).

2.2 Regional Water Quality Control Board

Recent July 2017 guidance from the RWQCB indicates that they have adopted the USACE policy of a "three-parameter wetland" (SWRCB 2017). Also in conjunction with the USACE, they will take jurisdiction over non-wetland waters to the OHWM. However, in contrast to the USACE, the RWQCB will take jurisdiction over isolated wetland features that do not have significant nexus to a TNW and an area that has less than five percent vegetation may still be considered a wetland.

2.3 California Department of Fish and Wildlife

The CDFW found the U.S. Fish and Wildlife Service (USFWS) wetland definition and classification system based on the Cowardin et al. (1979) definition to be the most biologically valid. In general, CDFW will take jurisdiction over drainage or lake features with a bed and bank and will limit their jurisdiction to the top of bank, and may include adjacent wetland or riparian areas on a case by case basis.

2.4 California Coastal Commission

Coastal wetlands are also protected under the California Coastal Act (CCA) of 1976, which defines wetlands as:

> *...lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*

The CCA includes requirements related to coastal zone management and wetlands protection, including coastal development permits, and established the California Coastal Commission (CCC) as the coastal regulatory and management agency. The CCC, which enforces the Coastal Act, defines coastal wetlands in its regulations as:

> *...land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentration of salts or other substances in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some during each year and their location within, or adjacent to vegetated wetland or deepwater habitats.*

The CCC's map requirement and boundary determinations criteria are provided in 14 CCR (California Code of Regulation) §13577.

2.5 County of Santa Barbara

Santa Barbara County's *Environmental Thresholds and Guidelines Manual* (County of Santa Barbara 2015) considers waters with one or more wetland indicator to be jurisdictional wetlands. The County also considers federal wetlands regulated under the CWA to be jurisdictional wetlands.

> *For purposes of this classification wetlands must have one or more of the following three attributes:*
> *a) At least periodically, the land supports predominantly hydrophytes (plants adapted to moist areas);*
> *b) The substrate is predominantly un-drained hydric soil, and*
> *c) The substrate is non soil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

3 Delineation Methods

3.1 Overview of Sampling Methodology

Jurisdictional wetlands and other waters were identified using methods and guidelines described in the 1987 Manual, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (hereafter "2008 Supplement"; USACE 2008b), and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008a). The site was visited in November of 2017 by Katie Brown and Ken McCarron.

3.1.1 Wetlands

Soil pits were dug by hand at two sample sites based on the presence of hydrophytic vegetation, wetland hydrology, or where low relief indicated potential wetland. Locations of sampling sites were recorded on the Jurisdictional Delineation Map (Exhibit A) and USACE Arid West Region Wetland Determination Data Forms (Exhibit B; updated sheet from 2010). Photos of each site are included in Section 8.0.

Wetland Hydrology

The presence or absence of wetland hydrology field indicators was assessed following methodology presented in the 1987 Manual and the 2008 Supplement. Wetland indicators used to determine if wetland hydrology features are present include, but are not limited to, high water table, site topography, drift lines, drainage patterns, sediment deposits, inundation, observation of wet conditions during the growing season, and saturation of soils.

Wetland Soils

Soils were examined according to methodology presented in the 2008 Supplement and 1987 Manual. The presence or absence of hydric soil indicators was determined by soil characteristics outlined within the United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) publication, *Field Indicators of Hydric Soils in the United States* (version 7.0; USDA-NRCS 2010) and the National Technical Committee for Hydric Soils (NTCHS) definition of hydric soils.

Wetland Vegetation

To determine if wetland species were present, vegetation in each stratum was identified to the species level and confirmed using the *National Wetland Plant List* (Lichvar et al. 2016). If wetland species were found, species dominance was recorded for each stratum using the "50/20 Rule," as per the 2008 Supplement. Dominance test was calculated for all samples and prevalence index was calculated if samples had a presence of hydric soil and hydrology but did not pass the dominance test.

3.1.2 Non-Wetland Waters

Drainages were identified onsite as features that display evidence of hydrology but do not contain vegetation suggestive of wetlands. Evidence of OHWM was used to determine extent of Corps jurisdiction over these non-wetland waters of the U.S. The OHWM Manual (USACE 2008a) lists and describes indicators associated with areas that become flooded or ponded, but are not

dominated by wetland vegetation and the duration of flooding, ponding, and/or near-surface soil saturation (less than or equal to 12 inches) is not sufficient to cause hydric soils to form or wetland hydrology conditions to occur. Ordinary High Water Mark was identified and noted according to guidance provided in the OHWM Manual.

3.1.3 Waters Connectivity/Adjacency

Connectivity to Traditional Navigable Waters and their tributaries is established via field work where accessible, as well through analysis of aerial photographs, United States Geographic Service (USGS) topographic map, USGS National Hydrography Dataset, and site-specific topographic survey. This connectivity determines whether the feature has "significant nexus" (i.e., it significantly affects the chemical, biological, or physical integrity of a Traditional Navigable Water).

3.2 Mapping Methodology

Mapping efforts utilized Samsung Galaxy Tab 4 tablets equipped with Garmin GLO GPS (Global Positioning System) Receivers. Delineation boundaries were drawn using aerial photography and field notes where access was limited. Existing datasets such as the National Hydrography Dataset and the USGS topographic maps were considered during mapping. Our results vary somewhat from these existing publications due to the finer scale and on-the-ground data collection techniques used in our work. GPS data, digitized notes, and photos were imported into Esri ArcGIS, a Geographic Information Systems software suite, and interpreted into maps. Maps were produced at a minimum scale of 1 map inch to 400 feet on the ground using field data, and presented over the existing conditions CAD file from Santa Barbara County.

4 Technical Findings

Drainage features in the Study Area meet federal wetland definitions. Our 2017 field work resulted in the delineation of 312 linear feet and 0.15 acres of jurisdictional wetlands within the Study Area. Adjacent riparian area did not meet the criteria of a federal wetland definition.

4.1 Federal Wetlands

One federal wetland was mapped within the Study Area. The wetland is limited to the OHWM of San Antonio Creek, a perennial stream, where it is dominated by watercress (*Nasturtium officinale*) and willows with a presence of narrow leaf cattail (*Typha angustifolia*) and almost entirely covered in an algal mat. Standing water was present in mid-November 2017 after eight months of only an inch of precipitation. We can assume that due to prolonged anaerobic conditions, despite dry weather, and slow-moving/stagnant water, there is likely a layer of hydric sediment on the creek bottom. OHWM is demarcated by a change in vegetation species, cover, and a break in bank slope. The channel itself contained standing water 18 feet wide and drift deposits present for an additional 1.5 feet on each side, totaling a 21-foot wide OHWM.

Although the vegetation upslope from the OHWM was dominated by willows and ruderal species such as blackberry and poison oak in unmaintained areas, the sample sites above the OHWM did not display signs of hydric soil or hydrology. This adjacent riparian habitat does not qualify as a federal wetland.

TABLE 3. AQUATIC FEATURE CHARACTERISTICS.

Feature	Sample Site	Dominant Species	Wetland Vegetation?	Soil Indicator	Wetland Soil?	Hydrology Indicator	Wetland Hydrology?	Federal Jurisdiction?
Maintained Riparian	1	FACW, FACU	✓	None		None		No
Maintained Riparian	2	NL, FACU, FACU	✓	None		None		No
Federal Perennial Stream	None	OBL, OBL	✓	POND	✓	A1, B3, B12	✓	Yes

UPL: 1% occurrence in wetlands
FACU: 1-33% in wetlands
FAC: 34-66% in wetlands
FACW: 67-99% in wetlands
OBL: 99% in wetlands

POND: Ponded water

A1: Surface water
B3: Drift deposits
B12: Biotic crust

4.2 Federal Non-Wetland Waters

No features within the Study Area qualify as a non-wetland water. The reach of San Antonio Creek in our Study Area is dominated by hydrophytic vegetation and algal mats with standing water present after multiple dry months and was therefore delineated as a wetland.

4.3 State Jurisdictional Areas

Adjacent habitat to the banks of San Antonio Creek, the habitat is classified as a broad-leaved deciduous scrub-shrub and persistent emergent palustrine wetland (Cowardin et al. 1979) dominated by multi-stem arroyo willows and/or hydrophytic herbs. Arroyo willows dominate the slopes adjacent to San Antonio Creek and stretch more than 300 feet wide. The understory consists of California blackberry and poison oak. The vegetation within the UPRR ROW is maintained by Union Pacific with an approximate width of 75 feet. As previously discussed, hydric soils and hydrology were limited to the OHWM, however the willow community upslope meets the definition of state wetland by CDFW, RWQCB, CCC, and the County of Santa Barbara.

5 Jurisdictional Delineation

The Study Area contains 0.15 acre and 319 feet of San Antonio Creek, a feature that meets the definition of wetland regulated by the USACE under CWA Section 404 and would also be jurisdictional to State (CDFW, RWQCB [CWA Section 404], and CCC) and County agencies. San Antonio Creek contained dense algal mats, narrowleaf cattails, and water parsnip, as well as Arroyo willows that encroach into the stream and thus meets the criteria for hydrophytic vegetation. Stagnant water was present in mid-November after very minimal spring, summer and autumn rainfall implying hydric sediment on the creek bottom. The OWHM was 21 feet wide on average.

An additional 2.39 acres are riparian habitat above the OHWM and may be considered State and County jurisdiction. Of the 2.39 acres, 0.53 acres of riparian vegetation is currently being maintained within the UPRR for Narlon Bridge. This upland area did not contain hydric soil nor hydrology and therefore would not be of federal jurisdiction as described by two sample sites investigated using the Wetland Determination Data Forms. The riparian width near the railroad crossing is approximately 320 feet.

TABLE 4. JURISDICTIONAL WETLAND MEASUREMENTS.

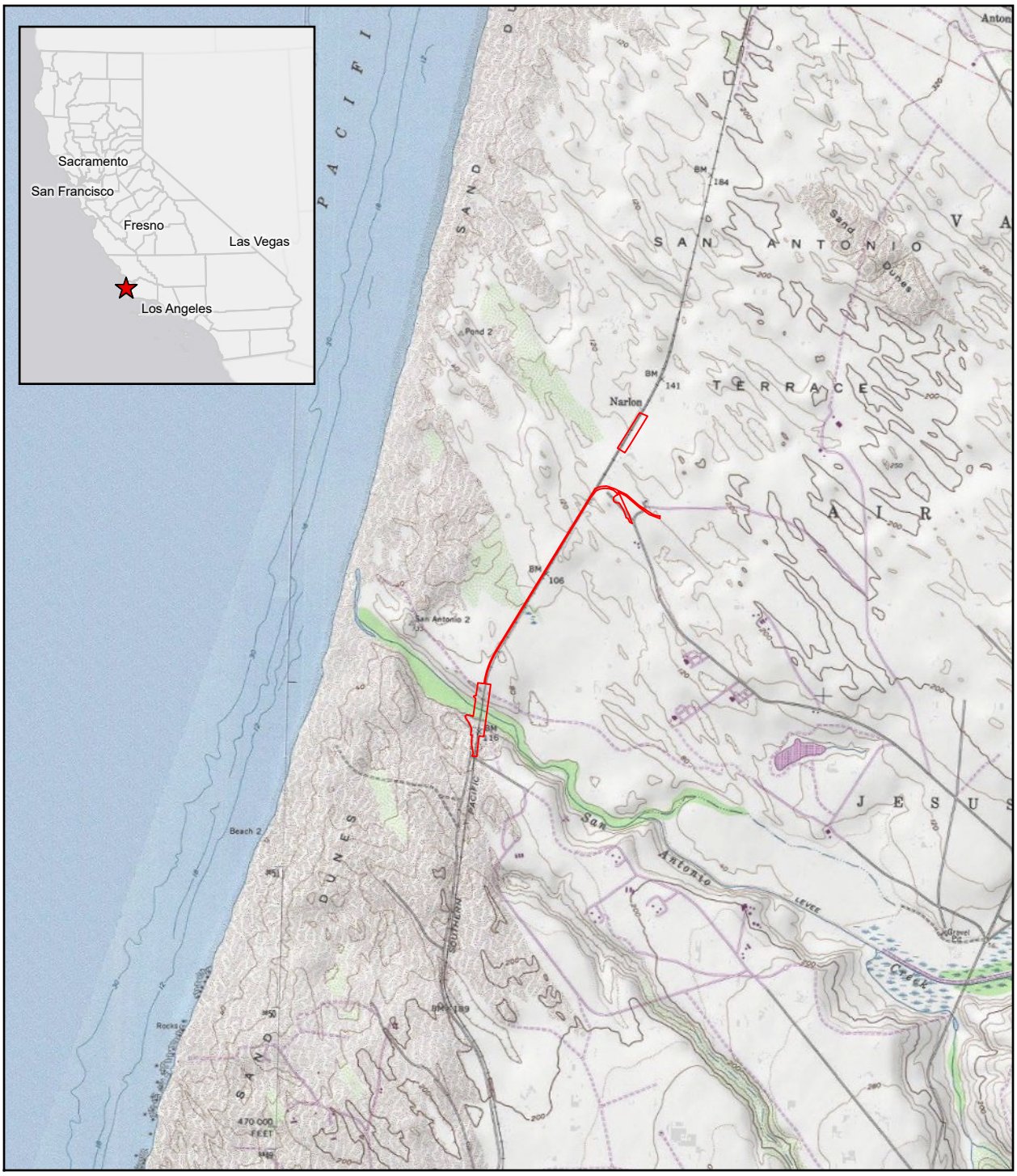
Feature	Rivers & Harbors Act Section 10	CWA Section 404	CWA Section 401	Classification	Area (acres)	Length (feet)
Federal Perennial Stream		✓	✓	Persistent Emergent Palustrine	0.15	319
Maintained Riparian Habitat			✓	Broad-Leaved Deciduous Scrub-Shrub Palustrine	0.53	319
Riparian Habitat			✓	Broad-Leaved Deciduous Scrub-Shrub Palustrine	1.86	319

This report is subject to verification by the United States Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife, the California Coastal Commission, and the County of Santa Barbara.

6 Figures

- Figure 1. United States Geological Survey Topographic Map
- Figure 2. Aerial Photograph
- Figure 3. Hydrologic Unit Codes
- Figure 4. National Hydrography Dataset
- Figure 5. Federal Emergency Management Agency Flood Insurance Rate Map
- Figure 6. National Wetlands Inventory

Figure 1. United States Geological Survey Topographic Map



Legend

Study Area

N

0 0.25 0.5 0.75 1 Mile

Union Pacific Railroad
Narlon Bridge Replacement
120.609°W 34.79796°N
Santa Barbara County

USGS Quadrangle: Casmalia

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 12:50 PM by JBB

Figure 2. Aerial Photograph

Legend

Study Area

Union Pacific Railroad Right of Way

N

0 500 1,000 1,500 2,000 Feet

Union Pacific Railroad
Narlon Bridge Replacement
120.60804°W 34.79831°N
Santa Barbara County

Imagery Date: 06/22/2017

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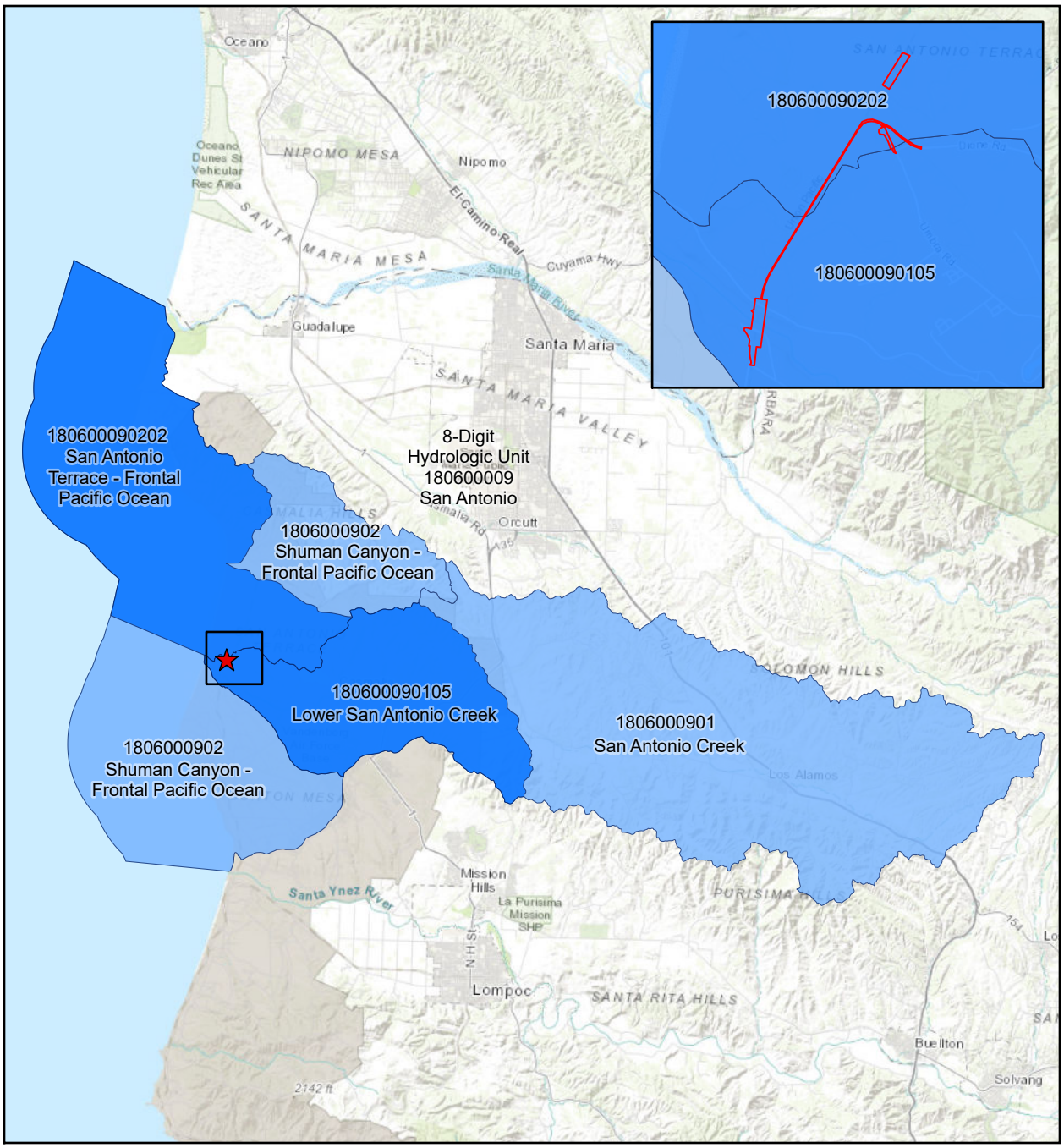
Map Updated:
December 13, 2018 10:28 AM by JBB

Figure 3. Hydrologic Unit Codes



Union Pacific Railroad
Narlon Bridge Replacement
120.42665°W 34.84353°N
Santa Barbara County

Data Source: United States Geological Survey

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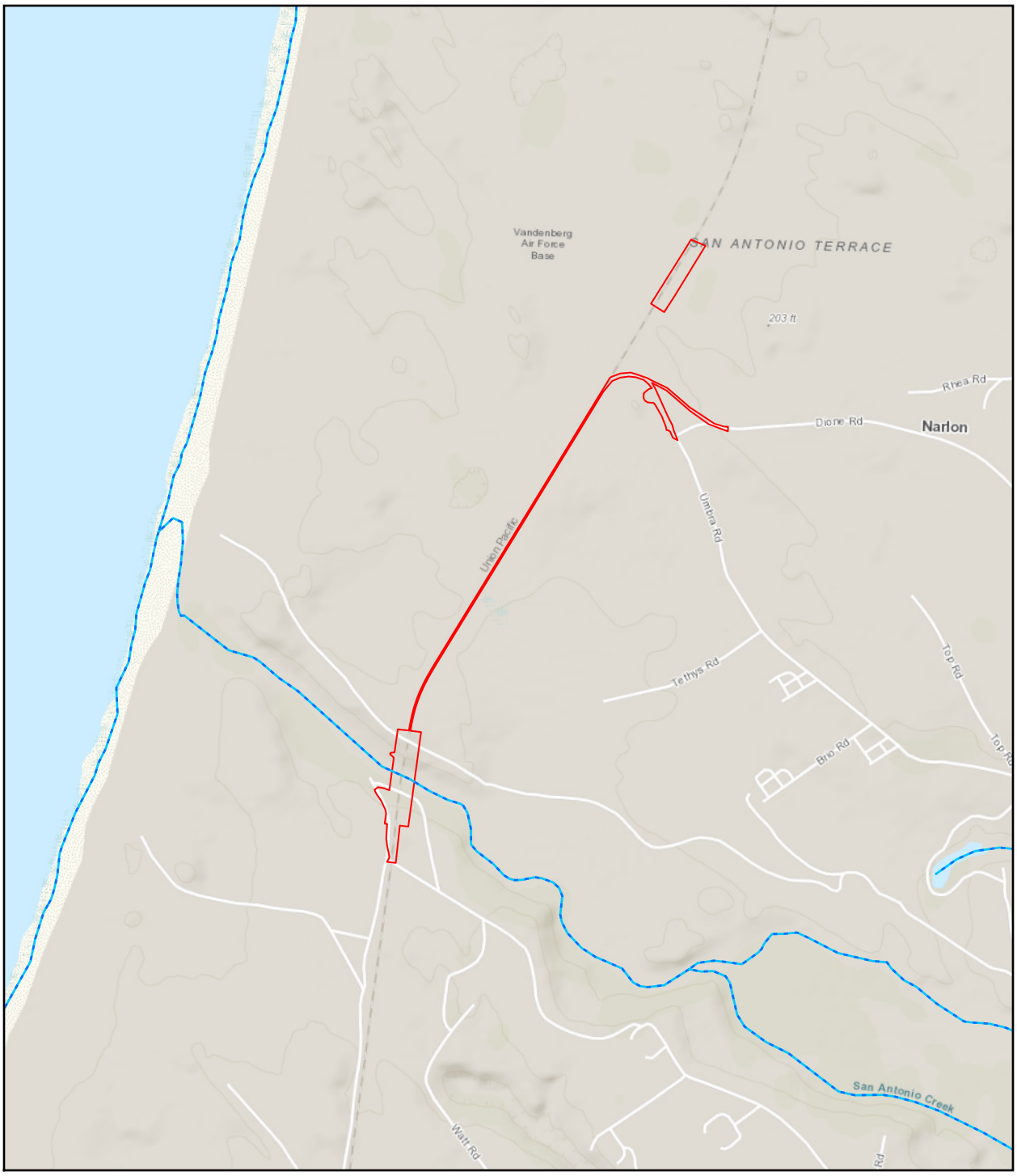
Map Updated:
January 10, 2019 02:21 PM by JBB

Figure 4. National Hydrography Dataset



Legend

Study Area — Drainages and Coastline

N

0 0.25 0.5 Mile

Union Pacific Railroad
Narlon Bridge Replacement
120.60659°W 34.79693°N
Santa Barbara County

Data Source: United States Geological Survey

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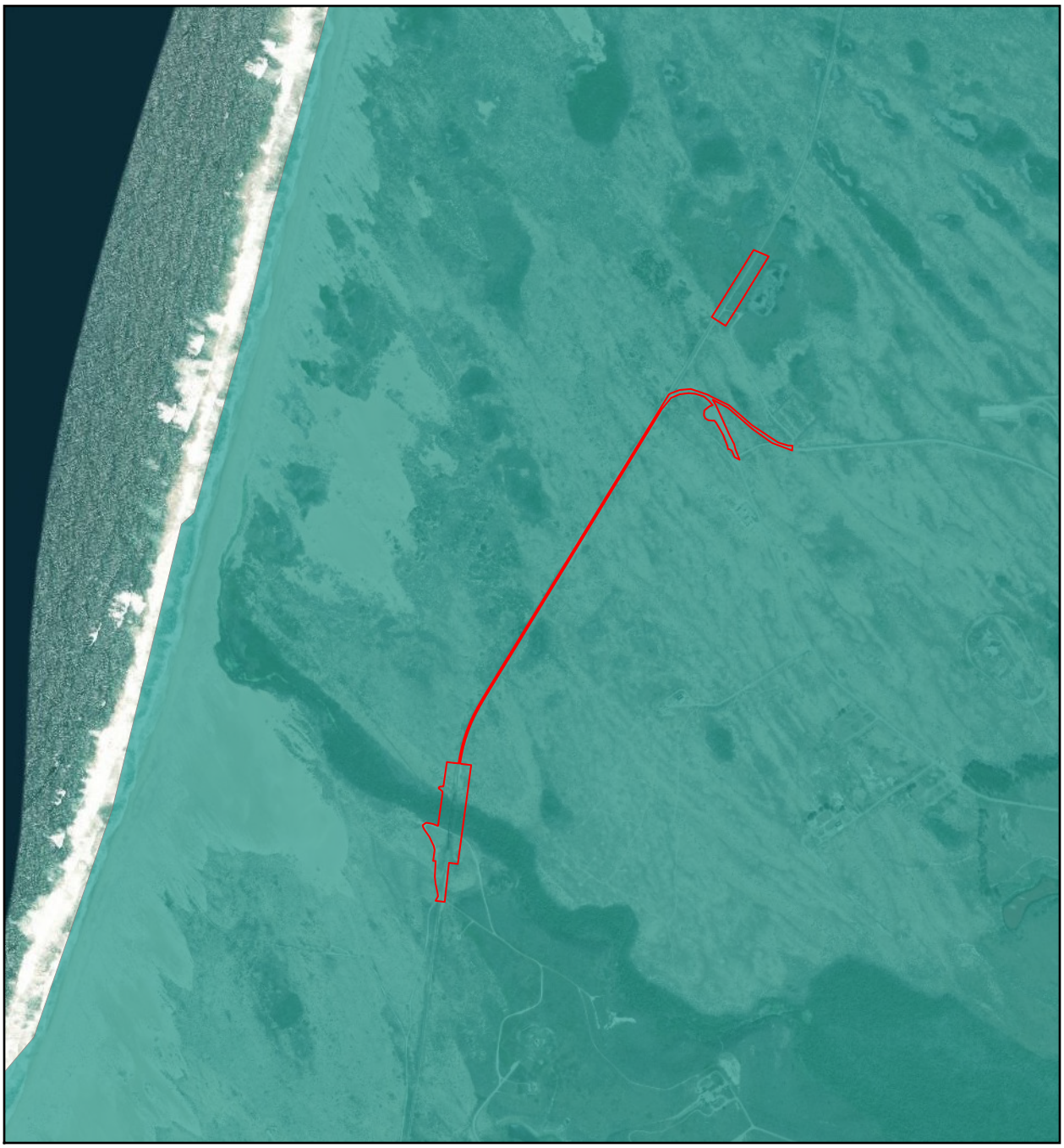
Map Updated:
December 12, 2018 01:24 PM by JBB

Figure 5. Federal Emergency Management Agency Flood Insurance Rate Map



Legend

Study Area

Flood Zone*

D - No Analysis of Flood Hazards Has Been Conducted

N

0 0.25 0.5 Mile

*Flood Zone Definitions on Reverse Side

Union Pacific Railroad
Narlon Bridge Replacement
120.6079°W 34.79825°N
Santa Barbara County

Map Code: 06083C0440G
Data Source: Federal Emergency Management Agency

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Map Updated:
December 12, 2018 01:18 PM by JBB

FEMA/FIRM Zone Classification

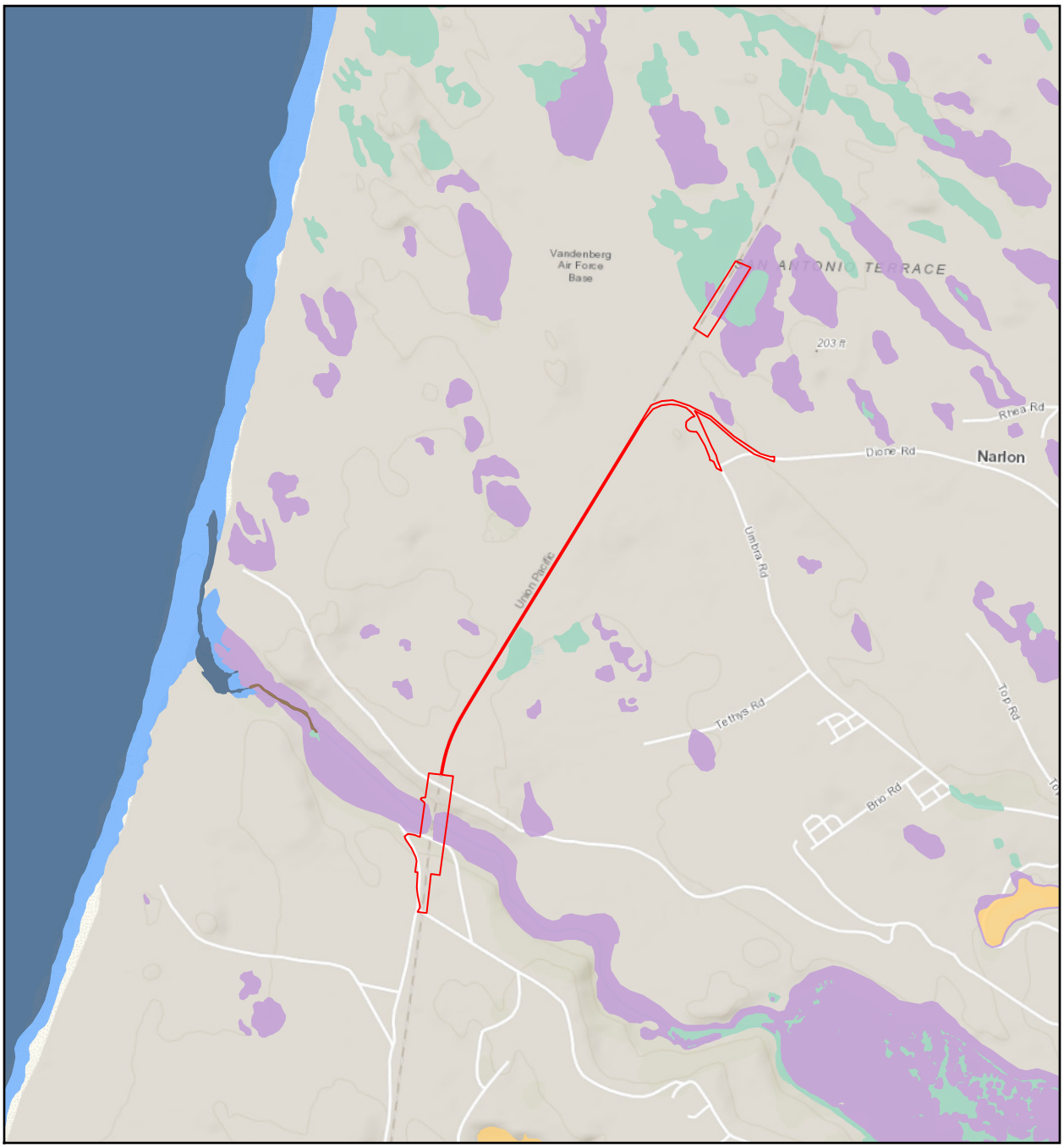
Moderate to Low Risk Areas

Zone	Description
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100- year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100- year flood.
D	Possible but undetermined risk of flooding.

High Risk Areas

Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-A30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1-30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Figure 6. National Wetland Inventory



Legend

- Study Area
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/ Shrub Wetland
- Freshwater Pond
- Riverine

N

0 0.25 0.5 Mile

Union Pacific Railroad
Narlon Bridge Replacement
120.60717°W 34.79864°N
Santa Barbara County

Data Source: United States Fish and Wildlife Service, Created from 2000's Color-Infrared Imagery

7 Photographs

Narlon bridge across San Antonio Creek.

View south.

November 14, 2017

Narlon bridge and smaller access bridge crossing San Antonio Creek's cleared riparian area.

View south.

November 14, 2017

San Antonio Creek

View east.

November 14, 2017

View into the unmaintained riparian habitat upslope of the creek.

November 14, 2017

Sample Site 1

Substrate

November 14, 2017

Sample Site 1

Surrounding vegetation

November 14, 2017

Sample Site 2

Substrate

November 14, 2017

Sample Site 2

Surrounding vegetation

November 14, 2017

Dune scrub found along railroad tracks at Narlon Station. November 9. 2018

Spur track at Rail Garrison. Union Pacific Rail Road in background. November 29, 2018.

Dune scrub habitat invaded by African veldt grass at Rail Garrison.

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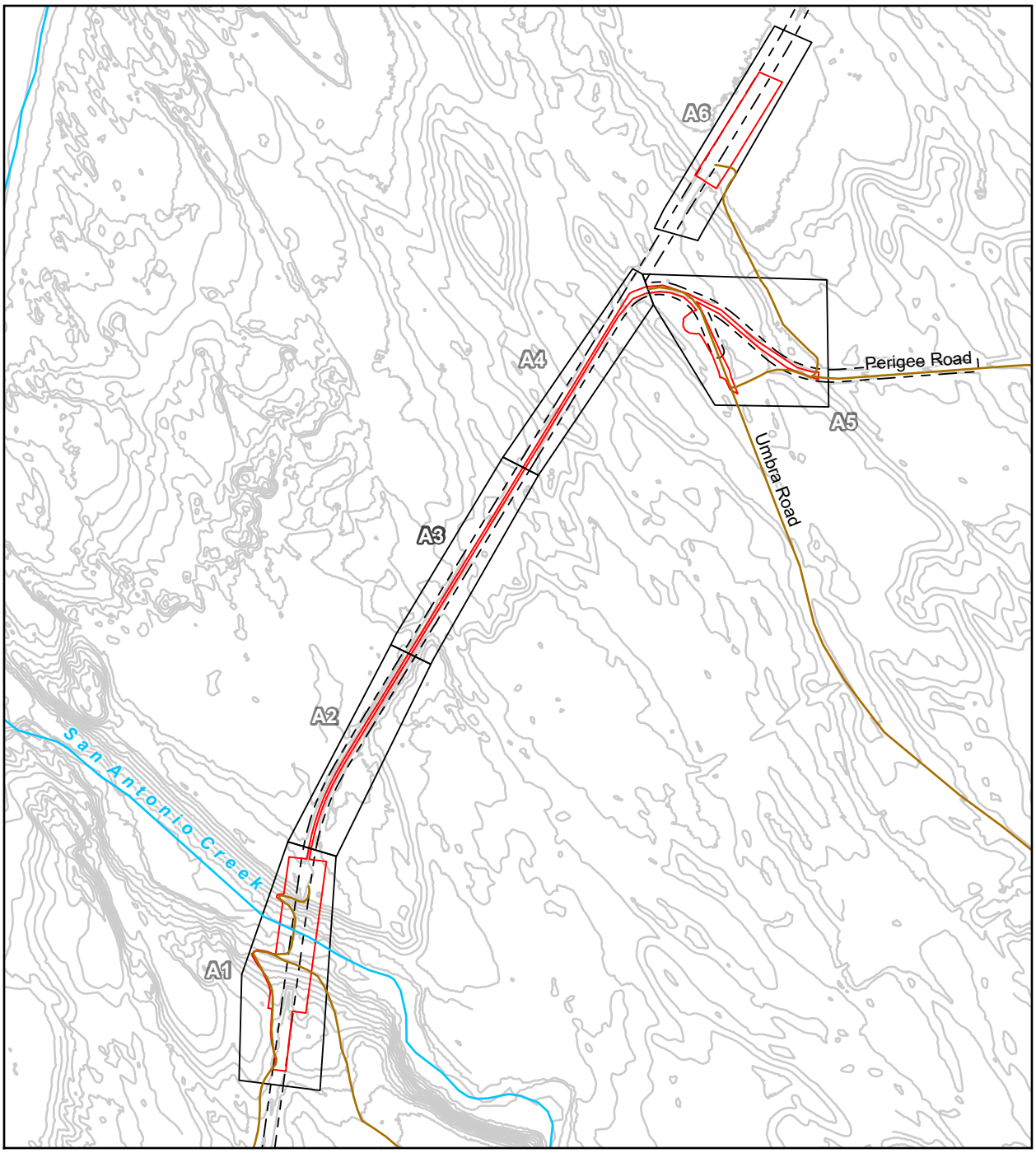
Exhibit A – Delineation of Jurisdictional Areas

Exhibit A. Wetland Delineation Overview



Legend

- Study Area (20.9 acres)
- Sheet Limit
- Union Pacific Railroad Right of Way
- Existing Roads

N

0 500 1,000 Feet

Union Pacific Railroad
Narlon Bridge Replacement
120.60526°W 34.79814°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

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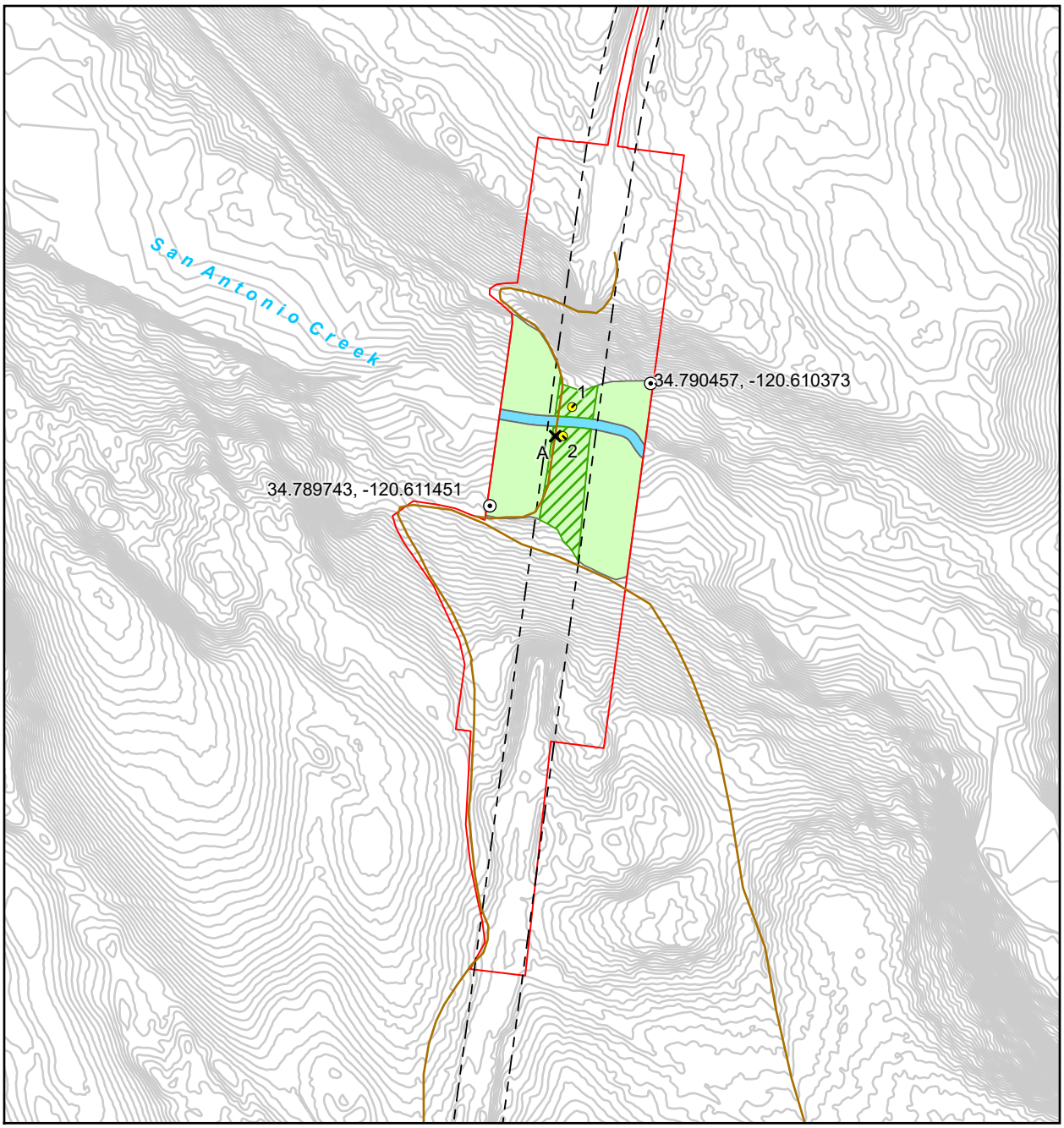
Map Updated:
December 12, 2018 02:33 PM by JBB

Exhibit A-1. Wetland Delineation



Legend

- Study Area
- Sample Site
- Cross-Section
- Map Reference Point
- Federal Perennial Stream (0.15 acre, 319 feet)
- Maintained Riparian Habitat (0.53 acre)
- Riparian Habitat (1.86 acres)
- Union Pacific Railroad Right of Way
- Existing Roads

N

0 100 200 300 400 Feet

Union Pacific Railroad
Narlon Bridge Replacement
120.61115°W 34.78942°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

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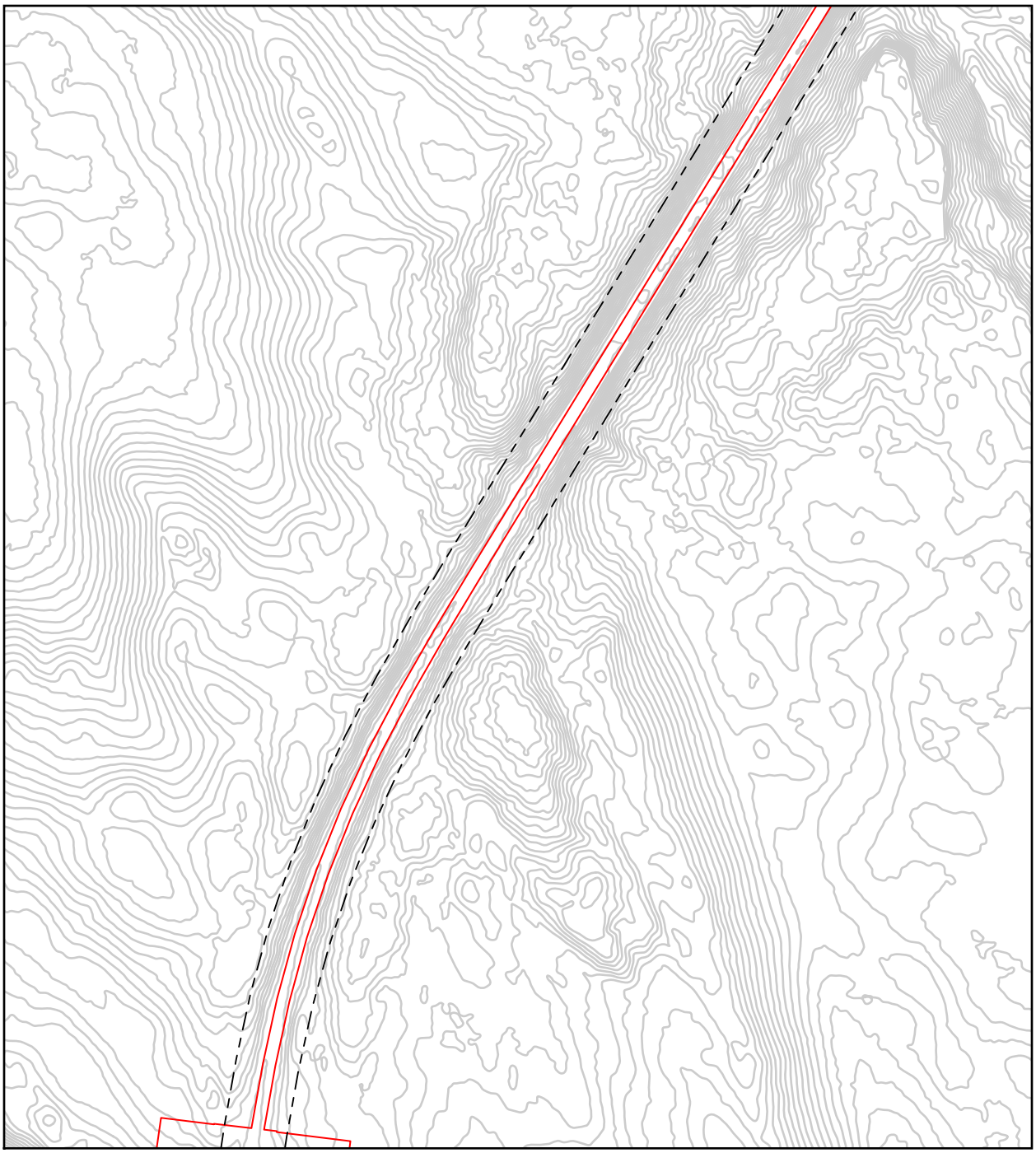
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 02:34 PM by JBB

Exhibit A-2. Wetland Delineation



Legend

Study Area

Union Pacific Railroad Right of Way

N

0 100 200 300 Feet

Union Pacific Railroad
Narlon Bridge Replacement
120.60938°W 34.79422°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

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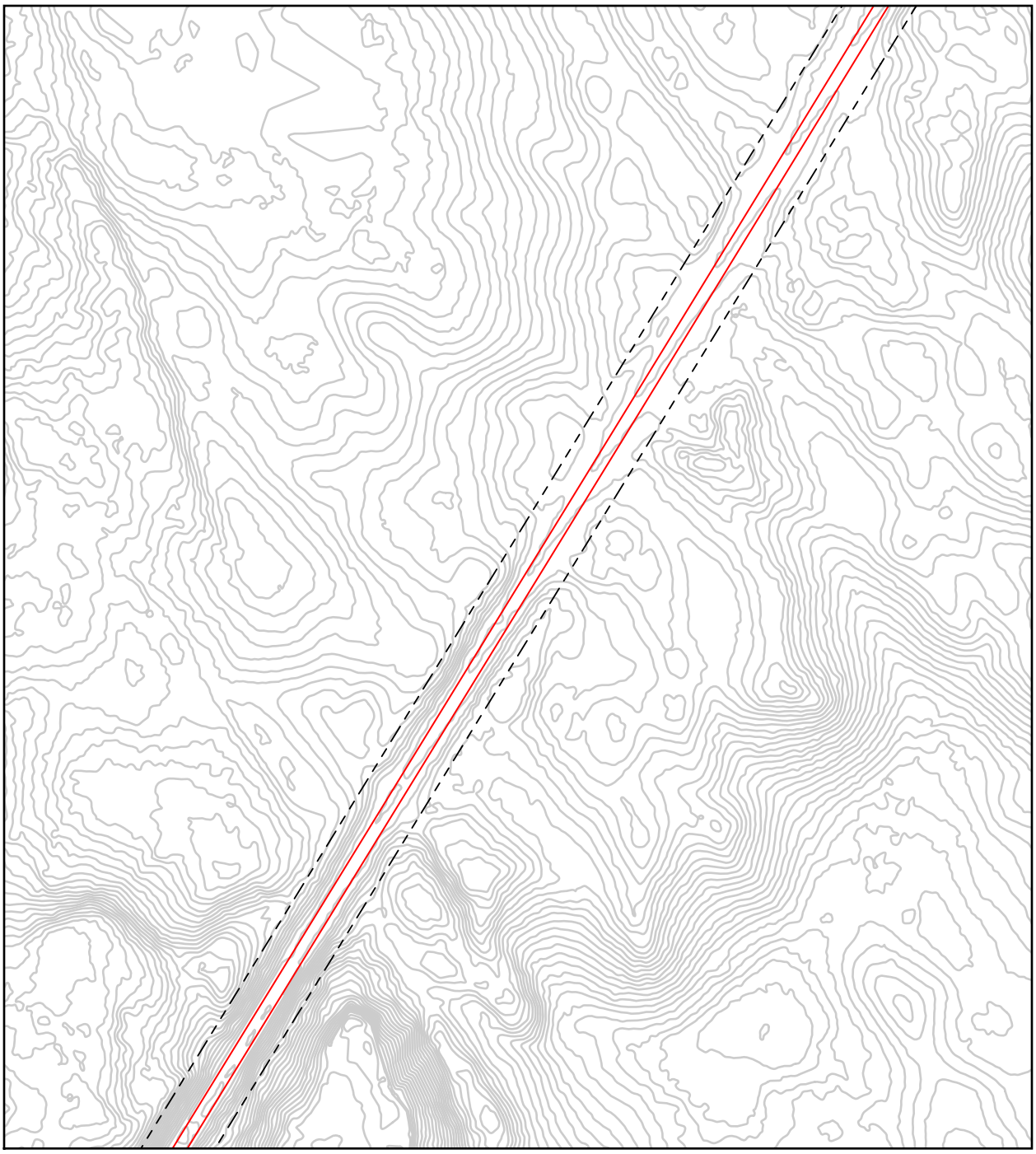
Map Updated:
December 12, 2018 02:37 PM by JBB

Exhibit A-3. Wetland Delineation



Legend

Study Area

Union Pacific Railroad
Right of Way

N

0 100 200 300 Feet

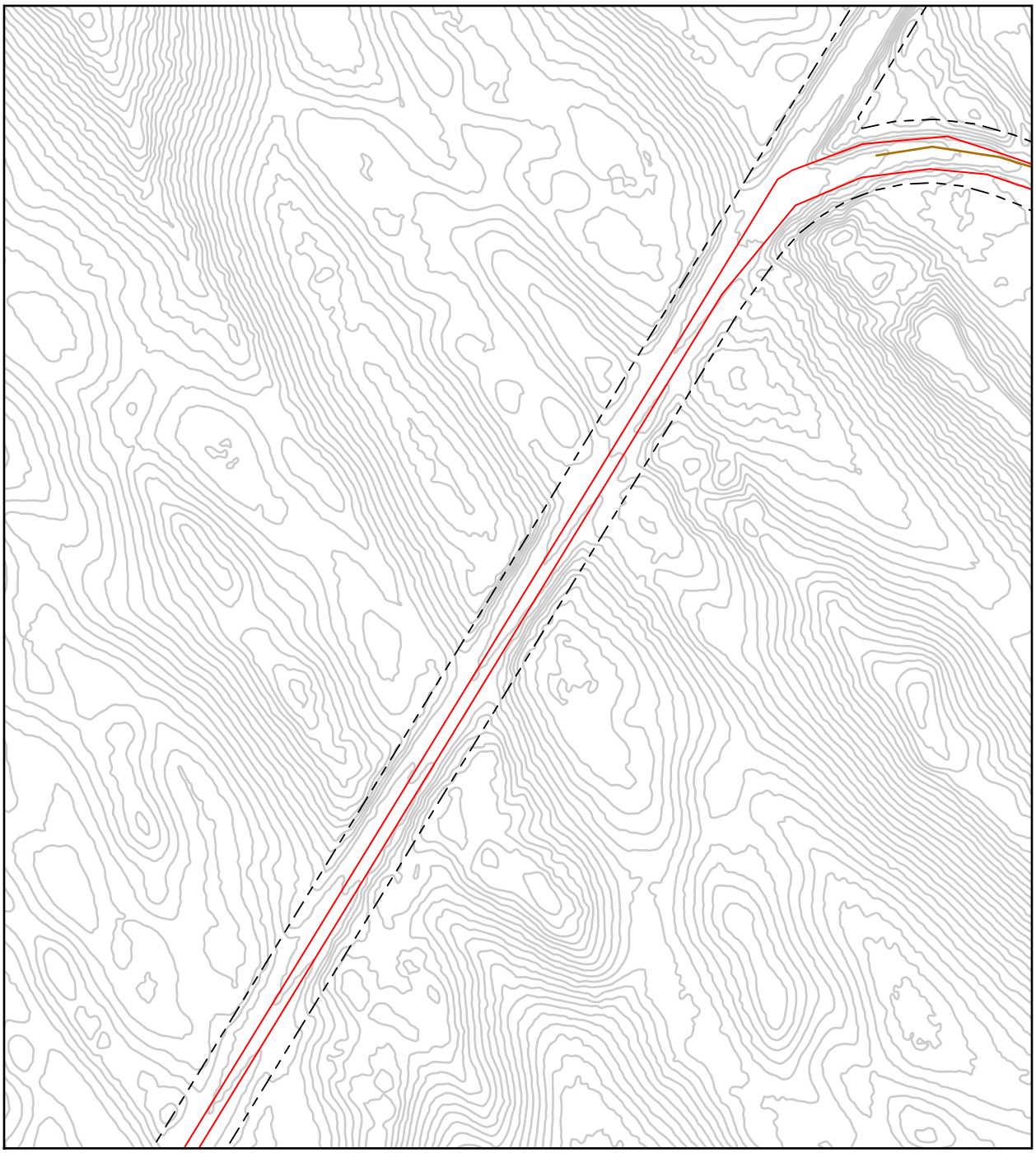
Union Pacific Railroad
Narlon Bridge Replacement
120.6067°W 34.79847°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 02:37 PM by JBB

Exhibit A-4. Wetland Delineation



Legend

- Study Area
- Union Pacific Railroad Right of Way
- Existing Roads

N

0 100 200 300 Feet

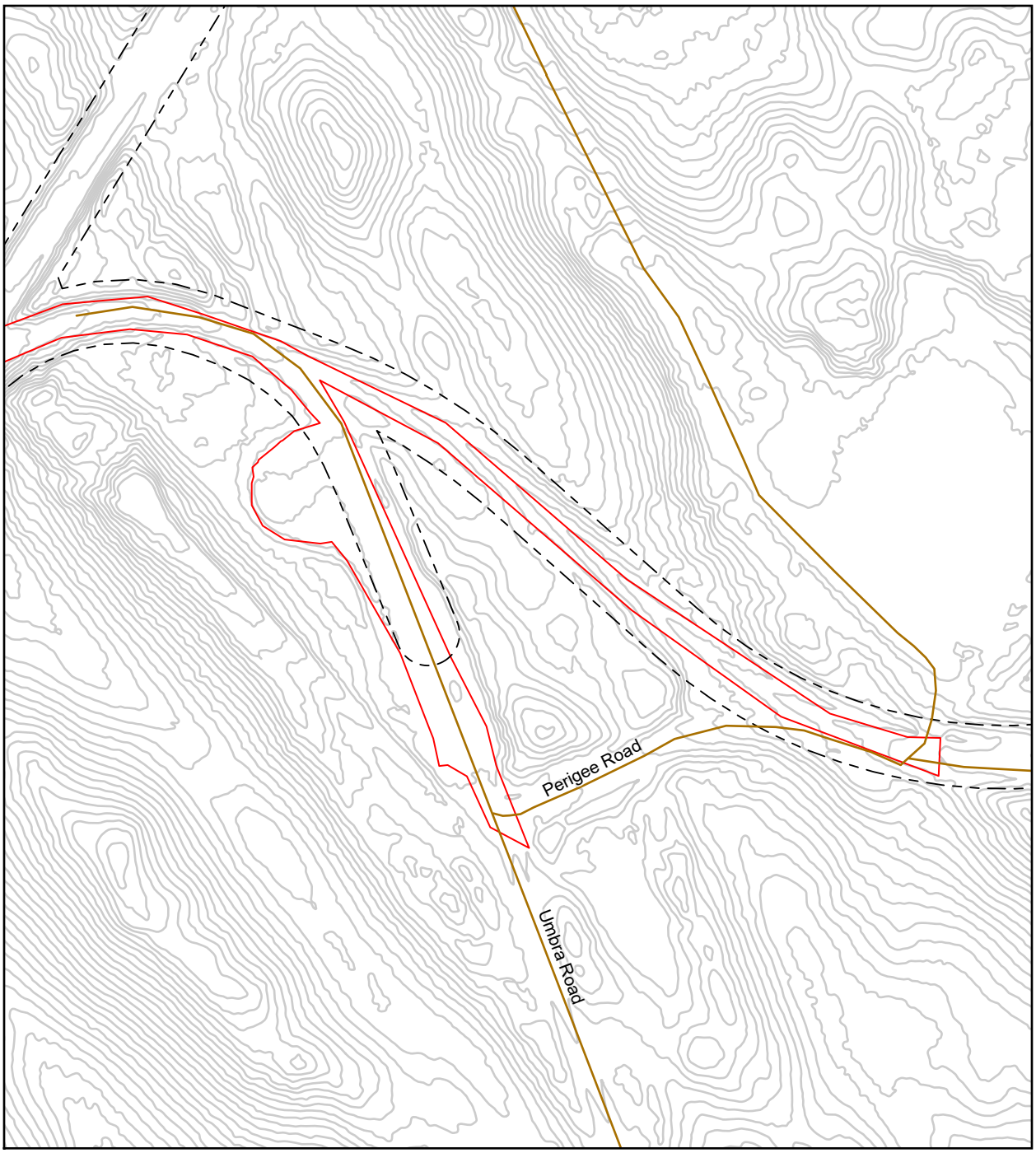
Union Pacific Railroad
Narlon Bridge Replacement
120.60379°W 34.8027°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 02:37 PM by JBB

Exhibit A-5. Wetland Delineation



Legend

- Study Area
- Union Pacific Railroad Right of Way
- Existing Roads

N

0 100 200 300 Feet

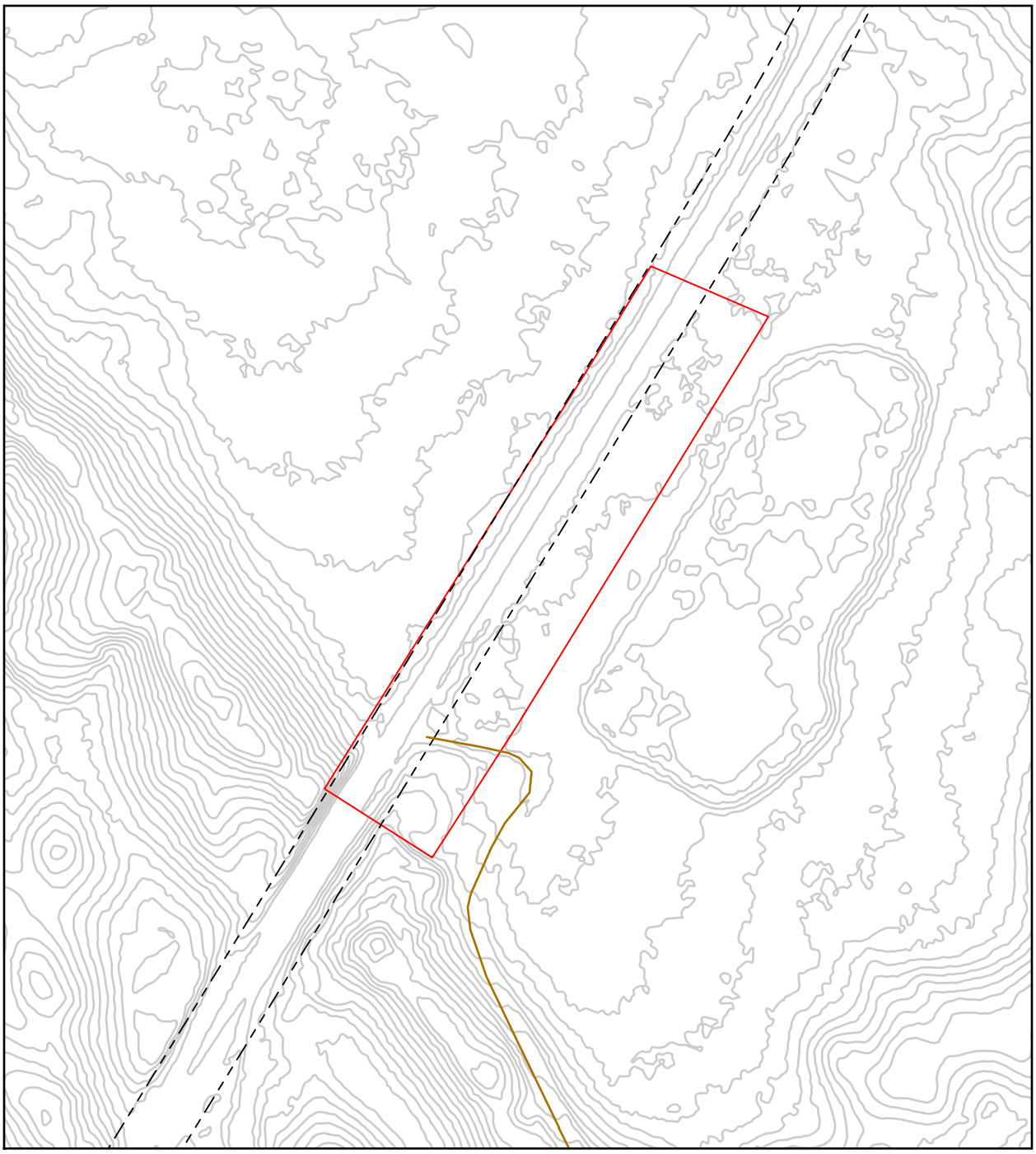
Union Pacific Railroad
Narlon Bridge Replacement
120.5996°W 34.80348°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 02:38 PM by JBB

Exhibit A-6. Wetland Delineation



Legend

- Study Area
- Union Pacific Railroad Right of Way
- Existing Roads

N

0 100 200 300 Feet

Union Pacific Railroad
Narlon Bridge Replacement
120.59981°W 34.80806°N
Santa Barbara County

Investigator: Jacqueline Tilligkeit
Contour Interval: 2-Feet

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

Map Updated:
December 12, 2018 02:39 PM by JBB

Exhibit B – Wetland Determination Data Forms

A United States Army Corps of Engineers, Wetland Determination Data Form (2008 Arid West Supplement Version 2.0) was completed in the field for two sampling sites. The forms included here are copies of forms written in the field. The original forms are on file in our office.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: NARLON BRIDGE City/County: LOMPOC, SANTA BARBARA Sampling Date: 11-14-17

Applicant/Owner: UNION PACIFIC RAILROAD State: CA Sampling Point: WD-2

Investigator(s): K. BROWN, J. K. McCARRON Section, Township, Range: T8N R34W

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR): LRRC Lat: 34.790146 Long: -120.610964 Datum: WGS84

Soil Map Unit Name: MARSH NWI classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation X, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20x20)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX LASIOLEPIS	15	Y	FACW
2.			
3.			
4.			
	15 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20x20)			
1. TOXICODENDRON DIVERSILOBUM	25	Y	FACU
2. RUBUS URSINUS	1		FAC
3. RIBES SP.	1		
4.			
5.			
6.			
7.			
8.			
	27 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	1	x 3 =	3
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	41 (A)		133 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: RAILROAD TRACK MAINTENANCE CLEARED VEGETATION WITHIN STUDY AREA. WILLOW & BLACK BERRY ARE DOMINANT ADJACENT TO SOIL PIT WHERE VEGETATION HAS NOT BEEN CLEARED. MULCH FROM CLEARED VEGETATION COVERS THE STUDY AREA ABOUT 2-INCHES THICK. SHORT SAPLINGS/SEEDLINGS ARE EMERGING THROUGH MULCH AFTER DISTURBANCE.

SOIL

Sampling Point: WD-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					SCL	
6-12	10YR 2/1	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOIL PIT IN RIPARIAN AREA ADJACENT TO SAN ANTONIO CREEK BUT NO SIGNS OF WETLAND HYDROLOGY INDICATORS.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: NARLON BRIDGE City/County: LOMPOC, SANTA BARBARA Sampling Date: 11-14-17
Applicant/Owner: UNION PACIFIC RAILROAD State: CA Sampling Point: WD-1
Investigator(s): K. BROWN, J.K. MCCARRON Section, Township, Range: T8N R34W
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): CONCAVE Slope (%): 0
Subregion (LRR): LRRC Lat: 34.790312 Long: -120.610906 Datum: WGS-84
Soil Map Unit Name: MARSH NWI classification: PFOC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation X, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X
Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:
SOIL PIT ADJACENT TO SAN ANTONIO CREEK, WITH RIPARIAN VEGETATION SURROUNDING THE CREEK.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. N/A			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. BACCHARIS PILULARIS	30	Y	NI
2. TOXICODENDRON DIVERSILOBUM	40	Y	FACU
3.			
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. BACCHARIS PILULARIS	10		NI
2. TOXICODENDRON DIVERSILOBUM	85	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. N/A			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	125 (A)		500 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: RAILROAD TRACK SITE MAINTENANCE CLEARED VEGETATION WITHIN STUDY AREA. WILLOW AND BLACKBERRY ARE DOMINANT ADJACENT TO STUDY AREA WHERE VEGETATION WAS NOT CLEARED. MULCH FROM CLEARED VEGETATION COVERED THE STUDY AREA. SHORT SPROUTS OF COYOTE BRUSH AND POISON OAK ARE COMING UP THROUGH THE MULCH.

SOIL

Sampling Point: WD-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 R 4/1	100					SANDY CLAY LOAM	
6-14	10 R 2.5/1	100					SANDY CLAY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ____ No X

Remarks:

SOIL IS HIGH IN ORGANIC MATTER, NO SIGNS OF HYDRIC SOIL INDICATORS.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ADJACENT TO SAN ANTONIO CREEK. SOIL PIT WITHIN FLOODPLAIN BUT NO SIGNS OF WETLAND HYDROLOGY INDICATORS.

Exhibit C - Ephemeral and Intermittent Streams OHWM Datasheets

A United States Army Corps of Engineers, Wetland Determination Data Form (2010 Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the United States) was completed in the field for one cross-section. The datasheet included here is a copy of the datasheet written in the field. The original is on file in our office.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Narlon Bridge
Project Number: 1015.004
Stream: San Antonio Creek
Investigator(s): J. Tilligkeit

Date: 11-9-18 **Time:** 1100 ~
Town: VAFB **State:** CA
Photo begin file#: **Photo end file#:**

Y ☐ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☐ Is the site significantly disturbed?

Location Details: Narlon Bridge over San Antonio Creek

Projection: None **Datum:** WGS84
Coordinates: 34.78996, -120.611065

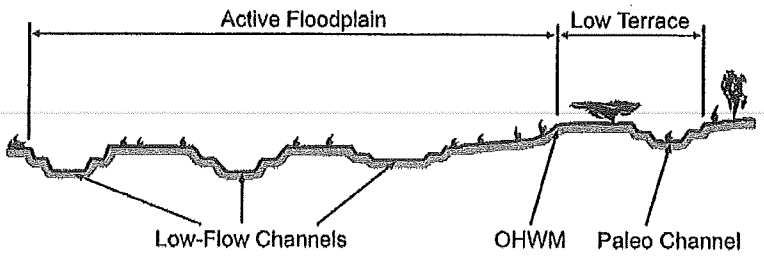
Potential anthropogenic influences on the channel system:
Railroad bridge crossing creek. 9-5 cross beam pylons within riparian area. Willow maintained w/in railroad ROW, dirt road to creek w/ wooden foot bridge crossing.

Brief site description:
Approximately 400' wide riparian (willow) corridor with narrow creek. Surrounded by dune habitat

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

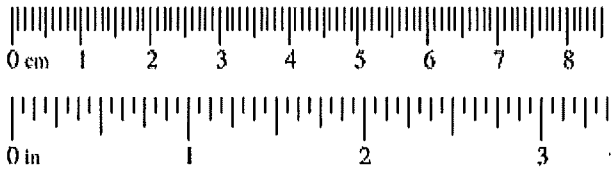


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☐ Other:

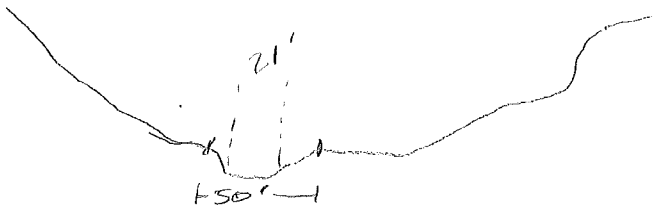
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
	10.08	256	Boulder	
	2.56	64	Cobble	Gravel
	0.157	4	Pebble	
	0.079	2.00	Granule	
	0.039	1.00	Very coarse sand	
	0.020	0.50	Coarse sand	
1/2	0.0098	0.25	Medium sand	Sand
1/4	0.005	0.125	Fine sand	
1/8	0.0025	0.0625	Very fine sand	
1/16	0.0012	0.031	Coarse silt	
1/32	0.00061	0.0156	Medium silt	Silt
1/64	0.00031	0.0078	Fine silt	
1/128	0.00015	0.0039	Very fine silt	
			Clay	Mud



Project ID: 1025.004 **Cross section ID:** A **Date:** 11/9/15 **Time:** 11:00

Cross section drawing:



OHWM

GPS point: _____

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

OHWM approximately 21' wide although incision of channel ~50' wide.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: sand / riparis

Total veg cover: 100 % Tree: ____ % Shrub: 100 % Herb: 100 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: water
- ☐ Other: _____
- ☐ Other: _____

Comments:

Project ID: 1025.004 **Cross section ID:** A **Date:** 11/9/18 **Time:** 1100

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:
Average sediment texture: Sand
Total veg cover: 100 % Tree: ____% Shrub: ____% Herb: 100% and woody vine
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:
Average sediment texture: Sand
Total veg cover: ____% Tree: ____% Shrub: 100 % Herb: ____% except in maintained portion
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Northern Santa Barbara Area, California

Narlon Bridge

December 17, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Northern Santa Barbara Area, California
Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 30, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DuE	Dune land	15.4	73.1%
Mh	Marsh	2.5	11.8%
Sk	Sandy alluvial land, wet	3.2	15.1%
Totals for Area of Interest		**21.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Northern Santa Barbara Area, California

DuE—Dune land

Map Unit Setting

National map unit symbol: hbyh
Elevation: 10 to 300 feet
Farmland classification: Not prime farmland

Map Unit Composition

Dune land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dune Land

Setting

Landform: Dunes

Typical profile

H1 - 0 to 6 inches: fine sand
H2 - 6 to 60 inches: sand

Interpretive groups

Land capability classification (irrigated): 8e
Land capability classification (nonirrigated): 8e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

Mh—Marsh

Map Unit Composition

Marsh: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marsh

Setting

Landform: Basin floors
Parent material: Alluvium

Typical profile

H1 - 0 to 60 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: Very poorly drained
Runoff class: Negligible
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)

Interpretive groups

Land capability classification (irrigated): 8w
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: SALINE (R014XD099CA)
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

Sk—Sandy alluvial land, wet

Map Unit Setting

National map unit symbol: hc1s
Elevation: 20 to 500 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 245 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Sandy alluvial land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sandy Alluvial Land

Typical profile

H1 - 0 to 10 inches: sand
H2 - 10 to 30 inches: stratified sand to loam
H3 - 30 to 60 inches: stratified gravelly loam

Properties and qualities

Slope: 0 to 5 percent
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: Rare

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 7w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: SALINE (R014XD099CA)
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Landform: Drainageways
Hydric soil rating: Yes

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APPENDIX N. AIR QUALITY CALCULATIONS

TABLE M-1
Construction Emissions Summary - Criteria Pollutants
UPRR: Narlon Bridge Replacement Project

Project Emissions	**VOC**	**CO**	**NOx**	**SOx**	**PM_{10}** [a]	**$PM_{2.5}$** [a]
Average Daily Emissions (lbs/day)	11.93	88.12	119.81	0.19	61.37	12.49
Total Emissions (tons) [b]	1.21	9.07	12.20	0.020	7.04	1.36
SBCAPCD Significance Threshold (tons/year) [c]	25	25	25	25	25	25
Exceeds Threshold (Y/N)?	N	N	N	N	N	N

Notes:

[a] PM_{10} and $PM_{2.5}$ emissions represent both exhaust and fugitive dust emissions, even though the SBCAPCD's significance thresholds are specific to exhaust. The fugitive dust emissions also account for best management practices to control fugitive dust.

[b] The total emissions assume a project duration of up to 12 months.

[c] In the absence of construction-specific quantitative significance thresholds, a threshold of 25 tons per year was used for all pollutants, as recommended in Section 5.2 of the SBCAPCD's *Scope and Content of Air Quality Sections in Environmental Documents* (SBCAPCD, 2017). Even this threshold is conservative since the project is not constructing a stationary source that will require an Authority to Construct permit.

TABLE M-2
Construction Emissions Summary - GHGs
UPRR: Narlon Bridge Replacement Project

Project Emissions	**CO_2 Emissions**	**CO_2e Emissions** [a]
Average Daily Emissions (lbs/day)	18,146	19,053
Total Emissions (metric tons) [b]	1,687	1,771
SBCAPCD Significance Threshold (metric tons/year) [c]	N/A	10,000
Exceeds Threshold (Y/N)?	N/A	N

Notes:
N/A = Not Available (i.e., no significance threshold exists)

[a] Only carbon dioxide (CO_2) emission factors were available for all types of construction equipment utilized for this project. Emissions of methane and nitrous oxide from combustion sources are expected to be much lower than emissions of CO_2, contributing in the range of 2 to 4 percent of the total carbon dioxide equivalent (CO_2e) emissions. Therefore, the CO_2 emissions were conservatively increased by 5 percent to calculate CO_2e emissions, accounting for the potential methane and nitrous oxide emissions associated with construction activities.

[b] The total emissions assume a project duration of up to 12 months.

[c] The SBCAPCD's significance threshold is only applicable to the operation of stationary sources, and does not apply to construction. However, it is listed here for comparison purposes only, as a general indication of magnitude.

TABLE M-3
Construction Emissions - Equipment and Vehicle Exhaust Emissions
UPRR: Narlon Bridge Replacement Project

Equipment and Vehicle Information

Equipment / Vehicle List [a]	Offroad Equipment Category / Vehicle Class [b]	Quantity [a]	Horsepower Rating [c]	Load Factor [c]	Total Number of Weeks Used [a]	Total Number of Days Used [d]	Phases [a]	Hours Per Day [e]	Miles Per Day [f]	Emission Factors [g, h]						
										VOC	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	CO_2
Construction Equipment										g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr
Cat 330 Excavator [i]	Crawler Tractors	1	212	0.43	43	215	2,3,4	10	--	0.360	1.555	4.632	0.005	0.175	0.161	472.9
Cat 430 Backhoe	Tractors/Loaders/Backhoes	1	97	0.37	48	240	All	10	--	0.331	3.601	3.326	0.005	0.210	0.193	475.2
CP56 84" Roller	Rollers	1	80	0.38	35	175	2,3,4	10	--	0.388	3.531	3.882	0.005	0.247	0.228	473.9
Cat 966 Loader	Rubber Tired Loaders	1	203	0.36	48	240	All	10	--	0.290	1.269	3.421	0.005	0.114	0.104	469.5
100 Ton Crawler Crane	Cranes	1	231	0.29	43	215	All	10	--	0.384	1.790	4.563	0.005	0.188	0.173	472.9
60 Ton R/T Hydraulic Crane	Cranes	1	231	0.29	43	215	All	10	--	0.384	1.790	4.563	0.005	0.188	0.173	472.9
250 Ton Crawler Crane	Cranes	1	231	0.29	16	80	2,3	10	--	0.384	1.790	4.563	0.005	0.188	0.173	472.9
Cat D6 Dozer	Rubber Tired Dozers	1	247	0.40	43	215	2,3,4	10	--	0.619	2.371	6.503	0.005	0.318	0.293	474.8
Drill Attachment For CIDH + Fixed Pile Leads	Bore/Drill Rigs	1	221	0.50	24	120	2,3	10	--	0.142	1.068	1.807	0.005	0.052	0.048	466.8
Light Plant	Generator Sets	12	84	0.74	43	215	2,3	10	--	0.364	3.380	3.173	0.006	0.179	0.179	568.3
60' Manlift	Aerial Lifts	1	63	0.31	43	215	All	10	--	0.115	3.177	1.869	0.005	0.042	0.038	472.1
Cat TH103 Forklift	Forklifts	1	89	0.20	48	240	All	10	--	0.459	3.760	4.133	0.005	0.308	0.283	471.5
400 Amp Welder	Welders	1	46	0.45	16	80	2,3	10	--	0.937	4.840	4.304	0.007	0.238	0.238	568.3
Vehicles - Running Exhaust										g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
1 Ton Flatbed Truck	Offroad Heavy-Duty Diesel	1	--	--	48	240	All	--	2	1.008	3.763	20.313	0.031	0.169	0.104	3,276.5
2 Ton Flatbed Truck	Offroad Heavy-Duty Diesel	1	--	--	48	240	All	--	2	1.008	3.763	20.313	0.031	0.169	0.104	3,276.5
4,000 Gallon Water Truck	Offroad Heavy-Duty Diesel	1	--	--	43	215	All	--	2	1.008	3.763	20.313	0.031	0.169	0.104	3,276.5
Welder's Rig	Offroad Heavy-Duty Diesel	1	--	--	16	80	2,3	--	2	1.008	3.763	20.313	0.031	0.169	0.104	3,276.5
Delivery Trucks [j]	Onroad Heavy-Duty Diesel	15	--	--	48	240	All	--	17.8	0.112	0.506	4.235	0.016	0.122	0.059	1,648.1
	Offroad Heavy-Duty Diesel	15	--	--	48	240	All	--	2	1.008	3.763	20.313	0.031	0.169	0.104	3,276.5
Foreman Pickup	Onroad Light-Duty Truck	3	--	--	48	240	All	--	5	0.027	1.308	0.145	0.003	0.047	0.019	308.1
	Offroad Light-Duty Truck	3	--	--	48	240	All	--	2	0.193	2.719	0.291	0.011	0.059	0.030	1,142.0
3/4 Ton Crew Pickup	Onroad Light-Duty Truck	5	--	--	48	240	All	--	5	0.027	1.308	0.145	0.003	0.047	0.019	308.1
	Offroad Light-Duty Truck	5	--	--	48	240	All	--	2	0.193	2.719	0.291	0.011	0.059	0.030	1,142.0
Passenger Vehicles (Worker Commutes) [k]	Onroad Light-Duty Auto/Truck	15	--	--	48	240	All	--	16.6	0.020	1.021	0.105	0.003	0.046	0.019	274.6
Vehicles - Idling Exhaust [l]										g/idle-hr	g/idle-hr	g/idle-hr	g/idle-hr	g/idle-hr	g/idle-hr	g/idle-hr
1 Ton Flatbed Truck	Offroad Heavy-Duty Diesel	1	--	--	48	240	All	0.08	--	1.122	4.124	35.888	0.062	0.074	0.071	6,467.8
2 Ton Flatbed Truck	Offroad Heavy-Duty Diesel	1	--	--	48	240	All	0.08	--	1.122	4.124	35.888	0.062	0.074	0.071	6,467.8
4,000 Gallon Water Truck	Offroad Heavy-Duty Diesel	1	--	--	43	215	All	0.08	--	1.122	4.124	35.888	0.062	0.074	0.071	6,467.8
Welder's Rig	Offroad Heavy-Duty Diesel	1	--	--	16	80	2,3	0.08	--	1.122	4.124	35.888	0.062	0.074	0.071	6,467.8
Delivery Trucks	Offroad Heavy-Duty Diesel	15	--	--	48	240	All	0.08	--	1.122	4.124	35.888	0.062	0.074	0.071	6,467.8

Notes:

-- = Parameter not required for computing emissions.

[a] Equipment and vehicle information, including the equipment/vehicle type, quantity, total number of weeks used, and applicable phases, were provided by UPRR (Email Correspondence with UPRR, April 2019, 'FW: Bridge 291.33 Santa Barbara Sub (Narlon) - 60% Kickoff/Permitting Needs.msg'). Note that the "Drill Attachment For CIDH" and "Fixed Pile Leads" equipment were consolidated into one item for emissions calculations, assuming only one of two attachments (drill and/or pile pounder) would be used at a time.

[b] The vehicle classes are represented as follows:

Light-Duty Truck: Assumed to be 50% LDT1 Gas and 50% LDT2 Gas values.

Heavy-Duty Diesel: Assumed to be 100% HHDT DSL values, per Section 4.5 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017).

Light-Duty Auto/Truck: Assumed to be 50% LDA Gas, 25% LDT1 Gas, and 25% LDT2 Gas values, per Section 4.5 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017).

[c] Horsepower rating and load factors taken as the default, average values provided in Table 3.3 of Appendix D of the *CalEEMod User's Guide* (Breeze Software, 2017).

[d] All vehicles and equipment are assumed to operate 5 days per week, as provided by UPRR (Memo from HDR, March 2019, 'Memo_VAFB_Const-Word Schedule, Access, and Equipment.pdf').

[e] All equipment are assumed to operate 10 hours per day, as provided by UPRR (Memo from HDR, March 2019, 'Memo_VAFB_Const-Word Schedule, Access, and Equipment.pdf').

[f] For Passenger Vehicles (Worker Commutes) and Delivery Trucks, miles per day were estimated using the H-W and C-NW rural values, respectively, for Santa Barbara-North of Santa Ynez Range County from Table 4.2 of Appendix D of the *CalEEMod User's Guide* (Breeze Software, 2017). For onsite vehicles, it was assumed that offroad travel is limited to 2 miles per day and onroad travel is limited to 5 miles per day, where some vehicles are used exclusively offroad. Note that the Delivery Trucks' onroad mileage was increased to account for the 5 miles per day that may be traveled between the site entrance and offroad work area.

[g] Construction equipment emission factors in grams per brake-horsepower-hour (g/bhp-hr) taken as the defaults for the year 2020 provided in Table 3.4 of Appendix D of the *CalEEMod User's Guide* (Breeze Software, 2017).

[h] Vehicle emission factors in grams per mile (g/mile) and idling emission factors in grams per idle-hour (g/idle-hr) from EMFAC2014 for Santa Barbara County, calendar year 2020. A speed of 40 miles per hour (mph) was assumed for onroad vehicles, which is consistent with the CalEEMod default. A speed of 5 mph was assumed for offroad vehicles. An average temperature of 63 degrees Fahrenheit (°F) and humidity of 64% were used per Table B-1 of *CT-EMFAC: A Computer Model to Estimate Transportation Project Emissions* (UC-Davis, 2007).

[i] This equipment was classified as a crawler tractor (instead of an excavator) because of the expected equipment wheel type, and to facilitate the calculation of fugitive dust emissions consistent with CalEEMod methodology.

[j] This represents the maximum average daily truck trips to the site, and assumes delivery trucks will travel all the way to the work area. This level of activity is expected to reduce significantly after 16 weeks.

[k] This represents the average daily passenger vehicle trips (worker commutes) to the site entrance. From the site entrance, workers would carpool/shuttle in pickup trucks to the work area.

[l] Heavy-duty diesel vehicles are assumed to idle only 5 minutes per day, consistent with CARB regulations. The Delivery Trucks are only expected to idle at the offroad work area to facilitate unloading.

Exhaust Emissions

Equipment / Vehicle List	Daily Emissions (lbs/day) [a, b]							Total Emissions (tons) [a]						Total Emissions (metric tons) [a, b]
	VOC	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	CO_2	VOC	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	CO_2
Construction Equipment														
Cat 330 Excavator	0.723	3.125	9.309	0.010	0.352	0.324	950.5	0.078	0.336	1.001	0.001	0.038	0.035	92.7
Cat 430 Backhoe	0.262	2.850	2.631	0.004	0.166	0.153	376.0	0.031	0.342	0.316	0.000	0.020	0.018	40.9
CP56 84" Roller	0.260	2.367	2.601	0.003	0.166	0.153	317.6	0.023	0.207	0.228	0.000	0.014	0.013	25.2
Cat 966 Loader	0.467	2.044	5.512	0.008	0.184	0.168	756.4	0.056	0.245	0.661	0.001	0.022	0.020	82.3
100 Ton Crawler Crane	0.567	2.644	6.739	0.007	0.278	0.255	698.5	0.061	0.284	0.724	0.001	0.030	0.027	68.1
60 Ton R/T Hydraulic Crane	0.567	2.644	6.739	0.007	0.278	0.255	698.5	0.061	0.284	0.724	0.001	0.030	0.027	68.1
250 Ton Crawler Crane	0.567	2.644	6.739	0.007	0.278	0.255	698.5	0.023	0.106	0.270	0.000	0.011	0.010	25.3
Cat D6 Dozer	1.348	5.164	14.165	0.011	0.693	0.638	1,034.2	0.145	0.555	1.523	0.001	0.074	0.069	100.9
Drill Attachment For CIDH + Fixed Pile Leads	0.346	2.601	4.403	0.012	0.127	0.117	1,137.2	0.021	0.156	0.264	0.001	0.008	0.007	61.9
Light Plant	5.986	55.582	52.178	0.099	2.944	2.944	9,345.4	0.643	5.975	5.609	0.011	0.316	0.316	911.4
60' Manlift	0.050	1.368	0.805	0.002	0.018	0.016	203.3	0.005	0.147	0.086	0.000	0.002	0.002	19.8
Cat TH103 Forklift	0.180	1.475	1.622	0.002	0.121	0.111	185.0	0.022	0.177	0.195	0.000	0.015	0.013	20.1
400 Amp Welder	0.428	2.209	1.964	0.003	0.109	0.109	259.3	0.017	0.088	0.079	0.000	0.004	0.004	9.4
Vehicles - Running Exhaust														
1 Ton Flatbed Truck	0.004	0.017	0.090	0.000	0.001	0.000	14.4	0.001	0.002	0.011	0.000	0.000	0.000	1.6
2 Ton Flatbed Truck	0.004	0.017	0.090	0.000	0.001	0.000	14.4	0.001	0.002	0.011	0.000	0.000	0.000	1.6
4,000 Gallon Water Truck	0.004	0.017	0.090	0.000	0.001	0.000	14.4	0.000	0.002	0.010	0.000	0.000	0.000	1.4
Welder's Rig	0.004	0.017	0.090	0.000	0.001	0.000	14.4	0.000	0.001	0.004	0.000	0.000	0.000	0.5
Delivery Trucks - Onroad	0.066	0.298	2.493	0.009	0.072	0.035	970.1	0.008	0.036	0.299	0.001	0.009	0.004	105.6
Delivery Trucks - Offroad	0.067	0.249	1.343	0.002	0.011	0.007	216.7	0.008	0.030	0.161	0.000	0.001	0.001	23.6
Foreman Pickup - Onroad	0.001	0.043	0.005	0.000	0.002	0.001	10.2	0.000	0.005	0.001	0.000	0.000	0.000	1.1
Foreman Pickup - Offroad	0.003	0.036	0.004	0.000	0.001	0.000	15.1	0.000	0.004	0.000	0.000	0.000	0.000	1.6
3/4 Ton Crew Pickup - Onroad	0.002	0.072	0.008	0.000	0.003	0.001	17.0	0.000	0.009	0.001	0.000	0.000	0.000	1.8
3/4 Ton Crew Pickup - Offroad	0.004	0.060	0.006	0.000	0.001	0.001	25.2	0.001	0.007	0.001	0.000	0.000	0.000	2.7
Passenger Vehicles (Worker Commutes)	0.011	0.561	0.058	0.002	0.025	0.011	150.7	0.001	0.067	0.007	0.000	0.003	0.001	16.4
Vehicles - Idling Exhaust														
1 Ton Flatbed Truck	0.000	0.001	0.007	0.000	0.000	0.000	1.2	0.000	0.000	0.001	0.000	0.000	0.000	0.1
2 Ton Flatbed Truck	0.000	0.001	0.007	0.000	0.000	0.000	1.2	0.000	0.000	0.001	0.000	0.000	0.000	0.1
4,000 Gallon Water Truck	0.000	0.001	0.007	0.000	0.000	0.000	1.2	0.000	0.000	0.001	0.000	0.000	0.000	0.1
Welder's Rig	0.000	0.001	0.007	0.000	0.000	0.000	1.2	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Delivery Trucks	0.003	0.011	0.099	0.000	0.000	0.000	17.8	0.000	0.001	0.012	0.000	0.000	0.000	1.9
Total	**11.926**	**88.117**	**119.809**	**0.191**	**5.829**	**5.555**	**18,145.6**	**1.206**	**9.070**	**12.199**	**0.020**	**0.598**	**0.570**	**1,686.7**

Notes:

[a] The following conversion factors were used to estimate emissions:

1 lb =	453.6	g
1 metric ton =	1,000,000	g
1 ton =	2,000	lbs

[b] Only CO_2 was evaluated for the construction emissions, because neither CalEEMod nor EMFAC2014 provide other comprehensive GHG emission factors.

TABLE M-4
Construction Emissions - Fugitive Dust Emissions
UPRR: Narlon Bridge Replacement Project

Vehicle Travel on Paved Surfaces (Road Dust)

Emission Factor calculated as follows, per Equation 1 from Section 13.2.1 of *AP-42* (U.S. EPA, 2011), which is generally consistent with Section 5.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017):

Emission Factor (g/VMT) = k (g/VMT) x [sL (g/m^2)]$^{0.91}$ x [W (tons)]$^{1.02}$

Pollutant	k (Particle Size Multiplier, g/VMT) [a]	sL (Road Surface Silt Loading, g/m^2) [b]	W (Mean Vehicle Weight, tons) [b]	Emission Factor (g/VMT)	Daily Miles on Paved Roads (VMT/day)	Total Miles on Paved Roads (VMT)	Daily Emissions (lbs/day)	Total Emissions (tons)
Paved Road PM_{10}	1.00	0.1	2.4	0.300	556	133,440	0.368	0.044
Paved Road $PM_{2.5}$	0.25	0.1	2.4	0.075	556	133,440	0.092	0.011

Notes:

[a] Particle Size Multiplier (k) taken from Table 13.2.1-1 of Section 13.2.1 of *AP-42* (U.S. EPA, 2011).

[b] Mean Vehicle Weight (W) and Road Surface Silt Loading (sL) taken from Section 5.3 of Appendix A of the *CalEEMod User's Guide* (BREEZE Software, 2017).

Vehicle Travel on Unpaved Surfaces (Road Dust)

Emission Factor calculated as follows, per Equations 1a and 2 from Section 13.2.2 of *AP-42* (U.S. EPA, 2006):

Emission Factor (g/VMT) = {k (lb/VMT) x [s (%) / 12]^{a} x [W (tons) / 3]^{b}} x [(365-P) / 365] x 453.6 (g/lb)

Pollutant	k (Particle Size Multiplier, lb/VMT) [a]	s (Silt Content, %) [b]	W (Mean Vehicle Weight, tons) [c]	P (Days of Precipitation > 0.01") [d]	a (Constant) [a]	b (Constant) [a]	Emission Factor (g/VMT)	Reduction From Watering 2x Daily (%) [e]	Controlled Emission Factor (g/VMT)	Daily Miles on Unpaved Roads (VMT/day)	Total Miles on Unpaved Roads (VMT)	Daily Emissions (lbs/day)	Total Emissions (tons)
Unpaved Road PM_{10}	1.5	8.5	16.5	37	0.9	0.45	965.434	55%	434.445	54	12,590	51.72	6.03
Unpaved Road $PM_{2.5}$	0.15	8.5	16.5	37	0.9	0.45	96.543	55%	43.445	54	12,590	5.17	0.60

Notes:

[a] Particle Size Multplier (k) and Constants (a and b) taken from Table 13.2.2-2 of Section 13.2.2 of *AP-42* (U.S. EPA, 2006) for industrial roads.

[b] Silt Content (s) taken from Table 13.2.2-1 of Section 13.2.2 of *AP-42* (U.S. EPA, 2006) for a Construction Site, Scraper Route; this value is consistent with the CalEEMod defaults.

[c] Mean Vehicle Weight (W) assumes that heavy- and light-duty trucks weigh an average of 16.5 tons.

[d] Days of precipitation greater than 0.01 inch (P) taken as the CalEEMod default for the climate region of Santa Barbara-North of Santa Ynez Range County.

[e] Percent reduction from watering twice daily taken from Table XI-D of the *SCAQMD CEQA Air Quality Analysis Handbook* for Travel Over Unpaved Roads (SCAQMD, 2007).

Truck Dumping/Loading

Emission Factor calculated as follows, per Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017):

Emission Factor (lb/ton) = k x 0.0032 x [U (mph) / 5]$^{1.3}$ / [M (%) / 2]$^{1.4}$

Pollutant	k (Particle Size Multiplier) [a]	U (Mean Wind Speed, mph) [a]	M (Material Moisture Content) [a]	Emission Factor (lb/ton)	Soil Density (ton/cy) [a]	Emission Factor (lb/cy)	Reduction From Watering to Maintain 12% Moisture (%) [b]	Controlled Emission Factor (lb/cy)	Total Truck Dumping/Loading Volume (cy) [c]	Daily Emissions (lbs/day) [d]	Total Emissions (tons)
Truck Dumping/Loading PM_{10}	0.35	7.00	12	1.41E-04	1.2641662	1.79E-04	69%	5.53E-05	14,365	3.31E-03	3.98E-04
Truck Dumping/Loading $PM_{2.5}$	0.053	7.00	12	2.14E-05	1.2641662	2.70E-05	69%	8.38E-06	14,365	5.02E-04	6.02E-05

Notes:

[a] Soil Density, Particle Size Multiplier (k), and Material Moisture Content (M) taken from Section 4.3 of Appendix A of the *CalEEMod User's Guide* (BREEZE Software, 2017). Mean Wind Speed (U) taken as the CalEEMod default for the Santa Barbara-North of Santa Ynez Range County climate region. Value converted from units of m/s to mph.

[b] Percent reduction from watering to maintain 12% moisture taken from Table XI-A of the *SCAQMD CEQA Air Quality Analysis Handbook* for Scraper Loading and Unloading (SCAQMD, 2007).

[c] Truck dumping/loading volume was found by estimating total cut/fill of soil for the entire project, as taken from the cut/fill layout provided by UPRR (BR 291.33 Santa Barbara Sub Temporary Construction Impacts Exhibit Plan View, HDR, 2019 -- 'Layout and Cut-Fill Limits.pdf').

[d] Truck dumping/loading from 1 loader was assumed to occur for 48 weeks, 5 days per week (information also available in Table A-3).

Grading Equipment Passes

Emission Factor calculated as follows, per Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017):

PM_{10} Emission Factor (lb/VMT) = 0.051 x [S (mph)]$^{2.0}$ x F_{PM10}

$PM_{2.5}$ Emission Factor (lb/VMT) = 0.04 x [S (mph)]$^{2.5}$ x $F_{PM2.5}$

Vehicle Miles Traveled (VMT) calculated as follows, per Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017):

VMT (mile) = As (acre) / Wb (ft) x 43,560 (ft^2/acre) / 5,280 (ft/mile)

Pollutant	S (Mean Vehicle Speed, mph) [a]	F (Scaling Factor) [a]	Emission Factor (lb/VMT)	Reduction From Watering Every 3 Hours (%) [b]	Controlled Emission Factor (lb/VMT)	As (Acreage of Grading Site, acre) [c, d]	Wb (Blade Width of Grading Equipment, ft) [a]	Total Vehicle Miles Traveled (VMT)	Daily Emissions (lbs/day)	Total Emissions (tons)
Grading PM_{10}	7.1	0.6	1.543	61%	0.602	269	12	184.8	0.517	0.056
Grading $PM_{2.5}$	7.1	0.031	0.167	61%	0.065	269	12	184.8	0.056	0.006

Notes:

[a] Mean Vehicle Speed (S), Scaling Factor (F), and Blade Width (Wb) taken from Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017).

[b] Percent reduction from watering every 3 hours taken from Table XI-A of the *SCAQMD CEQA Air Quality Analysis Handbook* for Construction Activities (SCAQMD, 2007).

[c] Acreage of the Grading Site (As) was calculated using the acres per 8-hour day value for crawler tractors and rubber tired dozers from Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017), adjusted for a 10-hour work day and the total number of days the crawler tractor and rubber tired dozer were used.

[d] Grading from 1 crawler tractor and 1 rubber tired dozer was assumed to occur for 43 weeks, 5 days per week (information also available in Table A-3).

Bulldozing Equipment Passes

Emission Factor calculated as follows, per Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017):

PM_{10} Emission Factor (lb/hr) = {[C x s (%)$^{1.5}$] / [M (%)$^{1.4}$]} x F_{PM10}

$PM_{2.5}$ Emission Factor (lb/hr) = {[C x s (%)$^{1.2}$)] / [M (%)$^{1.3}$]} x $F_{PM2.5}$

Pollutant	C (Arbitrary AP-42 Coefficient) [a]	M (Material Moisture Content, %) [a]	s (Material Silt Content, %) [a]	F (Scaling Factor) [a]	Emission Factor (lb/hr)	Reduction From Watering Every 3 Hours (%) [b]	Controlled Emission Factor (lb/hr)	Operation Per Day (hr/day) [c]	Daily Emissions (lbs/day)	Total Emissions (tons) [c]
Bulldozing PM_{10}	1.0	7.9	6.9	0.75	0.753	61%	0.29	10	2.936	0.316
Bulldozing $PM_{2.5}$	5.7	7.9	6.9	0.105	0.414	61%	0.16	10	1.614	0.173

Notes:

[a] Arbitrary Coefficient used by AP-42 (C), Material Moisture Content (M), Material Silt Content (s), and Scaling Factor (F) taken from Section 4.3 of Appendix A of the *CalEEMod User's Guide* (Breeze Software, 2017).

[b] Percent reduction from watering every 3 hours taken from Table XI-A of the *SCAQMD CEQA Air Quality Analysis Handbook* for Construction Activities (SCAQMD, 2007).

[c] Bulldozing from 1 dozer was assumed to occur for 43 weeks, 5 days per week, 10 hours per day (information also available in Table A-3).

calendar_year	season_month	sub_area	vehicle_class	fuel	temperature	relative_humidity	process	speed_time	pollutant	emission_rate
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	CO	3.763090433
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	NOx	20.31268047
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	SOx	0.031259049
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	ROG	1.007903208
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	CO2	3276.469356
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	PM10	0.071506743
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	5	PM2_5	0.068413393
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	CO	0.506465506
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	NOx	4.235497175
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	SOx	0.015723518
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	ROG	0.111810127
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	CO2	1648.086767
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	PM10	0.024601814
2020	Annual	Santa Barbara (	HHDT	Dsl	63	64	RUNEX	40	PM2_5	0.02353755
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	CO	66.10062426
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	NOx	5.897668688
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	SOx	0.04314745
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	ROG	3.391535832
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	CO2	4205.586487
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	PM10	0.004798772
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	5	PM2_5	0.004423046
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	CO	34.1626042
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	NOx	3.165969906
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	SOx	0.017732669
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	ROG	0.428795991
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	CO2	1721.513808
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	PM10	0.000629357
2020	Annual	Santa Barbara (	HHDT	Gas	63	64	RUNEX	40	PM2_5	0.00058088
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	CO	3.645328721
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	NOx	0.209790225
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	SOx	0.006681443
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	ROG	0.245057449
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	CO2	700.0729477
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	PM10	0.050856318

2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	5	PM2_5	0.048656297
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	CO	0.21657069
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	NOx	0.132709607
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	SOx	0.002306718
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	ROG	0.01990832
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	CO2	241.694965
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	PM10	0.012267919
2020	Annual	Santa Barbara (	LDA	Dsl	63	64	RUNEX	40	PM2_5	0.011737214
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	CO	1.403534244
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	NOx	0.12613574
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	SOx	0.008944689
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	ROG	0.10474207
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	CO2	893.7034522
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	PM10	0.012089536
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	5	PM2_5	0.011116264
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	CO	0.734822117
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	NOx	0.065427599
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	SOx	0.002417946
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	ROG	0.013597511
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	CO2	241.0920941
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	PM10	0.00148671
2020	Annual	Santa Barbara (	LDA	Gas	63	64	RUNEX	40	PM2_5	0.001367052
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	CO	3.994317443
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	NOx	0.853241728
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	SOx	0.009151642
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	ROG	0.91654351
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	CO2	958.8972608
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	PM10	0.705781754
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	5	PM2_5	0.675249947
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	CO	0.948877123
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	NOx	1.140954093
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	SOx	0.003205047
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	ROG	0.178037905
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	CO2	335.8206776
2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	PM10	0.145563288

2020	Annual	Santa Barbara (	LDT1	Dsl	63	64	RUNEX	40	PM2_5	0.139266285
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	CO	2.881649178
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	NOx	0.258214906
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	SOx	0.010520379
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	ROG	0.188138509
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	CO2	1048.927104
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	PM10	0.014526886
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	5	PM2_5	0.013359109
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	CO	1.333870024
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	NOx	0.129187414
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	SOx	0.002845792
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	ROG	0.027505857
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	CO2	282.9663816
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	PM10	0.001908385
2020	Annual	Santa Barbara (	LDT1	Gas	63	64	RUNEX	40	PM2_5	0.001755135
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	CO	2.38627279
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	NOx	0.158816495
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	SOx	0.008319187
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	ROG	0.26920299
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	CO2	871.6737054
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	PM10	0.02184139
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	5	PM2_5	0.020896541
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	CO	0.116212035
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	NOx	0.049711327
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	SOx	0.002913508
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	ROG	0.014375101
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	CO2	305.2736371
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	PM10	0.00642418
2020	Annual	Santa Barbara (	LDT2	Dsl	63	64	RUNEX	40	PM2_5	0.006146273
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	CO	2.556907861
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	NOx	0.323497073
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	SOx	0.01237371
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	ROG	0.196902189
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	CO2	1235.122985
2020	Annual	Santa Barbara (	LDT2	Gas	63	64	RUNEX	5	PM10	0.013163772

2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	5	PM2_5	0.012104355
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	CO	1.281182242
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	NOx	0.160714871
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	SOx	0.003346185
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	ROG	0.027011579
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	CO2	333.195968
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	PM10	0.001666786
2020	Annual	Santa Barbara (S	LDT2	Gas	63	64	RUNEX	40	PM2_5	0.001532702
2020	Annual	Santa Barbara (S	HHDT	Dsl			PMTW		PM10	0.036
2020	Annual	Santa Barbara (S	HHDT	Dsl			PMTW		PM2_5	0.009
2020	Annual	Santa Barbara (S	HHDT	Dsl			PMBW		PM10	0.06174
2020	Annual	Santa Barbara (S	HHDT	Dsl			PMBW		PM2_5	0.02646
2020	Annual	Santa Barbara (S	HHDT	Gas			PMTW		PM10	0.02
2020	Annual	Santa Barbara (S	HHDT	Gas			PMTW		PM2_5	0.005
2020	Annual	Santa Barbara (S	HHDT	Gas			PMBW		PM10	0.06174
2020	Annual	Santa Barbara (S	HHDT	Gas			PMBW		PM2_5	0.02646
2020	Annual	Santa Barbara (S	LDA	Dsl			PMTW		PM10	0.008
2020	Annual	Santa Barbara (S	LDA	Dsl			PMTW		PM2_5	0.002
2020	Annual	Santa Barbara (S	LDA	Dsl			PMBW		PM10	0.03675
2020	Annual	Santa Barbara (S	LDA	Dsl			PMBW		PM2_5	0.01575
2020	Annual	Santa Barbara (S	LDA	Gas			PMTW		PM10	0.008
2020	Annual	Santa Barbara (S	LDA	Gas			PMTW		PM2_5	0.002
2020	Annual	Santa Barbara (S	LDA	Gas			PMBW		PM10	0.03675
2020	Annual	Santa Barbara (S	LDA	Gas			PMBW		PM2_5	0.01575
2020	Annual	Santa Barbara (S	LDT1	Dsl			PMTW		PM10	0.008
2020	Annual	Santa Barbara (S	LDT1	Dsl			PMTW		PM2_5	0.002
2020	Annual	Santa Barbara (S	LDT1	Dsl			PMBW		PM10	0.03675
2020	Annual	Santa Barbara (S	LDT1	Dsl			PMBW		PM2_5	0.01575
2020	Annual	Santa Barbara (S	LDT1	Gas			PMTW		PM10	0.008
2020	Annual	Santa Barbara (S	LDT1	Gas			PMTW		PM2_5	0.002
2020	Annual	Santa Barbara (S	LDT1	Gas			PMBW		PM10	0.03675
2020	Annual	Santa Barbara (S	LDT1	Gas			PMBW		PM2_5	0.01575
2020	Annual	Santa Barbara (S	LDT2	Dsl			PMTW		PM10	0.008
2020	Annual	Santa Barbara (S	LDT2	Dsl			PMTW		PM2_5	0.002
2020	Annual	Santa Barbara (S	LDT2	Dsl			PMBW		PM10	0.03675

2020	Annual	Santa Barbara (S	LDT2	Dsl	PMBW	PM2_5	0.01575
2020	Annual	Santa Barbara (S	LDT2	Gas	PMTW	PM10	0.008
2020	Annual	Santa Barbara (S	LDT2	Gas	PMTW	PM2_5	0.002
2020	Annual	Santa Barbara (S	LDT2	Gas	PMBW	PM10	0.03675
2020	Annual	Santa Barbara (S	LDT2	Gas	PMBW	PM2_5	0.01575