

State Water Resources Control Board

8/3/2020

Governor's Office of Planning & Research

Jul 31 2020

STATE CLEARINGHOUSE

David Stoldt, General Manager
Monterey Peninsula Water Management District
5 Harris Court, Building G
Monterey, CA 92940

Dear Mr. Stoldt:

CLEAN/DRINKING WATER STATE REVOLVING FUND (SRF) PROGRAM INFORMATION FOR THE MONTEREY PENINSULA WATER MANAGEMENT DISTRICT (DISTRICT); POTENTIAL ACQUISITION OF MONTEREY WATER SYSTEM AND DISTRICT BOUNDARY ADJUSTMENT (PROJECT); MONTEREY COUNTY; STATE CLEARINGHOUSE (SCH) NO. 2020040069

We have received a copy of the District's draft Environmental Impact Report (EIR) from the State Clearinghouse for the Project. The Project is related to components under consideration for SRF financing, and the State Water Resources Control Board (State Water Board) is providing comments related to the environmental review and compliance requirements of the SRF Program. The Project is related to the following SRF financing applications: California-American Water Company's SRF application for the "CalAm Monterey Peninsula Water Supply Project" (SRF Project No. 7844-110), and Monterey One Water's SRF application for the "Pure Water Monterey Groundwater Project Expansion" (SRF Project No. 8432-110).

The following are specific comments on the EIR, pursuant to the California Environmental Quality Act (CEQA) Guidelines, Section 15044:

1. California-American Water Company has a completed Drinking Water SRF environmental review for SRF Project No. 7844-110, the CalAm Monterey Peninsula Water Supply Project. Please discuss how the Project would affect the following:
 - Effects to the planned enhancements of the "Aquifer Storage and Recovery Project" as described in the project description of the EIR;
 - Addressing the unavoidable biological impacts due to maintenance activities related to slant wells as described in the Oct. 18, 2018 Biological Opinion regarding the Monterey Peninsula Water Supply Project; and
 - Addressing growth inducement related to the removal of water supply limitation as described in the EIR.
2. Monterey One Water (formerly Monterey Regional Water Pollution Control Agency) has applied to the Clean Water SRF Program for the Pure Water Monterey Groundwater Project Expansion, SRF Project No. 8432-110. The project relies on an EIR (SCH no. 2013051094) which the District adopted and approved minor changes on February 22, 2017, and filed a Notice of Determination on March 9, 2017. Please address the following:
 - What role will the District take for the Pure Water Monterey Groundwater Project Expansion?

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

- If the Pure Water Monterey Groundwater Project Expansion is implemented as an alternative to the new desalination plant, how would it affect the anticipated growth-inducement and biological resources impacts?

If you have any questions or concerns about the State Water Board SRF Program environmental review process or the information provided in this letter, please feel free to contact me at (916) 341-6983, or Cedric.Irving@waterboards.ca.gov, or contact Brian Cary at Brian.Cary@waterboards.ca.gov.

Sincerely,

Cedric Irving
Environmental Scientist
Division of Financial Assistance

Enclosures (1)

1. Oct. 18, 2018 Biological Opinion

cc: State Clearinghouse
(Re: SCH# 2020040069)
P.O. Box 3044
Sacramento, CA 95812-3044

bcc: Cedric Irving, Division of Financial Assistance
Ahmad Kashkoli, Division of Financial Assistance
Brian Cary, Division of Financial Assistance
Bridget Binning, Division of Financial Assistance



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:
08EVEN00-2017-F-0613

October 18, 2018

Dawn L. Hayes, Deputy Superintendent
National Oceanic and Atmospheric Administration
Monterey Bay National Marine Sanctuary
99 Pacific Street, Building 455a
Monterey, California 93940

Subject: Biological Opinion on California American Water Company's Monterey Peninsula Water Supply Project, Monterey County, California

Dear Ms. Hayes:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the National Oceanic and Atmospheric Administration's (NOAA) proposed issuance of a permit pursuant to the National Marine Sanctuaries Act for the California American Water Company's (Cal-Am) Monterey Peninsula Water Supply Project (Project) and its effects on the federally threatened Monterey spineflower (*Chorizanthe pungens* var. *pungens*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), and western snowy plover (*Charadrius nivosus nivosus*); the federally endangered Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*), Yadon's piperia (*Piperia yadonii*), Menzies' wallflower (*Erysimum menziesii*), and Smith's blue butterfly; and designated critical habitats for the California red-legged frog and western snowy plover, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). We received your July 25, 2017, request for formal consultation on that same date.

We have based this biological opinion on information that accompanied your July 25, 2017, request for consultation and other information from our files. These documents and others relating to the consultation are located at the Ventura Fish and Wildlife Office.

Your July 25, 2017, request for consultation also included a request for our concurrence that the Project is not likely to adversely affect the federally endangered tidewater goby (*Eucyclogobius newberryi*) or its designated critical habitat. The only potential for effects to tidewater goby would occur at pipeline crossings of the Salinas River and Tembladero Slough. The Salinas River is a known occupied site for the species and the Tembladero Slough is potential habitat that has not been recently surveyed. Critical habitat for the tidewater goby has been designated at the Salinas River and nowhere else in the Project area. Cal-Am has proposed to attach the pipeline to an existing bridge over the Salinas River by working from a barge and/or from equipment positioned on the existing bridge, which we expect will result in minimal temporary

disturbance and no permanent effects to tidewater gobies and their habitat. In addition, Cal-Am has proposed monitoring and avoidance measures to minimize the potential for effects due to construction equipment or materials that unintentionally enter tidewater goby habitat. Cal-Am has proposed to install the pipeline under Tembladero Slough via horizontal directional drilling (HDD). If properly implemented in areas suitable for the technique, HDD should not affect species or habitats within Tembladero Slough. With poor implementation or unsuitable conditions, there is potential for drilling fluid used in HDD to escape the bore hole and enter the slough ("frac-out"). Cal-Am will prepare a contingency plan (for Service approval prior to HDD implementation) to help avoid a frac-out. Considering the small overlap between the Project area and tidewater goby habitat, the small potential for effects at the two sites of overlap, and the monitoring and avoidance measures proposed by Cal-Am and NOAA, we believe that the effects of the Project on the tidewater goby and its critical habitat would be insignificant or discountable and therefore we concur with your not likely to adversely affect determinations.

Consultation History

We participated in several interagency meetings regarding the Project, as detailed in the biological assessment (AECOM 2018). The Service and NOAA completed an informal consultation on the effects of a test well used to gather data for the Project, as documented in our letter to NOAA, dated July 7, 2014 (08EVEN00-2014-I-0341). We received your request for formal consultation on July 25, 2017. We sent you a letter requesting additional information on the Project and its effects on September 22, 2017. We received and discussed additional information on the Project and its effects in a series of electronic mail messages and phone conversations between Bridget Hoover, of your staff, and Jacob Martin, of my staff. We received the text of an updated biological assessment (AECOM 2018) on February 20, 2018, via electronic mail from Ms. Hoover, which completed the information needed to initiate formal consultation.¹

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following description is based on the updated biological assessment (AECOM 2018) for the Project. This description has been summarized and focuses on those aspects of the project that could affect listed species; additional details are available in the biological assessment, which is hereby incorporated by reference. The Project is comprised of the following facilities:

Seawater Intake System

The seawater intake system would include seven permanent subsurface slant wells (an existing test slant well plus 6 new wells) located at the Cemex Corporation's Lapis Sand Plant, an existing ocean-front sand mining area (Cemex Property) in the city of Marina. These wells

¹ We later received a complete electronic version of the biological assessment on compact disc, which included the text of the February 20, 2018, version, plus all figures and appendices. This version of the biological assessment was dated March 7, 2018, and is cited throughout this biological opinion.

would extend offshore into the submerged lands of the Monterey Bay National Marine Sanctuary (MBNMS). A source water pipeline would convey the combined source water from the slant wells to a desalination plant.

Cal-Am proposes to convert an existing test slant well into one of the seven proposed permanent slant wells. The test slant well was drilled at 19 degrees below horizontal and is approximately 720 feet long. To convert the test slant well into a permanent well, the test well would be shut down and test well infrastructure would be removed, including removal of the above ground mechanical piping, concrete pad, electrical cabinet, and water quality sampling equipment. The only infrastructure that would remain is the valve vault and discharge piping that connects to the MRWPCA ocean outfall junction structure. The existing test well submersible pump would be removed and upgraded to accommodate a larger flow rate and design head. Once the site is clear (except for the well head), the permanent facilities would be installed, including a pump to waste basin (discussed below), electrical enclosure, below grade mechanical vault, and conveyance pipeline.

Six new subsurface slant wells would be drilled from an onshore location and would extend under the seafloor, within MBNMS, using a 22 to 36-inch-diameter steel casing. The six new permanent slant wells would be approximately 900 to 1,000 feet long and drilled at approximately 14 degrees below horizontal.

The seven slant wells (the converted test slant well plus the six new wells) would be located at four new wellhead sites along the back of the dunes, and the one existing test slant well site. The well sites are numbered sequentially, with site 1 being the northernmost site and site 5 the southernmost site. The test slant well site (site 1) and two new sites (sites 3 and 4) would each have one slant well, and two sites (sites 2 and 5) would have two slant wells. Site 2 would be located about 650 feet south of site 1. Sites 2 through 5 would be drilled over a total distance of about 975 feet. Sites 3, 4 and 5 would be spaced approximately 250 feet apart.

Each of these well sites would include the following aboveground facilities: aboveground wellhead(s) (currently existing for the test well at site 1); a below ground mechanical piping vault (12 by 6 by 6 feet) for a meter, valves, and gauges (one per well); an aboveground electrical enclosure (14.5 by 12.5 by 10 feet) and a pump-to-waste basin. Each wellhead would be located aboveground for ease of maintenance. Each slant well would be equipped with a 2,500 gallons per minute (gpm), 300 horsepower (hp) submersible well pump. The electrical controls for operation of the slant wells would be housed in a single-story, 17-foot-long, 10-foot-wide, and 10-foot-high enclosure located at each of the five well sites. Each site would also have a pump-to-waste basin for the percolation of turbid water produced during slant well startup and shutdown. The pump-to-waste basin would be constructed of rip rap material on a 2:1 slope, approximately 2 feet deep, 12 feet long, and 8 feet wide and have a sand bottom. Other than two surge tanks, electrical enclosures, and rip rap within each pump-to-waste basin, the only physical infrastructure above ground will be the well head, an air release valve, and a pump-to-waste discharge pipeline.

The new permanent slant wells and associated infrastructure at sites 2 through 5 would be constructed on a 6,025-square-foot graded pad located above the maximum high tide elevation on the inland side of the dunes. The seawater pumped from site 1 would be pumped inland (east) through a buried source water pipeline located along the existing CEMEX access road. A 750 foot-long, 42 inch-diameter, buried pipe would collect the seawater pumped from sites 2 through 5 and convey it north to join a proposed source water pipeline. The source water pipeline would be an approximately 2.2-mile-long, 42-inch-diameter, buried pipeline that would convey water from the well clusters to the proposed desalination plant.

Maintenance of the slant wells would be required on a 5-year interval. The disturbance area associated with this periodic maintenance of the slant wells would be roughly 3.75 acres. This acreage includes 5 well sites at approximately 0.4 acre per site plus an approximately 1.75-acre unpaved access road. All disturbance would occur on the back side of the dunes at the graded pad/wellheads. Accounting for all of the slant wells, maintenance activities within the area would last between 9 and 18 weeks every 5 years. During maintenance, workers would access the well from the wellhead, and would lower mechanical brushes into the wells to clean the screens. If chemical cleaning products are needed for maintenance, only environmentally inert products would be used.

Desalination Plant

The desalination plant would be sited on approximately 25 acres of a vacant, 46-acre, parcel of land located along Charles Benson Road in Monterey County. The plant would house the seawater desalination infrastructure used to create potable water and would have a 6.4 million gallons per day (mgd) production capacity. The desalination plant would include pretreatment, reverse osmosis (RO), post-treatment, pumping, chemical feed and storage facilities, brine storage and conveyance facilities, and administrative facilities.

The desalination plant would operate at an overall recovery rate of 42 percent. Approximately 15.5 mgd of raw seawater would be needed to produce 6.4 mgd of desalinated product water. The RO process would generate approximately 8.99 mgd of brine. The salinity of the brine is expected to range between 57 and 58 parts per thousand (ppt), which is roughly 71 to 74 percent higher than seawater.

Brine Storage and Disposal System

The brine storage and disposal system would have an uncovered 3-million-gallon brine storage basin with two impermeable liners; two 6 mgd, 40 hp brine discharge pumps; and a brine aeration system to maintain dissolved oxygen concentrations in the brine at 5 milligrams per liter. The RO process would generate approximately 9 mgd of brine, including decanted backwash water. Brine from the RO system would be conveyed through a proposed 3,900-foot-long, 36-inch-diameter, brine discharge pipeline to a proposed brine mixing facility at the existing Monterey Regional Water Pollution Control Agency (MRWPCA) wastewater treatment plant. The brine would usually be combined with RO concentrate from the Pure Water Monterey

project (permitted and currently in construction) and with varying amounts of treated wastewater. The mixture of brine, RO concentrate, and treated wastewater is referred to as the combined discharge. The combined discharge would then be conveyed to the existing MRWPCA ocean outfall that discharges into MBNMS. When temporary storage is needed, brine would be directed to the brine storage basin on the east side of the desalination plant, where it can be stored for up to 5 hours, then pumped to a brine discharge pipeline. The existing MRWPCA outfall pipeline is 2.1 miles long and ends with a 1,100-foot-long, underwater diffuser that rests on rock ballast.

Desalinated Water Conveyance Facilities

Desalinated product water from the desalination plant would flow south through a series of proposed pipelines (i.e., the desalinated water pipeline and transmission main, described below) to existing and proposed Cal-Am water infrastructure. Pipelines would include surface equipment such as valves and blowoffs.

Desalinated, post-treatment product water would flow to two covered, aboveground treated-water storage tanks (clearwells). Each tank would be approximately 103 feet in diameter and 35 feet tall, constructed of steel or concrete, and provide 1,750,000 gallons of storage, for a total storage volume of 3.5 million gallons.

The pumps for the desalinated water would be located at the proposed multi-purpose pump station near the center of the proposed desalination plant. Salinas Valley return flow pumps would pump desalinated product water to the Castroville Community Services District (CCSD) and Castroville Seawater Intrusion Project (CSIP) water distribution systems. A separate system, as described in the following paragraphs, would pump desalinated product water to the Cal-Am water system.

The desalinated water pump station would pump water through a new desalinated water pipeline and new transmission main to join the existing Cal-Am storage and distribution system. The new desalinated water pipeline would be 3.3 miles long, 36 inches in diameter, and would extend west and south from the desalination plant to Reservation Road. The pipeline would include surface equipment such as valves and blowoffs.

Water would flow from the desalinated water pipeline and enter the 6-mile-long, 36-inch-diameter, new transmission main at Reservation Road. The transmission main would continue generally south to the existing Seaside groundwater basin aquifer storage and recovery (ASR) facilities near the intersection of General Jim Moore Boulevard and Coe Avenue (where developed areas of the city of Seaside meet undeveloped portions of the former Fort Ord). The pipeline would include surface equipment such as valves and blowoffs.

Expansion of the Seaside Ground Water Basin Aquifer Storage Recovery System

Cal-Am proposes to expand the existing ASR system to provide additional injection/extraction capacity for both desalinated product water and Carmel River water supplies. The proposed improvements to the ASR system include two additional injection/extraction wells, ASR-5 and ASR-6, and three parallel, 0.9-mile-long ASR pipelines. The new injection/extraction wells would be drilled to a depth of approximately 1,000 feet and would be screened in the Santa Margarita sandstone aquifer. Each well would have a permanent 500 hp, multi-stage, vertical turbine pump, supervisory control and data acquisition (SCADA) controls for remote operation, and various pipes and valves. Each well pump and electrical control system would be housed in a 900-square-foot concrete pump house. Security fencing would encompass an area of approximately 0.4 and 0.5 acre around the ASR-5 and ASR-6 wells, respectively.

Three parallel 0.9-mile-long, 16-inch-diameter, ASR pipelines would extend along General Jim Moore Boulevard between the proposed ASR wells and the existing ASR wells. The ASR recirculation pipeline would circulate water to prevent stagnation during times when no injection or extraction takes place. The ASR conveyance pipeline would convey water to/from the proposed ASR wells. The ASR pump-to-waste pipeline would convey backflush effluent from the proposed ASR wells to the existing settling basin just north of the intersection of General Jim Moore Boulevard and Coe Avenue. In addition, a 150-foot-long, 16-inch-diameter pipeline would connect the new transmission main to each of the new ASR wells. These pipelines would convey desalinated water to the proposed ASR wells for injection.

Carmel Valley Pump Station

The proposed Carmel Valley pump station would allow desalinated water to be stored and moved between existing storage facilities within Cal-Am's system (Forest Lake Reservoir and Segunda Tank). The proposed Carmel Valley pump station facility would consist of three, 60 hp pumps and approximately 1,000 linear feet of inlet and outlet piping. The mechanical equipment would be housed and raised above the 100-year flood elevation in a proposed concrete 756 square-foot building. The Carmel Valley pump station would require supply and discharge pipeline connections to the water main in Carmel Valley Road. Three new manual valves would be installed in areas of existing infrastructure. Additionally, three new actuated valves would be installed.

Connections to Existing Castroville and Salinas Valley Water Systems

The 4.5-mile-long, 12-inch-diameter, Castroville pipeline would convey water from the desalination plant north and east to the existing CSIP distribution system and an existing CCSD well. The pipeline would cross over the Salinas River at Monte Road by being attached to the underside of the Monte Road bridge. The pipeline would continue northeast from the Salinas River crossing under Tembladero Slough using HDD; entry and receiving pits would be approximately 50 by 50 feet, with one on each side of the crossing.

A proposed 1.2-mile-long, 12-inch-diameter, pipeline would deliver water from the desalination plant to the existing CSIP pond located at the southern end of the MRWPCA Regional Wastewater Treatment Plant. From the CSIP pond, water would be delivered to Salinas Valley agricultural users through existing CSIP infrastructure.

Satellite Water Systems

The proposed project would also improve existing interconnections at satellite water systems in the unincorporated communities of Ryan Ranch, Bishop, and Hidden Hills, which are located along the Highway 68 corridor. The Ryan Ranch–Bishop interconnection improvements would install a 1.1-mile-long, 8-inch-diameter pipeline extending between an existing interconnection at Highway 68 and Ragsdale Avenue and a new connection to the Bishop system. The Ryan Ranch improvements would be located within existing paved roads, within a business park with landscaping, coast live oak woodland, northern coastal scrub, and non-native annual grassland located adjacent to the roads and parking lots. The main system–Hidden Hills interconnection improvements site is located along Tierra Grande Drive in a low-density residential area north of Carmel Valley Road. The existing interconnection between the main Cal-Am distribution system and the Hidden Hills system would be improved by installing approximately 1,200 feet of 6-inch-diameter pipeline along the northern extent of Tierra Grande Drive, within the roadway. The existing pump capacity at the upper Tierra Grande booster station and the middle Tierra Grande booster station would be upgraded. The construction footprint for the main system–Hidden Hills interconnection improvements is 1.1 acres. Construction would occur during daytime hours, would take approximately 3 months to complete, and would be limited to the road right-of-way and within the existing developed booster stations.

Conservation Measures

Cal-Am and NOAA have proposed an extensive suite of avoidance, minimization, and mitigation measures to reduce Project effects to listed species and other resources. Those most relevant to listed species are presented here. Additional measures and more detail are available in the biological assessment (AECOM 2018).

Prior to starting work, all construction workers at the project areas will attend a construction worker environmental awareness training and education program. The program will include information on each Federal and State-listed species, as well as other special-status wildlife and plant species and sensitive natural communities that may be encountered during construction activities. The training will include: information on special-status species' life history and legal protections, the measures Cal-Am and/or its contractors have committed to implement to protect special-status species and sensitive natural communities, reporting requirements and communication protocols.

Prior to initiation of construction, Cal-Am and/or representatives of Cal-Am will retain a qualified lead biologist to oversee compliance with avoidance and minimization measures for all special-status species and sensitive habitats. The lead biologist will be onsite, or will appoint

qualified biologists and/or qualified biological monitors to be onsite, during all fencing and ground disturbance activities. The lead Biologist, qualified biologists, and biological monitors will be subject to approval by the Service prior to conducting the monitoring work. Only the lead biologist and/or qualified biologists may lead protocol surveys and relocate special-status species, as authorized by the resource agencies with jurisdiction over these species.

In the event that construction-related activities have the potential to accidentally violate the prescribed special-status species and habitat protection measures, the project lead biologist, a qualified biologist, or qualified biological monitor will report to construction or operational site supervisors with authority to stop work to prevent any violations. Work will proceed only after the construction-related hazards to special-status species and habitats are removed and the species is no longer at risk. Violations will be thoroughly documented as part of compliance monitoring activities.

The lead biologist will ensure that all compliance monitoring activities are documented on a daily basis, and will prepare a summary monitoring report on a monthly basis to be submitted to regulatory agencies upon their request.

Prior to the start of construction at any proposed facility site where special-status amphibians, reptiles, and mammals have a moderate or high potential to occur, the construction work area boundary will be fenced with a temporary exclusion fence to prevent special-status wildlife from entering the site during construction. The exclusion fencing will be constructed of metal flashing, plastic sheeting, or other materials that will prevent California tiger salamanders, California red-legged frogs, and other special-status reptiles, amphibians, and rodents from climbing or going under the fence. The fencing will be buried a minimum of 6 inches below grade to secure the fence and extend a minimum of 30 inches above grade. The fencing will be inspected by the lead biologist or qualified biological monitor on a daily basis during construction activities to ensure fence integrity. Any needed repairs to the fence will be performed on the day of their discovery. Fencing will be installed and maintained during all phases of construction. Final fence design and location will be determined in consultation with the Service. Exclusion fencing will be removed once construction activities are complete.

If special-status wildlife species are found on the site during project construction, construction activities will cease in the vicinity of the animal until the animal moves on its own outside of the project area (if possible). If the animal does not move on its own, a qualified biologist will relocate the animal to appropriate habitat outside the work area. A report will be prepared by the lead biologist to document the activities of the animal within the site; all fence construction, modification, and repair efforts; and movements of the animal once it is again outside the exclusion fence. This report will be submitted to the Service.

Immediately prior to conducting vegetation removal or grading activities inside fenced exclusion areas, the lead biologist or a qualified biologist will survey within the exclusion area to ensure that no special-status species are present. The lead biologist or a qualified biologist will also monitor vegetation removal or grading activities inside fenced exclusion areas for the presence of special-status species.

To prevent the inadvertent entrapment of special-status wildlife during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered with plywood or similar materials at the close of each working day, or escape ramps constructed of earth fill or wooden planks will be positioned within the excavations to allow special-status wildlife to escape on their own. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If trapped animals are observed, escape ramps or structures will be installed immediately to allow escape. If individual(s) of a listed species are trapped, work will be stopped, in the vicinity, until a qualified biologist can relocate the individual(s) to appropriate habitat outside the work area.

All construction pipes, culverts, or similar structures that are stored at a construction site for one or more overnight periods and with a diameter of 4 inches or more will be inspected for special-status wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a listed animal is discovered inside a pipe, that pipe will not be moved until a qualified biologist can relocate the individual(s) to appropriate habitat outside the work area.

All vertical tubes used in project construction, such as chain link fencing poles or signage mounts, will be temporarily or permanently capped at the time they are installed to avoid the entrapment and death of special-status birds.

All vehicles and equipment will be in proper working condition to ensure that there is no potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The lead biologist will be informed of any hazardous spills within 24 hours of the incident. Hazardous spills will be immediately cleaned up and the contaminated soil will be properly disposed of at a licensed facility.

A trash abatement program will be implemented during construction. Trash and food items will be contained in closed containers and removed from the construction site daily to reduce the attractiveness to sensitive wildlife species and opportunistic predators.

Workers will be prohibited from feeding wildlife and bringing pets and firearms to the construction work areas. Intentional killing or collection of wildlife species, including special-status species in the project area and surrounding areas will be prohibited.

All temporarily disturbed areas will be returned to pre-project conditions or better.

To prevent exterior lighting from affecting special-status species, the design, construction, and operation of lighting at Project facilities will adhere to the following requirements:

1. Use of low-intensity street lighting and low-intensity exterior lighting will be required.
2. Lighting fixtures will be cast downward and shielded.
3. Lighting fixtures will be designed and placed to minimize glare.
4. Fixtures and standards will conform to State and local safety and illumination requirements.

Cal-Am will retain a licensed geotechnical engineer to develop a “frac-out” contingency plan. Cal-Am will submit the plan to the Service and other relevant agencies for approval prior to the start of construction of any pipeline that will use HDD installation. The plan will be implemented at all areas where HDD installation under a waterway would occur to avoid, minimize, or mitigate for project impacts either prior to, concurrently with, or following HDD installation, as specified in the plan.

The following measures will be implemented to reduce direct impacts on sensitive natural communities and the special-status species that utilize these sensitive communities. To the extent feasible, the construction contractor(s) will implement the following avoidance and minimization measures:

1. Where feasible, project facilities will be sited and designed to avoid disturbance of central maritime chaparral, central dune scrub, coast live oak woodland, and riparian woodland and scrub, any areas defined as environmentally sensitive habitat areas (ESHA) by the California Coastal Commission, any sensitive communities defined by local jurisdictions, and any other sensitive natural communities, including designated critical habitats, identified within the project area.
2. Any areas used for staging, laydown, material storage, equipment storage, job trailers, employee parking, or other project-related support activities that do not need to be located in the active construction area will be located away from jurisdictional areas, sensitive communities, and will be protected from stormwater runoff using temporary perimeter sediment barriers such as berms, silt fences, fiber rolls, covers, sand/gravel bags, and straw bale barriers.
3. All potential contaminants will be stored on impervious surfaces, plastic ground covers, or in secondary containment to prevent any spills or leakage from contaminating the ground, and will be located at least 100 feet from adjacent habitat, where practicable.
4. Any spillage of pollutants or construction material will be contained immediately in accordance with the project stormwater pollution prevention plan. The contaminated area will be cleaned and any contaminated materials properly disposed of. The lead biologist will be notified of all spills.
5. Where direct impacts on sensitive natural communities, including designated critical habitats cannot feasibly be avoided, Cal-Am will implement the following measures: Any temporarily impacted sensitive natural communities, including designated critical habitats, will be restored to previous conditions or better at the end of construction. To the extent feasible, topsoil will be salvaged during grading and earthmoving activities, stockpiled separately from subsoil, and protected from erosion (e.g., covered or watered). Composting additives will be used to amend the soil, if needed, and compacted topsoil will be properly prepared prior to reuse for post-construction restoration of temporarily

disturbed areas. A minimum of 12 inches of topsoil will be salvaged (or if there is less than 12 inches of topsoil initially, as much as practicable). Restoration will be conducted in conformance with the terms of a Habitat Mitigation and Monitoring Plan (HMMP), as described below. Compensatory mitigation for permanent impacts on sensitive natural communities will occur at a ratio of 3:1. All compensatory mitigation will be conducted in accordance with the terms of the HMMP. Where applicable, compensatory mitigation will be developed onsite. Alternatively, subject to approval by the appropriate agencies, offsite mitigation may be developed, or credits purchased through an approved mitigation bank.

Cal-Am proposes mitigating for impacts to the listed amphibian species, California tiger salamander and California red-legged frog, through purchase of credits with the Sparling Ranch Conservation Bank. Their agency approved service area includes the northern part of Monterey County and the Project area. Purchase of mitigation credits for permanent impacts to amphibian habitat is proposed at a ratio of 3:1; there is expected to be permanent impacts to 14.73 acres of habitat for California tiger salamander and 0.47 acre of permanent impacts for California red-legged frog.

In light of the Cemex settlement agreement with the California Coastal Commission to cease operation at the Cemex Property by December 31, 2020, and its provisions for restoration and reclamation activities to encourage the recovery of the habitat values, a deed restriction to be placed on the property at sale to protect it in perpetuity, and the transfer of the site at a reduced price to a non-profit or governmental agency approved by the Commission, Cal-Am will work with the involved stakeholders to implement their proposed mitigation by cooperating with Cemex to protect and manage restoration areas at the Cemex Property for conservation of Smith's blue butterfly, western snowy plover, and listed dune plants. Again, Cal-Am is proposing restoration of temporary impacts to habitat at a ratio of 1:1 and mitigation for permanent impacts is proposed at 3:1.

Note that the acreages of impacts are not necessarily cumulative, especially for listed plants. Some of the acreages of affected habitat overlap in that the same affected habitat may be suitable for more than one species.

Cal-Am will develop and submit a HMMP to the Service and other relevant agencies for approval prior to project construction. The HMMP will be implemented at all areas where special-status species habitat or special-status natural communities will be restored, created, or enhanced to mitigate for project impacts either prior to, concurrently with, or following project construction. Final project impact acreages will be calculated after the 100 percent design is complete², and these acreages will be used to calculate the amount of mitigation required. The

² Minor changes in the amounts and locations of habitats affected may be revealed through the final design process and the implementation of Cal-Am's proposed minimization measures, but we do not expect these changes to result in any additional adverse effects to listed species beyond those discussed in the Effects of the Action section, below (i.e., we expect more detail on the locations where listed species habitats would be affected, but we do not expect that more habitat would be affected).

HMMP will outline measures to be implemented, depending on the mitigation requirements, to restore, improve, or re-establish special-status species habitat, sensitive communities, and critical habitat on the site, and will include additional conservation measures, as applicable (see AECOM 2018, pages 3-9 for more detail).

Prior to construction, Cal-Am or its contractor will conduct focused botanical survey(s) for special-status plants in all potentially suitable habitat during the appropriate blooming period for each species and in accordance with the guidelines established by California Department of Fish and Game (2009). Maps depicting the results of these surveys will be prepared for use in final design. If more than two years elapse between the focused botanical surveys and commencement of ground disturbance activities, a final set of appropriately-timed, focused botanical surveys will be conducted and populations mapped. The results of these final surveys will be combined with previous survey results to produce habitat maps showing habitat where the special-status plants have been observed during the focused botanical surveys conducted for each facility site. The following measures to avoid and minimize adverse effects on special-status plants will be implemented:

1. To the extent feasible, project facilities will be sited to avoid permanent and temporary adverse effects on special-status plants and their required constituent habitat elements.
2. Special-status plants located within temporary construction areas will be fenced or flagged for avoidance (if feasible) prior to construction. The Lead Biologist or the appointed biological monitor will ensure compliance with off-limits areas. If avoidance is not feasible, seasonal avoidance measures (i.e., limited operating periods based on timing of annual plant dormancy), or temporarily placing heavy fabric or wooden mats over the affected habitat will be applied as appropriate.
3. Compensation for temporary or permanent loss of special-status plant occurrences, in the form of land purchase or restoration, will be provided at a 1:1 ratio for temporary losses and a 3:1 ratio for permanent losses.
4. Cal-Am will prepare a HMMP, which will describe either onsite or offsite restoration.

Cal-Am or its construction contractor(s) will implement the following measures to reduce adverse effects on the Smith's blue butterfly during construction:

1. Floristic botanical surveys of all suitable habitat for coast buckwheat (*Eriogonum latifolium*) and seacliff buckwheat (*Eriogonum parvifolium*), both of which are host plants to the Smith's blue butterfly, will be conducted by a qualified biologist during project design and prior to project implementation. Maps depicting the results of these surveys will be prepared to document the location of the host plants within or adjacent to the project area.
2. Construction of project elements will be planned to avoid mapped host plants for Smith's blue butterfly whenever feasible.
3. If it is not feasible to avoid disturbance to host plants during project construction, the following will be implemented.
 - a. Prior to the start of construction activities and before conducting preconstruction surveys for Smith's blue butterfly, the lead biologist or an appointed qualified biologist will prepare a protect-in-place and/or relocation plan for Smith's blue

- butterfly and its host plants. If either is found in areas subject to permanent habitat or plant loss, then plants would be salvaged and relocated in accordance with the plan. The relocation plan will be submitted to the Service for approval. The relocation plan will define the study area, describe appropriate handling and relocation methods (such as digging up and removing individual plants, duff, and/or soil and moving them to a new location), and identify appropriate relocation sites.
- b. If preconstruction surveys identify butterflies or host plants in areas subject only to temporary disturbance that do not require plant removal, then the plants, and leaf litter and soil, which may hold dormant butterfly pupae, would be protected in place with heavy fabric, plywood or other mats (depending on the stability of the underlying soil) to allow construction vehicles to pass over. Following construction, the fabric or mats would be carefully removed and the area allowed to recover.
 - c. A qualified biologist will survey the work area no more than 30 days before the onset of ground disturbance. If any life stage of the Smith's blue butterfly or its host plants is found within the project area boundary, the lead biologist or qualified biologist will relocate plants, duff, and/or soil, from the site before construction begins per the relocation plan described above.
4. Upon completion of construction activities, Cal-Am will restore Smith's blue butterfly habitat temporarily removed during construction. Compensatory mitigation for permanent losses of habitat will be provided at a ratio of 3:1. Restoration and mitigation activities will be described in the HMMP.

A preconstruction survey for California tiger salamander and California red-legged frog will be conducted by a qualified biologist in suitable habitat where there is a moderate to high potential for these species to occur prior to vegetation removal or grading, as specified below:

1. Prior to conducting the surveys, the qualified biologist will prepare a relocation plan that describes the appropriate survey and handling methods for California tiger salamander and California red-legged frog, and identifies nearby relocation sites where individuals would be relocated if found during the preconstruction surveys. The relocation plan will be submitted to the Service for approval prior to the start of construction activities.
2. Preconstruction surveys will be conducted within 5 days prior to vegetation removal, grading, or installation of exclusion fencing; to identify any California tiger salamanders, California red-legged frogs, and any small mammal burrows.
3. Small mammal burrows within the project footprint identified during preconstruction surveys will be surveyed (through hand-excavation, scoping, or other suitable methods to be determined in consultation with the Service) to identify any California tiger salamanders or California red-legged frogs. Once the burrow is confirmed to be vacant of any animals, the burrow will be collapsed.
4. If California tiger salamanders or California red-legged frogs are observed within the project footprint, a qualified biologist will relocate the individual according to the relocation plan.

5. Exclusion fencing will be installed around construction areas where there is a moderate to high potential for these species to occur.
6. The qualified biologist will monitor vegetation removal and grading inside the exclusion fence.

Upon completion of construction activities, Cal-Am will restore any California tiger salamander and California red-legged frog habitat temporarily modified during construction. Compensatory mitigation for permanent adverse effects on suitable habitat will be provided.

Construction contractors will be required to implement the following measures to avoid adverse effects on western snowy plover:

1. Construction work at the intake slant wells and along the segment of the source water pipeline located west of the Cemex Lapis Plant site will begin during the western snowy plover non-nesting season (defined as October 1 through February 28), unless no snowy plovers are present during the nesting season (as determined from nesting surveys performed by a Service-approved biologist) and work during the nesting season in specified locations has previously been approved by the Service.
2. For work that cannot be completed during the non-nesting season, and thus will need to be conducted during nesting season, the following steps to obtaining Service approval will be implemented:
 - a. Cal-Am will engage the services of Point Blue Conservation Science or another qualified western snowy plover biologist (subject to approval by the Service) to perform one year of surveys during the nesting season preceding construction to determine whether nesting is occurring within sight or audible range of the slant well head locations or source water pipeline.
 - b. If findings from the nesting season survey are negative, then the qualified western snowy plover biologist will conduct additional pre-construction nesting surveys within 24 hours of initiation of construction activities within 300 feet of all construction work areas to determine if any snowy plover nests are present. If there is a break of 3 days or more in construction activities, a survey will be conducted before construction begins again.
 - c. If nests are observed within 300 feet of construction activities, the qualified biologist will notify and consult with the Service to determine whether construction may proceed, based on detailed information on location of nest(s), proximity to construction, site lines and topography, and noise environment. Any additional avoidance or minimization measures will be implemented prior to initiating construction activities.
3. For construction during the breeding season that is approved by the Service, visual barriers will be installed to screen work areas from potential nesting habitat that is outside the Project footprint but within line of sight. Visual barriers will be constructed at an adequate height and width to visually block construction equipment and construction crews from any snowy plover nesting habitat outside the Project footprint. Cal-Am and the Service acknowledge that the proposed intake wells would be constructed within potential western snowy plover nesting habitat and that visual screening of areas within

the Project footprint is not practical. Final designs of the visual barriers will be coordinated with the Service. Existing sand dunes may serve as visual barriers. Signage will be placed along a roped or fenced buffer zone around habitat adjacent to construction activities. Signs will show pictures of snowy plovers, their nests, and warn workers of their potential presence. The Service-approved monitor will be onsite during the nesting season, and required to provide environmental training to all construction workers prior to their starting work.

4. For work conducted during the non-nesting season, a qualified biologist will evaluate the nature and extent of wintering plover activity in the project area several days prior to construction and inform Cal-Am so they can make construction decisions that avoid or minimize disturbance to plovers. The biologist will conduct periodic monitoring during construction to ensure that minimization measures are implemented to avoid or minimize disturbance to plovers. The Service-approved monitor will be onsite during the nesting season and required to provide environmental training to all construction workers prior to their starting work.
5. Cal-Am will restore all temporarily affected potential snowy plover habitat following construction.
6. Anti-perching devices, such as bird spikes or wire strips, will be installed and maintained on the top of the proposed electrical control enclosures to discourage potential plover predators.
7. Permanent loss of western snowy plover habitat will be compensated, at a minimum ratio of 3:1 through actions to enhance existing degraded habitat according to one of the following approaches, or a combination thereof:
 - a. Prior to project implementation, Cal-Am will prepare a HMMP. The plan will include actions to benefit western snowy plovers, in conjunction with providing mitigation for special-status plants. The plan will be subject to Service input and approval. It will describe restoration methods that may include, but not be limited to, removal of ice plant and planting, seeding, or other means of re-establishing native plant species. Cal-Am will identify and secure access rights and other approvals to implement the plan, and will execute the plan. Cal-Am will conduct, or will support a qualified third party monitor to conduct annual monitoring of restoration performance measures, such as cover, density and diversity of native plant species, thresholds of non-native plant abundance, and stability of dune sands.
 - b. Alternatively, and also subject to USFWS input and approval, in lieu of undertaking restoration actions described above, Cal-Am may contribute funds to either a mitigation bank authorized to sell credits for western snowy plover habitat or dunes scrub vegetation, or to an existing restoration program in areas where recreational effects on plovers are adequately managed. Sites where recreation may adversely affect plovers should not be considered suitable mitigation sites for western snowy plovers unless management is improved.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the rangewide conditions of the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly, the factors responsible for those conditions, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the conditions of the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly in the Action Area, the factors responsible for those conditions, and the relationship of the Action Area to the survival and recovery of the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly; (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 the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the Action Area, on the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly.

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 the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, and Smith's blue butterfly, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the Monterey spineflower, California tiger salamander, California red-legged frog, western snowy plover, Monterey gilia, Yadon's piperia, Menzies' wallflower, or Smith's blue butterfly in the wild by reducing the reproduction, numbers, and distribution of these species.

Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of “destruction or adverse modification” was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.”

The “destruction or adverse modification” analysis in this biological opinion relies on four components: (1) the Status of Critical Habitat, which describes the rangewide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the Environmental Baseline, which analyzes the condition of the critical habitat in the Action Area, the factors responsible for that condition, and the value of the critical habitat in the Action Area for the conservation/recovery of the listed 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 and interdependent activities on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) Cumulative Effects, which evaluate the effects of future non-Federal activities that are reasonably certain to occur in the Action Area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.

For purposes of making the “destruction or adverse modification” determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the Action Area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the Action Area for the conservation/recovery of the listed species based on the Environmental Baseline analysis.

STATUS OF THE SPECIES AND THEIR CRITICAL HABITATS

Monterey spineflower

The Monterey spineflower was listed as a federally threatened subspecies on February 4, 1994 (59 FR 5499), and 11,055 acres of critical habitat were designated on January 9, 2008 (73 FR 1525). Information contained in this account was obtained primarily from the Monterey Spineflower (*Chorizanthe pungens* var. *pungens*) 5-Year Review (Service 2009a).

Monterey spineflower is a prostrate annual species in the buckwheat family (Polygonaceae). It has long, somewhat wiry branching stems supporting aggregates of small white to pinkish flowers. Seeds typically germinate after the onset of winter rains and plants can be found above ground as early as December (Fox et al. 2006). Flowering occurs from late March to June, depending on weather patterns, and seed is dispersed in mid-summer.

At the time of listing, Monterey spineflower in the Monterey Bay area was known from scattered populations along the immediate coast, in the Prunedale Hills at Manzanita Park, in the coastal and inland areas of former Fort Ord, and from historical collections described as east of Watsonville and near Mission Soledad in the Salinas Valley. Since its listing, additional populations of Monterey spineflower have been discovered in the Prunedale Hills of Monterey County and interior areas of Santa Cruz County.

Monterey spineflower is currently known to be extant in southern Santa Cruz and northern Monterey Counties. The distribution of Monterey spineflower extends from Santa Cruz County south along the Monterey Bay to the Monterey Peninsula. Two historical collections were made farther south, in southern Monterey County in 1935 and in northern San Luis Obispo County in 1842. The CNDDDB lists 29 extant occurrences of Monterey spineflower in this range (CNDDDB 2017). Populations also occur inland in Monterey County in the Prunedale Hills and at former Fort Ord. One population has also been located in the Soledad area of the Salinas Valley (Reveal and Hardham 1989, CNDDDB 2017).

As an annual species, Monterey spineflower responds strongly to annual precipitation patterns and amounts, resulting in large fluctuations in the population of plants visible above-ground from year to year. Many populations support large numbers of individuals (thousands or tens of thousands of plants) scattered in openings among the dominant perennial vegetation (CNDDDB 2017).

Researchers recently investigated the phylogenetic relationships of various members of the genus *Chorizanthe*, subsection *Pungentes*, including Monterey spineflower (Brinegar 2006, Baron and Brinegar 2007, Brinegar and Baron 2008). Results from the first phase of the molecular study, using ribosomal DNA internal transcribed spacer (ITS) sequencing, indicate that Monterey spineflower and robust spineflower appear to be more closely related to one another than to the other subspecific taxa in the *C. pungens* and *C. robusta* complex. In a second phase of analysis, researchers sequenced chloroplast DNA to determine if it was possible to further differentiate

Monterey spineflower from robust spineflower based on these genetic techniques. Results indicated that: (1) there is a general agreement between the results of the ITS sequencing and the chloroplast DNA phylogenies for the *C. pungens*/*C. robusta* complex, while results for the other *Pungentes* taxa are often inconsistent with their position in the ITS-based phylogeny; (2) there is a general biogeographical pattern to this phylogeny with regard to the *C. pungens*/*C. robusta* complex; and (3) there is genetic diversity between populations of Monterey spineflower. While the researchers suggest that a taxonomic revision of the *Pungentes* complex may be in order, no changes are being proposed at this time (S. Baron, botanic consultant, in litt. 2008).

Monterey spineflower readily grows where suitable sandy substrates occur and, like other *Chorizanthe* species, where competition with other plant species is minimal (Harding Lawson Associates 2000; Reveal 2001). Studies of the soil requirements and shade tolerances of a related taxon, Scotts Valley spineflower (*Chorizanthe pungens* var. *hartwegiana*), concluded that this taxon is restricted to openings in sandy soils primarily due to its intolerance of shade produced by competing vegetation, rather than its restriction to the specific soil type (McGraw and Levin 1998).

Where Monterey spineflower occurs within native plant communities, along the coast as well as at more interior sites, it occupies microhabitats found between shrubs where there is little cover from other herbaceous species. In coastal dune scrub, shifts in habitat composition caused by patterns of dune mobilization that create openings suitable for Monterey spineflower are followed by stabilization and successional trends that result in increased vegetation cover over time (Barbour and Johnson 1988). Accordingly, over time there are shifts in the distribution and size of individual colonies of Monterey spineflower found in the gaps between shrub vegetation.

Human-caused disturbances, such as scraping of roads and firebreaks, can reduce the competition from other herbaceous species and consequently provide favorable conditions for Monterey spineflower, as long as competition from other plant species remains minimal. This has been observed at former Fort Ord, where Monterey spineflower occurs along the margins of dirt roads and trails and where it has colonized disturbances created by military training (Corps 1992, BLM 2003). However, such activities also promote the spread and establishment of nonnative species, can bury the seedbank of Monterey spineflower, and do not result in the cycling of nutrients and soil microbial changes that are associated with some large-scale natural disturbances, such as fires (Stylinski and Allen 1999, Keeley and Keeley 1989).

The primary threats to the Monterey spineflower identified at the time of listing were development for human uses, recreation, and encroachment of invasive nonnative species into its habitat. While these are still occurring and diminishing occurrences of Monterey spineflower, other lands that support this taxon have been purchased by conservation-oriented organizations and are preserved (e.g., Long Valley in the Prunedale Hills) or have the potential for long-term preservation (e.g., Caltrans lands). Within its range, numerous occurrences are on lands being restored or enhanced (e.g., State Beaches, Naval Post-Graduate School) or are planned for restoration and enhancement (e.g., former Fort Ord). A primary component of these programs is

the removal of nonnative invasive species that compete with Monterey spineflower. Monterey spineflower appears able to recolonize sites where nonnative species have been removed (Service 2009a).

Recovery of Monterey Spineflower

The Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan (Service 1998a) outlines recovery criteria for Monterey spineflower. Monterey spineflower can be considered for delisting when the following criteria have been met:

1. The Fort Ord disposal and reuse process has led the management agencies to develop, fund, and implement permanent protection plans for the species' habitat including permanent iceplant suppression programs; and
2. Beach-dune occurrences on State Park and private lands throughout its current range from Santa Cruz to the Monterey Peninsula are covered under a permanent protection plan. Plans to conserve roughly 60 percent of Fort Ord appear sufficient for recovery of the interior occurrence. A reassessment would be made should plans call for conservation of less habitat. Existing management along the coast at the State Parks units needs to be supplemented with protection and management on private lands (management to be determined after a thorough analysis of the beach populations).

California tiger salamander

The Service recognizes three distinct populations of the California tiger salamander: one in Sonoma County; one in northern Santa Barbara County; and the one under consideration in this biological opinion in central California. On September 21, 2000, the Service listed the Santa Barbara County distinct population segment of the California tiger salamander as endangered (65 FR 57241). On March 19, 2003, the Service listed the Sonoma County distinct population segment of the California tiger salamander as endangered (68 FR 13497). On August 4, 2004, the Service published a final rule listing the California tiger salamander as threatened range-wide, including the previously identified Sonoma and Santa Barbara distinct population segments (69 FR 47212). On August 19, 2005, U.S. District Judge William Alsup vacated the Service's downlisting of the Sonoma and Santa Barbara populations from endangered to threatened. Thus, the Sonoma and Santa Barbara populations are listed as endangered, and the central California population is listed as threatened.

The central California tiger salamander is endemic to the grassland community found in California's Central Valley, the surrounding foothills, and coastal valleys (Fisher and Shaffer 1996). The distribution of breeding locations of this species, and the other two distinct populations, does not naturally overlap with that of any other species of tiger salamander (Loredo et al. 1996, Petranksa 1998, Stebbins 2003).

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches total length, and females averaging about 6.8 inches in total length. For both sexes, the average snout-to-vent length is approximately 3.6 inches (65 FR 57241). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Loredo and Van Vuren 1996).

Historically, natural ephemeral vernal pools were the primary breeding habitats for California tiger salamanders (Twitty 1941, Fisher and Shaffer 1996, Petranksa 1998). However, with the conversion and loss of many vernal pools through farmland conversion and urban and suburban development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Fisher and Shaffer 1996, Robins and Vollmar 2002).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them (Trenham and Shaffer 2005). The upland component of California tiger salamander habitat typically consists of grassland and/or savannah, but also includes scrub or chaparral habitats (Shaffer et al. 1993, 65 FR 57241). Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels (*Otospermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925, Loredo and Van Vuren 1996, Trenham 1998). Burrow habitat created by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo et al. 1996). Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001). California tiger salamanders cannot dig their own burrows, and as a result, their presence is associated with burrowing mammals (Seymour and Westphal 1994). Active ground-burrowing rodent populations likely are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time (69 FR 47212). Loredo et al. (1996) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals.

California tiger salamanders have been found in upland habitats various distances from aquatic breeding habitats. During a mark and recapture study in the Upper Carmel River Valley in Monterey County, Trenham et al. (2000) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake in Solano County, Trenham and Shaffer (2005) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond. In a trapping study in Contra Costa County (Orloff 2011), most California tiger salamanders were trapped at least 2,600 feet from the nearest breeding pond and some were captured as far as 7,200 feet from the nearest breeding pond.

Adults enter breeding ponds during fall and winter rains, typically from October through February (Storer 1925, Loredó and Van Vuren 1996, Trenham et al. 2000). Males migrate to the breeding ponds before females (Twitty 1941, Shaffer et al. 1993, Loredó and Van Vuren 1996, Trenham 1998). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredó and Van Vuren 1996, Trenham 1998).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925, Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994). The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 0.5 to 0.6 inch in total length (Petranka 1998). The larvae are aquatic. Each is yellowish gray in color and has a broad, plump head; large, feathery external gills; and broad dorsal fin that extends well onto the back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (Anderson 1968). Larger larvae have been known to consume smaller tadpoles of tree frogs (*Pseudacris* spp.) and California red-legged frogs (*Rana draytonii*) (Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems.

The larval stage of the California tiger salamander usually lasts 3 to 6 months, because most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during April varied from 1.9 to 2.3 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988, Pechmann et al. 2001). The larvae perish if a site dries before they complete metamorphosis (Anderson 1968, Feaver 1971). Pechmann et al. (2001) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders.

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925, Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Loredó et al. 1996). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland et al. 1990).

We do not have data regarding the absolute number of California tiger salamanders due to the fact that they spend most of their lives underground. Virtually nothing is known concerning the historical abundance of the species. At one study site in Monterey County, Trenham et al. (2000) found the number of breeding adults visiting a pond varied from 57 to 244 individuals. A Contra Costa County breeding site approximately 124 miles north of the Trenham et al. (2000) study site in Monterey County showed a similar pattern of variation, suggesting that such fluctuations are typical (Loredo and Van Vuren 1996). At the local landscape level, nearby breeding ponds can vary by at least an order of magnitude in the number of individuals visiting a pond, and these differences appear to be stable across years (Trenham et al. 2001).

Lifetime reproductive success for California tiger salamanders is typically low. Less than 50 percent breed more than once (Trenham et al. 2000). In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4 or 5 years of age. Combined with low survivorship of metamorphs (in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998)), low reproductive success limits California tiger salamander populations. Because of this low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Based on metapopulation theory (Hanski and Gilpin 1991), factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for dispersing individuals to replenish the population further threaten the survival of a local population.

The California tiger salamander is threatened primarily by the destruction, degradation, and fragmentation of upland and aquatic habitats, primarily resulting from the conversion of these habitats by urban, commercial, and intensive agricultural activities. Additional threats to the species include hybridization with introduced nonnative barred tiger salamanders (*A. tigrinum mavortium*), destructive rodent-control techniques (e.g., deep-ripping of burrow areas, use of fumigants), reduced survival due to the presence of mosquitofish (*Gambusia affinis*) (Leyse and Lawlor 2000), and mortality on roads due to vehicles. Disease, particularly chytridiomycosis and ranaviruses, and the spread of disease by nonnative amphibians, are discussed in the listing rule as an additional threat to the species.

Recovery of the California Tiger Salamander

The strategy of the Recovery Plan for the Central California Distinct Population Segment (DPS) of the California Tiger Salamander (Service 2017) focuses on alleviating the threat of habitat loss and fragmentation in order to increase population resiliency (ensure each population is sufficiently large to withstand stochastic events), redundancy (ensure a sufficient number of populations to provide a margin of safety for the species to withstand catastrophic events), and representation (conserve the breadth of the genetic makeup of the species to conserve its adaptive capabilities). Recovery of this species can be achieved by addressing the conservation of remaining aquatic and upland habitat that provides essential connectivity, reduces fragmentation, and sufficiently buffers against encroaching development and intensive agricultural land uses. Appropriate management of these areas will also reduce mortality by addressing non-habitat

related threats, including those from non-native and hybrid tiger salamanders, other non-native species, contaminants, disease, and road mortality. Research and monitoring should be undertaken to determine the extent of known threats, identify new threats, and reduce threats to the extent possible.

The recovery strategy is intended to establish healthy, self-sustaining populations of Central California tiger salamanders through the protection and management of upland and aquatic breeding habitat, as well as the restoration of aquatic breeding habitat where necessary. It also ensures habitat management and monitoring and the conducting of research. Due to shifting conditions in the ecosystem (e.g., invasive species, unforeseen disease, climate change, and effects from future development and conversion to agriculture), the Service anticipates the need to adapt actions that implement this strategy over time. The recovery strategy ensures that the genetic diversity of the Central California tiger salamander is preserved throughout the DPS to allow adaptation to local environments, maintenance of evolutionary potential for adaptation to future stresses, and reduction in the potential for genetic drift and inbreeding to result in inbreeding depression.

The range of the Central California tiger salamander has been classified into four recovery units (Service 2017). These recovery units are not regulatory in nature; the boundaries of the recovery units do not identify individual properties that require protection, but they are described solely to facilitate recovery and management decisions. The recovery units represent both the potential extent of Central California tiger salamander habitat within the species' range and the biologically (genetically) distinct areas where recovery actions should take place that will eliminate or ameliorate threats. All recovery units must be recovered to achieve recovery of the DPS.

The four recovery units have been further subdivided into Management Units (Service 2017). These subdivisions of recovery units are areas that might require different management, that might be managed by different entities, or that might encompass different populations. In the recovery plan, the management units are primarily administrative in that they serve to organize the recovery units into separate and approximately equal areas that will assist in managing the implementation of the recovery actions.

California red-legged frog

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 FR 25813). We issued a recovery plan for the California red-legged frog in 2002 (Service 2002), and designated critical habitat for the species on March 17, 2010 (75 FR 12816). A detailed description of the California red-legged frog can be found in Storer (1925), Jennings and Hayes (1994), and Stebbins (2003).

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 (Storer 1925; Jennings and Hayes 1985; Shaffer et al. 2004). The species has sustained a 70 percent reduction in its geographic range as a result of several factors acting singly or in combination (Davidson et al. 2001).

The California red-legged frog uses several habitat types, including various aquatic systems, riparian, and upland habitats. The species has been found at elevations that range from sea level to about 5,000 feet. Populations persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 28 inches) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). California red-legged frogs spend considerable time resting and feeding within dense riparian vegetation; the moisture and camouflage provided by the riparian plant community provide good foraging habitat and riparian vegetation provides cover during dispersal (Rathbun et al. 1993). Access to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution. Diet analyses (Bishop et al. 2014) indicate the importance of upland areas for foraging California red-legged frogs, with 82-100% of prey coming from terrestrial sources.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites; Bulger et al (2003) observed movements up to 2.2 miles. However, most California red-legged frogs are non-migrating individuals and typically remain within 250 feet of their aquatic site of residence) (Bulger et al. 2003). Rathbun et al. (1993) radio tracked several California red-legged frogs near the coast in San Luis Obispo County at various times between July and January; these frogs also stayed rather close to water and never strayed more than 85 feet into upland vegetation. Nine California red-legged frogs radio-tracked from January to June 2001, in East Las Virgenes Creek in Ventura County remained relatively sedentary as well; the longest within-channel movement was 280 feet and the farthest movement away from the stream was 30 feet (Scott 2002).

After breeding, California red-legged frogs often move from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders; downed trees; logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks; and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993; Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 30 inches may also provide habitat (61 FR 25813). This type of movement and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 19 inches, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1985), numerous locations in the species' historical range where these elements are well represented do not support California red-legged frogs. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be the introduction of non-native predators and competitors and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites, and diseases.

Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). 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 as well as competition or predation from non-native species including the bullfrog (*Rana catesbeiana*), catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*); and disease. Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Recovery of the California Red-legged Frog

The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002), which are based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The status of this species is considered within the smaller scale of recovery units as opposed to the overall range. These 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 will allow 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 California red-legged frogs.

Critical Habitat for the California red-legged frog

The Service first designated critical habitat for the California red-legged frog on March 13, 2001 (66 FR 14626). We revised the designation in a final rule published on March 17, 2010 (75 FR 12816). The final rule describes 48 separate units, encompassing approximately 1,636,609 acres, in 27 counties in California. The designation includes lands supporting those features necessary for the conservation of the California red-legged frog. In addition, the Service finalized a special rule pursuant to section 4(d) of the Act, associated with final listing of the California red-legged frog as threatened, for existing routine ranching activities (71 FR 19244). A detailed discussion of the history and methods used in developing critical habitat can be found in the final rule (75 FR 12816).

In accordance with section 3(5)(A)(i) of the Act and Federal regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat, we identified the physical or biological features (PBFs)³ essential to the conservation of the species which may require special management considerations or protection. Because not all life history functions require all the PBFs, not all areas designated as critical habitat will contain all of the PBFs. Based on our current knowledge of the life history, biology, and ecology of the California red-legged frog, we determined the California red-legged frog's PBFs to consist of: (1) aquatic breeding habitat; (2) aquatic non-breeding habitat; (3) upland habitat, and (4) dispersal habitat. Detailed descriptions of these PBFs can be found in the final rule (75 FR 12816). The following is a brief summary of the PBFs:

1. Aquatic breeding habitat consists of standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and manmade (stock) ponds, slow moving streams or pools within streams and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
2. Aquatic non-breeding habitat consists of the freshwater habitats as described for aquatic breeding habitat but which may or may not hold water long enough for the subspecies to complete the aquatic portion of its lifecycle, but which provide for shelter, foraging, predator avoidance, and aquatic dispersal habitat of juvenile and adult California red-legged frogs.
3. Upland habitat consists of upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of one mile in most cases (i.e., depending on surrounding landscape and dispersal barriers), including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for California red-legged frogs. Upland habitat should contain structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.

³ In older critical habitat rules we used the term "primary constituent elements (PCEs)" to describe those habitat features essential to conservation of the species. We refer to such features as PBFs throughout this biological opinion, but if you refer to the rules designating critical habitats you may find them referred to as PCEs.

4. Dispersal habitat consists of accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within one mile of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres in size, or other areas that do not contain those features identified in PBFs 1, 2, or 3 as essential to the conservation of the species.

Western Snowy Plover

The Service listed the Pacific coast population of the western snowy plover as threatened on March 5, 1993 (58 FR 12864). We designated critical habitat in 1999 (64 FR 68508 68544) and redesignated it in 2005 (70 FR 56970 57119). In 2012, we issued a revised critical habitat designation which included a change in taxonomic nomenclature (77 FR 36727 36869). We completed a 5-year status review in 2006 (Service 2006a), and issued a recovery plan in September 2007 (Service 2007).

The western snowy plover is a small shorebird in the family Charadriidae, a subspecies of the snowy plover (*Charadrius nivosus*). It is pale gray-brown above and white below, with a white collar on the hind neck and dark patches on the lateral breast, forehead, and behind the eyes. The bill and legs are black.

Western snowy plovers are primarily visual foragers, using the run-stop-peck method of feeding typical of most plover 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. They sometimes probe for prey in the sand and pick insects from low-growing plants (Service 2007, pp. 17-18).

The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. The main coastal habitats for nesting include sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries (Page and Stenzel 1981, p. 12; Wilson 1980, p. 23). Western snowy plovers nest less commonly on bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and gravel river bars (Wilson 1980, p. 9; Page and Stenzel 1981, pp. 12, 26; Powell et al. 2002, pp. 156, 158, 164; Tuttle et al. 1997, pp. 1-3).

Their nests consist of a shallow scrape or depression, sometimes lined with beach debris (e.g., small pebbles, shell fragments, plant debris, and mud chips). As incubation progresses, western snowy plovers may add to and increase the nest lining. Driftwood, kelp, and dune plants provide cover for chicks that crouch near objects to hide from predators. Because invertebrates often occur near debris, driftwood and kelp are also important for harboring snowy plover food sources (Page et al. 2009).

Along the west coast of the United States, 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. Fledging (reaching flying age) of late-season broods may extend into the third week of September throughout the breeding range (Service 2007, p. 11).

The approximate periods required for snowy plover nesting events are: 3 days to more than a month for scrape construction (in conjunction with courtship and mating), usually 4 to 5 days for egg laying, and incubation averaging 28.4 days in the early season (before May 8) to 26.9 days in the late season (Warriner et al. 1986, pp. 23-24). The usual clutch size is three eggs with a range from two to six (Page et al. 2009). Both sexes incubate the eggs, with the female tending to incubate during the day and the male at night (Warriner et al. 1986, pp. 24-25). Adult western snowy plovers frequently will attempt to lure people and predators from hatching eggs and chicks with alarm calls and distraction displays.

Western snowy plover chicks are precocial, leaving the nest with their parents within hours after hatching (Service 2007, p. 14). They are not able to fly for approximately 1 month after hatching; fledging requires 29 to 33 days (Warriner et al. 1986, p. 26). Broods rarely remain in the nesting area until fledging (Warriner et al. 1986, p. 28; Lauten et al. 2010, p. 10). Casler et al. (1993, p. 6) reported broods would generally remain within a 1-mile radius of their nesting area; however, in some cases would travel as far as 4 miles (pp. 11-12).

In winter, western snowy plovers are found on many of the beaches used for nesting, as well as 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 concentrate on sand spits and dune-backed beaches. Some also occur on urban and bluff-backed beaches, which they rarely use for nesting (Page et al. 1986, p. 148; Page and Stenzel 1981, p. 12). South of San Mateo County, California, wintering western snowy plovers also use pocket beaches at the mouths of creeks and rivers on otherwise rocky shores (Page et al. 1986, p. 148). Snowy plovers forage in loose flocks. Roosting snowy plovers will sit in depressions in the sand made by footprints and vehicle tracks, or in the lee of kelp, driftwood, or low dunes in wide areas of beaches (Page et al. 2009, Behavior). Sitting behind debris or in depressions provides some shelter from the wind and may make the birds more difficult for predators to detect.

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California (Service 2007, p. 21). In Washington, western snowy plovers formerly nested at five coastal locations (Washington Department of Fish and Wildlife 1995, p. 14) and at over 20 sites on the coast of Oregon (Service 2007, p. 24). In California, by the late 1970s, nesting western snowy plovers were absent from 33 of 53 locations with breeding records prior to 1970 (Page and Stenzel 1981, p. 27).

The first quantitative data on the abundance of western snowy plovers along the California coast came from window surveys conducted during the 1977 to 1980 breeding seasons by Point Reyes Bird Observatory (Page and Stenzel 1981, p.1). Observers recorded an estimated 1,593 adult western snowy plovers during these pioneering surveys. The results of the surveys suggested that the western snowy plover had disappeared from significant parts of its coastal California breeding range by 1980 (Service 2007, p. 27).

Breeding season and winter window survey data from 2005 to 2017 includes approximately 250 sites in Washington, Oregon, and California, with the majority of the sites located in California. In California, 1,807 western snowy plovers were counted during the 2016 breeding window survey, and 3,802⁴ western snowy plovers were counted during the 2016-2017 winter window survey (Arcata Fish and Wildlife Office (AFWO) 2016, 2017). Across the Pacific coast range, the 2016 breeding window survey estimated 2,284 western snowy plovers, and the 2016-2017 winter window survey estimated 4,214 western snowy plovers in Washington, Oregon and California (AFWO 2017). These numbers demonstrate that a large percentage of all western snowy plovers in the Pacific coast range were counted in California during both winter and breeding window surveys.

Historical records indicate that nesting western snowy plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California. The reasons for decline and degree of threats vary by geographic location; however, the primary threat was, and remains, habitat destruction and degradation. Habitat loss and degradation can be primarily attributed to human disturbance, urban development, introduced beachgrass (*Ammophila* spp.), and expanding predator populations (Service 2007, p. 33). Natural factors, such as inclement weather, have also affected the quality and quantity of western snowy plover habitat (58 FR 12865).

Recovery of the Western Snowy Plover

The primary objective of the recovery plan (Service 2007, p. vi) is to remove the Pacific coast population of 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 Pacific coast population 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 Pacific coast population of the western snowy plover would be considered for delisting when the following criteria have been met (Service 2007, p. vii):

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

⁴ This number likely includes wintering inland birds that are not part of the listed Pacific coast population.

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 plan.

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.
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.

Critical Habitat for the Western Snowy Plover

The current critical habitat designation (77 FR 36727) includes 60 units totaling 24,527 acres in Washington, Oregon, and California (Table 1). The physical and biological feature (PBFs) (77 FR 367474) of critical habitat for the western snowy plover include sandy beaches, dune systems immediately inland of an active beach face, salt flats, mud flats, seasonally exposed gravel bars, artificial salt ponds and adjoining levees, and dredge spoil sites, with:

1. Areas that are below heavily vegetated areas or developed areas and above the daily high tides;
2. Shoreline habitat areas for feeding, with no or very sparse vegetation, that are between the annual low tide or low water flow and annual high tide or high water flow, subject to inundation but not constantly under water, that support small invertebrates, such as crabs, worms, flies, beetles, spiders, sand hoppers, clams, and ostracods, that are essential food sources;
3. Surf- or water-deposited organic debris, such as seaweed (including kelp and eelgrass) or driftwood located on open substrates that supports and attracts small invertebrates described in PBF 2 for food, and provides cover or shelter from predators and weather, and assists in avoidance of detection (crypsis) for nests, chicks, and incubating adults; and
4. Minimal disturbance from the presence of humans, pets, vehicles, or human-attracted predators, which provide relatively undisturbed areas for individual and population growth and or normal behavior.

Table 1. Critical habitat designations by State (77 FR 36728)

State	Designation
Washington	4 units, totaling 6,077 acres
Oregon	9 units, totaling 2,112 acres
California	47 units, totaling 16,337 acres

Monterey Gilia

Monterey gilia was listed as a federally endangered subspecies on June 22, 1992 (57 FR 27848). Critical habitat has not been designated for this subspecies. Information contained in this account was obtained primarily from the Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*) 5-Year Review: Summary and Evaluation (Service 2008a).

Monterey gilia is an annual herbaceous plant in the phlox family (Polemoniaceae), endemic to the Monterey Bay and Peninsula dune complexes. Individual plants are less than 7 inches tall, with a basal rosette of leaves and white and purple funnel-shaped flowers. Fifteen known natural occurrences are distributed in discontinuous populations from Spanish Bay on the Monterey Peninsula north to Moss Landing. Monterey gilia is typically associated with sandy soils of dune scrub, coastal sage scrub, and maritime chaparral vegetation types in the coastal dunes of Monterey County, California. The species is thought to be primarily self-pollinating based on its stamens not protruding from the flower, no observations of pollinators, and very viable seed (Service 1998).

There are likely 24 currently extant occurrences of Monterey gilia; 7 occurrences were known at the time the subspecies was listed. Since listing, 11 additional inland occurrences of Monterey gilia have been located, 12 coastal occurrences have been located, and 5 occurrences have likely been extirpated. One occurrence was extirpated prior to listing. Although these inland occurrences may constitute a range extension from what was known at the time of listing, the overall range of the taxon is still limited. It is unclear as to where the range of the subspecies *Gilia tenuiflora* ssp. *arenaria* ends and the range of *Gilia tenuiflora* ssp. *tenuiflora* begins. There is an additional possibility that some cross-breeding is occurring on the boundary between these subspecies. Genetic analyses should be undertaken to confirm the limits of this species' range.

The primary threats to Monterey gilia are habitat destruction due to development and an increase in cover by invasive, nonnative plant species (which inhibits its ability to germinate and colonize). The interior sites are generally more at risk than coastal populations. The coastal populations of Monterey gilia on State Park lands are relatively more protected than interior sites at this time, although nonnative plant control is required at virtually all sites and repeated out-plantings have been necessary to maintain numbers and expand population areas. Because invasive species are a concern throughout the Monterey Bay region, it is likely that they pose a threat to Monterey gilia on private parcels in this area as well; however, little information is available regarding the status of occurrences on private lands along the coast.

The status of Monterey gilia since the time of listing has likely improved at some sites by virtue of current or planned management for conservation. Along the coast, acquisition of one private parcel by Big Sur Land Trust and management activities within the State Park units have been a benefit to the long-term conservation of the taxon. At inland sites, the current and future transfer of lands from former Fort Ord to the University of California and Bureau of Land Management will also potentially benefit the long-term conservation of the taxon; however, planned losses of habitat along the western edge of former Fort Ord via land transfers to local agencies for development, and likely future development of other private lands along the coast, will likely result in direct losses of populations, secondary impacts to a portion of the remaining populations, and increased fragmentation of remaining habitat (particularly between the coastal and inland populations). For all remaining populations, both coastal and inland, threats due to invasive species will persist and will likely require management in perpetuity (Bossard et al. 2000).

Recovery of Monterey Gilia

The immediate objective of the Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan (Service 1998) is to minimize the threats to the species and the habitats upon which they depend. The plan's primary objective is to delist taxa covered by the plan in a minimum of 20 years. This recovery plan includes recovery criteria for Monterey gilia.

Monterey gilia can be considered for delisting when habitat throughout its range in the Monterey Bay Dunes from Moss Landing to about Sand City, and from dunes in and near Asilomar State Park on the Monterey Peninsula, is protected from encroachment of non-native species, recreational activity (including off-road vehicles and horses), and development; restored to native vegetation at proper densities to allow natural colonization; monitored sufficiently to assure that local threats are spotted promptly; and has enough plants at enough locations within protected habitat to reasonably assure the viability of the species. Specific numbers at each location can be found in the recovery plan for the species.

Yadon's piperia

Yadon's piperia was listed as a federally endangered species on August 12, 1998 (63 FR 43100), and 2,117 acres of critical habitat was designated for the species on November 23, 2007 (72 FR 60409). Information contained in this account was obtained primarily from the *Piperia yadonii* (Yadon's Piperia) 5-Year Review (Service 2009b).

Yadon's piperia is a slender perennial herb in the orchid family (Orchidaceae). As in other orchids, germination of Yadon's piperia seeds probably involves a symbiotic relationship with a fungus. Following germination, orchid seedlings typically grow below ground for one to several years before producing their first basal leaves. Plants may produce only vegetative growth for several years, before producing flowers. In mature plants of Yadon's piperia, the basal leaves typically emerge sometime after fall or winter rains and wither by May or June, when the plant produces a single flowering stem. The blooming season of Yadon's piperia is fairly short; the

first flowers are dependent on age and/or tuber size and will open in late June with blooming completed by early August and fruits maturing from August to early October. The plant is dormant until the winter rains stimulate root and leaf bud development. Pollinators include nocturnal moths, bumblebees, and infrequently midges and mosquitoes (Doak and Graff 2001).

Yadon's piperia has been found in two primary habitat types: Monterey pine forest with an herbaceous, sparse understory; and ridges in maritime chaparral growing beneath dwarf Hooker's manzanita (*Arctostaphylos hookeri*) shrubs in shallow soils (Morgan and Ackerman 1990, Allen 1996, Doak and Graff 2001). In the Monterey pine forest habitat, the species grows through pine needle duff among sparse herbaceous vegetation. Yadon's piperia grows in filtered sun on soils (sandy, podzolic, or decomposed granite when associated with Monterey pine and manzanitas) with a shallow clay hard pan that becomes very dry during the flowering season. Overall, this species favors a well-drained sandy soil substrate with podzolic conditions; areas that retain moisture during the rainy season but are not subject to inundation (V. Yadon, Pacific Grove Museum of Natural History, in litt. 1997). In some Monterey pine forest locations, Yadon's piperia plants occur among dense stands of the non-native annual grass *Briza maxima* (quaking grass) (Doak and Graff 2001). In maritime chaparral habitat in northern Monterey County, plants grow on sandstone ridges where soils are shallow. They are commonly found under the edges of prostrate mats of Hooker's manzanita. Yadon's piperia can occur in some locations where disturbance has occurred in the past 10 to 15 years and continue to be affected by limited recreation, development, and landscaping, such as abandoned dirt roads or cut slopes created by road construction (Allen 1996). Like other orchid species, Yadon's piperia does not appear to be an early successional species but is able to colonize trails and road banks within dwarf maritime chaparral or Monterey pine forest once a decade or more has passed and if light and moisture regimes are favorable (Allen 1996; Yadon, in litt. 1997).

The center of distribution for Yadon's piperia is the Monterey Peninsula where plants are found throughout the larger undeveloped tracts of Monterey pine forest. To the north, the range of Yadon's piperia extends to the Los Lomas area, near the border of Santa Cruz County (Allen 1996; Yadon, in litt. 1997). Since preparation of the listing rule, Yadon's piperia has been found at one location south of the Monterey Peninsula near Palo Colorado Canyon in maritime chaparral (J. Norman, in litt. 1995). Yadon's piperia has been found only 4 to 6 miles inland (Allen 1996; Yadon, in litt. 1997) despite searches of lands farther east (Allen 1996). The final recovery plan lists five geographic areas important for recovery of the species: Monterey Peninsula, the interior of Monterey Peninsula, north County/Elkhorn/Prunedale, Point Lobos, and Palo Colorado Canyon.

The Pebble Beach Company funded intensive surveys for Yadon's piperia, focusing on the Monterey Peninsula in 1995 and beyond the Peninsula in western Monterey County in 1996. Yadon's piperia plants have been counted at known sites, approximately 346 acres, throughout the range of this species since 1990 (R. Morgan, in litt. 1992; Uribe and Associates, in litt. 1993; Norman, in litt. 1995; Allen 1996; Jones and Stokes 1996). During the 1995 surveys, the greatest concentrations of Yadon's piperia, approximately 57,000 plants, or 67 percent of all known plants, were found scattered throughout much of the remaining Monterey pine forest owned by

the Pebble Beach Company and the Del Monte Forest Foundation on the Monterey Peninsula (Allen 1996). About 8,500 of these plants were in designated open space areas (Allen 1996). Another 2,000 plants, 2 percent of all known, occurred on remnant patches of Monterey pine

forest in parks and open space areas of Pacific Grove and Monterey (Allen 1996, Jones and Stokes 1996). During a 2004 follow-up survey in known occupied habitat, 129,652 plants, a 240 percent increase from the previous surveys, were identified on lands owned by Pebble Beach Company (Zander Associates 2004).

East of the Monterey Peninsula, individuals were identified on or near the Monterey Peninsula Airport, but the population has been greatly reduced in certain areas of the airport (B. Leitner, in litt. 2001; CNDDDB 2016). More than 2,350 plants were identified at the Naval Postgraduate School/Navy Golf Course in Monterey where they continue to be discovered and are expanding due to management efforts (Greening Associates 1999). At the Former Fort Ord site, Yadon's piperia was only known to occur in the extreme northern and southern boundaries until surveys conducted in 2009 identified at least 340 flowering Yadon's piperia in 118 locations on approximately 47 acres (Service 2009b, Army 2011). The remaining populations occur on properties owned by the Pebble Beach Company, Del Monte Forest Foundation, U.S. Department of Defense, County of Monterey, City of Carmel, Monterey Peninsula Regional Park District, and an undetermined number of other private landowners (Jones and Stokes 1996). The largest populations occur on property owned and managed by the Pebble Beach Company (Jones and Stokes 1996). Several of the privately-owned populations continue to be threatened by development. Although some of the populations are protected from development, threats to their long-term survival include non-native species and recreational activities.

Inland to the north of the Monterey Peninsula, about 18,000 Yadon's piperia plants, or 21 percent of all known plants, have been found on the chaparral-covered ridges north of Prunedale (Allen 1996). South of the Peninsula, about 7,500 plants have been found on California Department of Parks and Recreation properties at Point Lobos Ranch (Big Sur Land Trust, in litt. 1997) and in a smaller parcel that is in private ownership. Considering the current abundance of Yadon's piperia in the remaining large tracts of Monterey Forest, this species probably occurred throughout the Peninsula when Monterey pine forests were much more extensive before urbanization.

South of Carmel Highlands, near Palo Colorado Canyon, 38 plants were observed in 1995. Plants were identified but not quantified on a return visit to the site in 2004. This site, in private ownership, was noted to be high-quality chaparral with a unique assemblage of species (CNDDDB 2016).

At the time of listing in 1994, habitat fragmentation and development were named as threats to Yadon's piperia. Much of the habitat fragmentation occurred in the past, however the potential for further fragmentation of the remaining populations continues to be a threat to the species.

Other threats to habitat for Yadon's piperia at the time of listing, and that continue, include competition from non-native plants, mowing of vacant properties, roadside maintenance and a fire directive requiring mowing within 6 to 8 inches of the ground surface of habitat along

roadways in the Pebble Beach area (M. Stromberg, in litt. 2002), the potential loss of viable habitat due to changes in vegetative structure within sites following fire suppression (Graff 2006), and loss of plants from potential improvement projects at the Monterey Peninsula Airport. Large portions of the existing population at the airport may be lost from proposed future projects.

Since the time of listing, the threat of development and habitat fragmentation has been reduced somewhat; in particular, some of the densest populations of Yadon's piperia on Monterey Peninsula have been set aside in designated open space areas by Pebble Beach Company and will likely not be developed in the future. In addition, plans are being developed to acquire populations of Yadon's piperia in the near future for conservation and they will receive an additional level of protection through implementation of management plans. Also since the time of listing, we have conducted extensive surveys and discovered additional populations, a wider species range, and higher numbers of individuals; however, a number of factors have been shown to reduce the reproductive potential of the species. Recent research has shown high rates of herbivory have significantly affected the populations of Yadon's piperia over time by reducing the ability of individual plants to survive and reproduce (Doak and Graff 2001). Research has also elucidated the importance of pollinators to achieving viable seed set, which is also crucial for long-term persistence (Doak and Graff 2001). Therefore, although the range is greater and the number of populations and individuals now known is higher than at the time of listing, threats including herbivory, disease, and low rates of seed set may be decreasing the long-term persistence of the species.

The Pebble Beach Company has County of Monterey approval to develop portions of the Del Monte Forest. Under their development plan, the Pebble Beach Company will preserve through conservation easements the largest, contiguous populations of Yadon's piperia including the upper Pescadero Canyon watershed and the Huckleberry Hill Natural Area.

Recovery of Yadon's piperia

The current recovery objective for Yadon's piperia is reclassification to threatened status. Further loss of existing plants and the species' habitat should be avoided, and threats to its survival should be eliminated. Recovery criteria will be revised and delisting criteria will be developed after management is underway and specific data become available relating to population size and viability, habitat requirements, and fragmentation effects (Service 2004).

Downlisting for Yadon's piperia can be considered when all of the following criteria have been achieved [summarized from the recovery plan (Service 2004)]:

1. Secure and protect areas throughout the present range of Yadon's piperia that contain populations of sufficient size to ensure the long-term survival and recovery of the species.

2. Protected areas are adequately maintained, such that encroachment by nonnative plants, excessive herbivory (from deer and rabbits), edge effects from road maintenance, fuel modification activities, or other threats do not directly or indirectly adversely affect Yadon's piperia and its habitat.
3. Results of monitoring activities have determined that the protected populations of Yadon's piperia are of adequate size to be self-sustaining and to ensure their long-term persistence. Because this species is a perennial that exhibits dormancy, spending an undetermined period underground between seed germination and emergence of first leaf aboveground, it is likely that a minimum of 10 to 15 years of monitoring will be needed in order to define a population trend.

The recovery priority number for Yadon's piperia is 2C. This number indicates that the taxon is a species that faces a high degree of threat and has a high potential for recovery. The "C" indicates conflict with construction or other development projects or other forms of economic activity.

Menzies' wallflower

Menzies' wallflower, was federally listed as endangered on June 22, 1992 (57 FR 27848). The information contained in this account was obtained primarily from the final rule for listing, the Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly (Service 1998), and the 5-year review for the species (Service 2008b).

There has been an important change in taxonomy (as described in the Jepson Manual (Price 1993)) since the species was listed. Menzies wallflower was listed in 1992 as a full species (*E. menziesii*) with no subspecies recognized. Subsequently, 3 subspecies have been recognized within the listed entity (*E. menziesii* ssp. *menziesii*, *E. menziesii* ssp. *eurekaense*, and *E. menziesii* ssp. *yadonii*) and an unlisted entity (which was formerly recognized as the full species *E. concinnum*) has been subsumed into *E. menziesii* as the subspecies *E. menziesii* ssp. *concinnum*. *E. menziesii* ssp. *concinnum* remains unlisted. See Service (2008b) for additional detail.

The distribution of *Erysimum menziesii* ssp. *eurekaense* extends from the mouth of the Mad River south approximately 12 miles to the southern tip of the Samoa Peninsula (North Spit) of Humboldt Bay (Pickart et al. 2000). A moderate sized occurrence is located on the Elk River Spit, and another small colony is located on the South Spit of Humboldt Bay. Ownership includes the Lanphere-Christensen Dunes Unit of the Humboldt Bay National Wildlife Refuge, City of Eureka, Bureau of Land Management, and various private owners.

Erysimum menziesii ssp. *menziesii* exhibits a very disjunct distribution in Monterey and Mendocino Counties (California Department of Fish and Game 2006). The Mendocino County population occupies the Ten Mile Dunes, extending from the Ten Mile River approximately 5.4 miles south nearly to Fort Bragg, and up to 0.5 mile inland. Virtually the entire distribution occurs within MacKerricher State Park, with a relatively small number of plants located on private property east of the park (Imper 2005 as cited in Service 2008b). Currently occupied

dunes within the park are estimated at about 240 acres (Maslach 2005 as cited in Service 2008b). By far the largest population, and greatest amount of habitat for *Erysimum menziesii* ssp. *menziesii*, occurs at MacKerricher State Park (Imper 2005 as cited in Service 2008b). In Monterey County, *Erysimum menziesii* ssp. *menziesii* is known from four isolated dune exposures on the west edge of the Monterey Peninsula, extending from Point Pinos about 5 miles south to Cypress Point. Populations are known or suspected extant, from north to south, at the former Point Pinos Coast Guard station/lighthouse (recently transferred to the City of Pacific Grove); Asilomar State Beach; the Spanish Bay dunes (largely intermingled in a golf course); and Signal Hill dunes (includes Signal Hill, Spyglass Hill Road, and Bird Rock Road sites reported by the California Natural Diversity Database (CNDDDB 2006).

The entire current and historical distribution of *Erysimum menziesii* ssp. *yadonii* occurs between the mouth of the Salinas River and the former Fort Ord military reservation, some 8 miles to the south (Dixon pers. comm. 2006 as cited in Service 2008b). The only two known extant, naturally-occurring sites are at Marina State Beach and the Cemex Property, which occupy a coastal strip of less than 3 miles on the west side of the City of Marina. Ownership includes the California Department of Parks and Recreation (Marina State Beach) and Cemex. The population at Marina State Beach has not been recently quantified; it qualitatively appears to be doing generally well, but with some threat due to erosion of occupied dune habitat (Palkovic in litt. 2018). The population at Cemex has not been recently quantified, but was qualitatively observed to be the largest and least impacted population of the subspecies at the time of the 5-year review (Service 2008b and references therein). In addition to the naturally-occurring sites, the Monterey Peninsula Regional Parks District established *E. m.* ssp. *yadonii* at their Marina Dunes Preserve, located between Marina State Beach and the Cemex Property, about 20 years ago; no current information is available on that population. The California Department of Parks and Recreation also introduced *E. m.* ssp. *yadonii* into the Fort Ord Dunes State Park, approximately 4 miles south of Marina State Beach; two populations were introduced and one of those is small but persisting (Palkovic in litt. 2018). *Erysimum menziesii* ssp. *yadonii* historically occurred at the Salinas River National Wildlife Refuge and the Martin Dunes property, which is managed by the Big Sur Land Trust. The population at the Salinas River National Wildlife Refuge has been extirpated, while the status of the Martin Dunes population is unknown (Service 2008b and references therein).

The habitat characteristics of the Monterey County populations of *Erysimum menziesii* are different than the northern California populations. The species is generally distributed in clusters or patches in both regions (Botanica Northwest Associates 1992 as cited in Service 1998b). In northern California, the species occurs in the northern foredune or dune mat community, on the flanks or crests of dunes, in open sand areas, on sparsely vegetated dunes, and in the borders of lupine scrub (Botanica Northwest Associates 1992 as cited in Service 1998b). The species can tolerate some sand movement. The associated vegetation community (sand-verbena - beach bursage series) is composed of low-growing suffrutescent (obscurely shrubby) perennial and

herbaceous species (Sawyer and Keeler-Wolf 1995). Common species are beach sagewort (*Artemisia pycnocephala*), dune goldenrod (*Solidago spathulata*), coast buckwheat (*Eriogonum latifolium*), sand verbena (*Abronia latifolia*), beach pea (*Lathyrus sp.*), and sand-dune bluegrass (*Poa douglasii*).

In Monterey, the species occurs on the coastal strand, close to the high tide line, but protected from wave action and in bluff scrub, and open sparsely vegetated dunes. On the coastal strand the species has high exposure to strong wind, salt spray, and occasional wave action from storms and high tides. The substrate is loose sand lacking in organic matter and minerals (Thomas Reid and Associates 1987 as cited in Service 1998). Associated species along the Monterey Peninsula include beach evening primrose (*Camissonia cheiranthifolia*), beach-bur (*Ambrosia chamissonis*), sea rocket (*Cakile maritima*), beach knotweed (*Polygonum paronychia*), sand verbena (*Abronia latifolia*) and iceplant. Monterey County populations are relatively free of the invasive European beachgrass.

Menzies wallflower usually flowers once then dies, although subspecies *yadonii* may flower twice (Service 2008b). Blooming typically occurs from March through April, although it may begin as early as late February. The species reproduces by seed and the seeds are dispersed by wind. *Erysimum menziesii* germinates after first rains in fall or early winter. The vegetative rosette stage of the life cycle can continue for up to 8 years, and flowering may be a function of rosette size (Pickart in litt. 1995 as cited in Service 1998). Seed production per plant is high and seedling survival to maturity is low.

Pollinators are bees, bumblebees, butterflies, and moths (Price 1986 as cited in Service 1998). The species is self-compatible; therefore, the reproduction of this species involves selfing and facultative outcrossing (Price 1986 as cited in Service 1998). The seeds are dispersed over time because they can remain attached after dehiscence (Pickart 1988 as cited in Service 1998). Current evidence suggests that the seed bank is contained in the old standing plants and that seed in the soil (sand) does not seem to persist (Carothers 1996 as cited in Service 2008b). Most seed dispersal is restricted to the immediate vicinity of the parent plants. Long distance dispersal of seed may occur by fragmentation of seed-bearing branches breaking off and tumbling with the prevailing wind.

The species is threatened by non-native species, industrial and residential development, and trampling by recreational users such as golfers, pedestrians, equestrians, hang-gliders, and off road vehicle users. The severity of disease threats is uncertain, however crucifer rust (*Albugo candida*), a fungus, has been the focus of a long-term study which is evaluating its effects on the population ecology of Menzies' wallflower. Deer herbivory continues to be a problem on the Monterey Peninsula, where restoration efforts have only been successful if individual plants are protected with cages.

Recovery of the Menzies' wallflower

The Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly (Service 1998, p. 89) established general downlisting criteria for all of the listed plants it addressed, including Menzies' wallflower. These criteria include: securing currently occupied habitat with long-term commitments and endowments for management; implementing management to address threats from invasive species, grazing, pedestrians, and off-road vehicles; monitoring to reveal the success of management actions; and, securing additional restored habitat areas with additional populations of the species and long-term commitments and endowments for management.

Service (1998, p. 91) further established delisting criteria for the Menzies' wallflower, which include: studies to better understand the species' life history so that population viability and responses to management can be predicted; protection of dune habitats from recreation, development, weeds, and predators; and, conservation of specific minimum numbers of populations and individuals within each subspecies.

Smith's blue butterfly

The Service listed the Smith's blue butterfly as endangered on June 1, 1976 (41 FR 22041 22044). Critical habitat was proposed on February 8, 1977 (42 FR 7972), but was not designated. The Service completed a recovery plan for the species on November 9, 1984 (Service 1984).

Smith's blue butterflies co-occur with buckwheat plants that grow in coastal dune, cliffside chaparral, coastal scrub, and coastal grassland communities from the mouth of the Salinas River in Monterey County to San Carpoforo Creek in northern San Luis Obispo County. The Smith's blue butterfly is dependent upon its host plant species, Seacliff buckwheat (*Eriogonum parvifolium*) and coast buckwheat (*Eriogonum latifolium*), during all life stages, except that adults may also feed on nectar from naked buckwheat (*Eriogonum nudum*).

Synchronous with peak flowering of its buckwheat hosts, adult Smith's blue butterflies emerge from their pupal cases for a single flight season extending from mid-June to early September. Adults live for about 1 week, during which time they locate mates, court, and copulate. Females oviposit singly in individual flower heads. Larvae hatch 4 to 8 days after oviposition and feed on buckwheat flowers as they grow and molt through five instars. Under natural conditions, pupation occurs from early August to mid-September (Arnold 1980, p. 54). The location where pupation occurs has not been adequately documented. Researchers have surmised that pupation occurs in the heads of flowers, adjacent to leaf or stem axils, in the duff, or several inches below the soil surface (Arnold 1980, p. 82). Larvae overwinter as pupae and emerge as adults the following flight season.

Like many other lycaenid butterflies, Smith's blue butterfly larvae are tended by ants during the third through fifth instars. The larvae produce a sugary secretion upon which the ants feed. In return, the ants are presumed to provide the larvae with protection from predation or parasitism. The importance of such ant associations to the Smith's blue butterfly is currently unknown.

In the northern portion of their range, Smith's blue butterflies occur at the Salinas River National Wildlife Refuge, in the Marina area (including Marina State Beach), on Fort Ord, and in the vicinity of Sand City (Service 2006, p. 42). In the southern portion of their range, Smith's blue butterflies occur in Carmel Valley (including occupied sites at Garland Ranch Regional Park, the Santa Lucia Preserve, and Palo Corona Regional Park) (Service 2006, pp. 6-10) and along the Big Sur coast, including at least 69 sites between Cooper Point (in Monterey County near the border of Andrew Molera and Pfeiffer Big Sur State Parks) and San Carpoforo Creek (in northern coastal San Luis Obispo County) (Arnold 2002, p. 1). The exact elevation range of the species is unknown and likely varies from north to south, but Smith's blue butterflies have been observed from near sea level to 2,300 feet and potential habitat occurs to approximately 2,500 feet in some locations (Arnold 1980, p. 50; Service 2003, p. 18).

There are no occupied Smith's blue butterfly localities found from just south of Sand City to the Carmel Highlands (i.e., an approximately 9 mile gap occurs within the range). Smith's blue butterflies are notably absent from the Monterey Peninsula, although, historically, they have been observed just to the north at the Naval Postgraduate School and the south at Point Lobos State Reserve. Thus, Smith's blue butterflies are found within two disjunct areas within their range; 1) a northern area of primarily dune habitats along Monterey Bay north of the Monterey Peninsula, and 2) a southern area of primarily scrub, chaparral, and grassland habitats of the Carmel Valley and Big Sur Coast south of the Monterey Peninsula (Service 2006, p. 6). Long-term monitoring has not occurred for any population of the Smith's blue butterfly. Most of our knowledge of the distribution of the Smith's blue butterfly is the result of singular observations made in the past 30 years. Therefore, the number, size, and persistence of colonies throughout the range of the species are poorly understood.

Several colonies of Smith's blue butterflies and some potential habitat are currently protected from at least some of the threats which led to its listing. Large amounts of land that have supported known colonies of the Smith's blue butterfly are owned and managed by resource agencies. Along the Monterey Bay, these areas include the Salinas River National Wildlife Refuge, Monterey State Beach, Marina State Beach, and the coastal portion of the former Fort Ord. Further south, several occupied localities and at least 574 acres of habitat have been confirmed in the Los Padres National Forest (Service 2003, p. 5).

Vegetation within the range of the Smith's blue butterfly is very dynamic, especially where stands of Seacliff buckwheat occur. Seacliff buckwheat seedlings depend upon disturbances such as landslides and other erosional features for the development of site conditions favorable for germination and establishment. Landslides and mass wasting are common along the Monterey coast and provide the disturbances required by Seacliff buckwheat; conversely, these geologic activities can also destroy existing stands of Seacliff buckwheat. The Smith's blue butterfly may benefit from some human disturbances when they mimic natural processes. The quality of habitat likely changes over relatively brief periods due to natural successional processes and, increasingly, due to the invasion of non-native plants. Over time, especially when disturbances are rare, stands of Seacliff buckwheat are likely to be displaced by larger native shrubs on all but the harshest sites.

The role of dynamic processes in creating and maintaining habitat for the Smith's blue butterfly is poorly understood. Most likely, Smith's blue butterflies abandon areas where Seacliff buckwheat is replaced by other vegetation. Adults would be expected to disperse and colonize new areas that contain adequate patches of host buckwheat plants. Arnold (1991, p. 5) found that the density and age class distribution of Seacliff buckwheat and coast buckwheat are important determinants for the establishment and persistence of Smith's blue butterfly populations in some locations. The Smith's blue butterfly has a wingspan of generally less than 1 inch and adult Smith's blue butterflies are not strong fliers; therefore, colonies may become isolated if suitable habitat is not available nearby for dispersal and colonization.

Threats to the Smith's blue butterfly exist at many of the sites that are protected from development pressures. Much of the species' habitat has been invaded and, in some cases overtaken, by invasive plants. At least 70 non-native plant species introduced during the past 200 years threaten habitat for the Smith's blue butterfly in both protected and unprotected areas throughout the sub-species' range.

The decline of the Smith's blue butterfly is attributed to degradation and loss of habitat as a result of urban development, recreational activities in dune habitats, sand mining, military activities, fire suppression in chaparral habitat, and encroachment of exotic plant species. Wildfire suppression increases the risk of large-scale, high-intensity wildfires and reduces the frequency of smaller fires. Smaller fires would be expected to create disturbances that favor establishment of Seacliff buckwheat plants; while large, high-intensity fires would be more likely to damage soils and destroy seed banks to the detriment of native plant communities. As a recent example, the 2008 Basin Complex fire burned approximately 19,424 acres of potential Smith's blue butterfly habitat. Fire intensity was variable and the effects of that fire on habitat have not been well documented, but the large size of the area burned creates concern about the ability of Smith's blue butterflies to recolonize the area. Aggressive, disturbance-oriented invasive plant species such as kikuyu grass (*Pennisetum clandestinum*), pampas grass (*Cortaderia jubata*), Cape ivy (*Delairea odorata*), and French broom (*Genista monspessulana*) are found on sites otherwise suitable for seacliff buckwheat and the Smith's blue butterfly. In sand dunes along Monterey Bay, non-native ice plant (*Carpobrotus* spp.) has covered hundreds of acres of formerly suitable habitat for the Smith's blue butterfly. The low vagility of adults, coupled with fragmentation of suitable habitat, reduce the probabilities of colonization events and migratory exchange between populations. Due to the lack of long-term monitoring, the status of the Smith's blue butterfly must be assessed largely based on the status of habitat for the species.

Urban development, recreational activities, and other activities continue to result in habitat loss and degradation. Urban development, introduction of invasive plant species and recreational use have fragmented and continue to fragment habitat for the Smith's blue butterfly. This fragmentation has several ramifications for the Smith's blue butterfly. The quality of the remaining suitable habitat is reduced, the distance dispersing adults must travel to reach the next

island of suitable habitat is increased, the entire metapopulation structure is potentially disrupted, and genetic diversity is reduced. Overall, groups of Smith's blue butterflies occupying smaller, more isolated stands of suitable habitat are more likely to be extirpated by stochastic or anthropogenic factors.

Recovery of the Smith's blue butterfly

The Smith's blue butterfly recovery plan was published in 1984 and is outdated. The recovery objectives in the plan focus on protection of those localities that were known when the plan was published. However, due to changes in our knowledge of the subspecies' range and the threats that it faces, the objectives are largely obsolete. The range is larger and shifted to the south, relative to what was understood in 1984, and several of the locations identified for protection in the recovery plan do not have suitable habitat or are outside the currently accepted range (Service 2003, pp. 20-22). Of the 18 locations identified for protection in the recovery plan (Service 1984, pp. 13-15), 3 are north of the currently accepted range (Service 1986) and 1 was likely misidentified, as it is at a higher elevation than any other occupied location and has no suitable habitat (Service 2003, pp. 20-22).

The general recovery needs of the Smith's blue butterfly include conserving and managing existing habitat, maintaining and improving connectivity between areas of habitat, and increasing the amount of occupied habitat through restoration efforts. The Smith's blue butterfly occurs in two disjunct areas and conservation of the subspecies in both will be necessary for recovery. Although the recovery plan is outdated, several of the recovery actions it identifies are still valid, including: (1) Revegetating existing blow-out areas with native plants and removing exotic plants; (2) Controlling off-road vehicle use of dunes; (3) Carrying out prescribed burns; (4) Iceplant and Holland dune grass eradication; and, (5) Developing public awareness.

ENVIRONMENTAL BASELINE

Action Area

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 Code of Federal Regulations 402.02). The Action Area for this biological opinion is the buffered footprint of all Project facilities as described in Table 2. This area totals approximately 150 acres spread over much of Monterey County between Castroville in the north and Carmel Valley in the south.

Cal-Am estimates that all effects of construction would be limited to the Project footprint plus a 50-foot buffer (to allow for limited effects of noise, dust, etc. on areas adjacent to the project footprint). The total (footprint plus buffer) areas of each project component are presented in Table 2 (adapted from AECOM 2018, pp. 2-26).

Table 2. Project Acreages by Component including a 50-foot Buffer.

Project Component	Total area (acres)
Intake Slant Wells	33.05
Source Water Pipeline	1.56
Desalination Plant	23.26
Desalinated Water Pipeline	11.12
Transmission Main Pipeline	36.20
Pipeline to CSIP Pond, Brine Discharge Pipeline combined area* of segments	7.15
Castroville Pipeline	28.25
ASR Wells	1.24
Carmel Valley Pump Station	0.90
Castroville Pipeline, Desalinated Water Pipeline, Source Water Pipeline – combined area* of these segments along Charles Benson Road	8.37
<i>Total</i>	151.10

*A combined area is given where pipelines run parallel for a given distance.

Habitat Characteristics of the Action Area

A detailed description of plant communities within the Action Area is provided in the biological assessment (AECOM 2018). Because of the long and largely linear nature of the project, it crosses many habitat types, including: woodland, chaparral, scrub, grassland, wetland, riparian, aquatic, barren, and developed areas. Much of the project has been proposed within existing disturbed areas, including the intake wells within a retired portion of an existing sand mine, the desalination plant in a fallow agricultural field, several Project components at the existing MRWPCA treatment plant, and pipeline routes that largely follow road right-of-ways.

Previous Consultations in the Action Area

Pipelines and ASR improvements proposed as parts of the Project would overlap the former Fort Ord Base. We issued biological opinions to the U.S. Army on October 19, 1993, March 30, 1999, March 14, 2005, and June 1, 2007, on the effects of their closure, cleanup, re-use, and disposal of the former base. These biological opinions addressed effects to the Smith's blue butterfly, western snowy plover, Monterey gilia, California red-legged frog, Monterey spineflower, and California tiger salamander. We determined that the proposed actions were not likely to jeopardize the continued existence of any of these species. The actions addressed in these biological opinions are ongoing, with large portions of the former base having been transferred to the Bureau of Land Management, California Department of Parks and Recreation, University of California, and several local jurisdictions and cleanup actions continuing on the remaining Army-administered lands.

Condition (Status) of the Species in the Action Area

Monterey spineflower

The Monterey spineflower occurs in high numbers throughout much of the Action Area, including on pipeline alignments containing sandy soils, sun exposure, and some stabilization. It is one of the dominant groundcover types within the new transmission main, source water pipeline, and desalinated water pipeline alignments, and scattered individuals were also found at the proposed desalination plant site. It has also been observed in disturbed areas, including erosion control slopes, lawns, and sidewalk plantings in areas adjacent to the Action Area. Densities of up to roughly 40,000 plants per acre were observed within 4.6 acres of the Action Area, for an approximate total of 184,000 plants. As an annual plant with a seed bank, abundance varies annually and the species also has the potential to occur in portions of the Action Area where it has not yet been observed during surveys.

California tiger salamander

California tiger salamanders have the potential to use coastal oak woodland, valley foothill riparian, and coastal scrub habitats within the Action Area as dispersal or upland habitat. Annual grasslands with small mammal burrows within the Action Area also provide suitable upland habitat, and numerous burrows were observed during field surveys. California tiger salamanders may use chaparral habitats as upland or dispersal habitat and these communities occur within the Action Area within dispersal range from potential breeding areas. Individuals may also move through irrigated field and row crop agricultural habitat within the Action Area to breeding ponds and upland habitats. The Action Area contains abundant suitable upland habitat for California tiger salamanders and there is a high potential for the species to occur along the new desalinated water pipeline, source water pipeline, brine discharge pipeline, and the pipeline to CSIP pond. There is also high potential for the species to occur around the proposed desalination plant site.

There is no high-quality breeding habitat in the Action Area, but it is possible that California tiger salamanders could breed in the portion of Tembladero Slough within the Action Area. Breeding habitat quality at Tembladero Slough is low due to high levels of intensive agricultural use and other disturbance in the surrounding area and periodic high flows through Tembladero Slough, which could wash out eggs.

California red-legged frog

There is suitable habitat for the California red-legged frog in portions of the Action Area, including aquatic breeding and upland habitats. Using the site assessment and survey protocol for the species (Service 2005), AECOM (2018) identified 14 potential aquatic breeding sites within 1 mile of the Action Area. They eliminated 7 sites as lacking in suitable breeding habitat and surveyed 2 sites without finding the species. The species is or may be present at the 5 remaining sites that were not surveyed (surveys were not possible due to private land access restrictions or

occupancy was assumed due to historical observations) or in upland areas adjacent to those sites. The 5 sites that do or may provide California red-legged frog habitat are Tembladero Slough, Neponset Road Pond (between Marina and Castroville and within 0.3 mile of portions of the Project footprint), the Desalination Plant Wetland (adjacent to the proposed desalination plant and near the Salinas River), the Salinas River, and the Carmel River (within 0.7 mile of the proposed Carmel Valley Pump Station). These aquatic habitats have potential to support breeding California red-legged frogs and individuals could move from them into terrestrial habitats of the Action Area. Oak woodlands, annual grasslands, and irrigated field and row crops adjacent to these aquatic breeding habitats may provide suitable dispersal or upland habitat for the species.

Western snowy plover

Western snowy plovers breed and overwinter in the sand dunes and adjacent beach at the Cemex Property. Western snowy plovers may be found in the barren sand, coastal scrub, and sand dune habitats at the Cemex Property near the proposed intake wells. The majority of nesting within and adjacent to the Action Area occurs on the beach and ocean-facing dune front west of the proposed intake wells (Point Blue Conservation Science 2017, Figure 2) (i.e., most nests would be screened from construction activities at the proposed intake wells by existing dunes). However, multiple nests have also been documented in interior dune portions of the Action Area (Point Blue Conservation Science 2017) that would be affected by the proposed intake wells. Most recently (2017), a western snowy plover nest was found in the southern portion of the area where the intake wells are proposed (Point Blue Conservation Science 2018, appendix 10), at the proposed well site 5.

Point Blue Conservation Science (as cited in AECOM 2018) noted that recent intense winter storms have caused the beach to become narrower and lower in elevation, reducing the available habitat for western snowy plovers. The loss of this beach habitat, which is expected to worsen with climate change, may cause western snowy plovers to utilize the Action Area more frequently than historically recorded (AECOM 2018).

Monterey gilia

The Monterey gilia occurs in a few small populations in the Action Area, in maritime chaparral and coastal scrub around the ASR pipelines and the new transmission main pipeline along General Jim Moore Boulevard. None of these populations are within the Project footprint, but overlap the buffer portions of the Action Area where plants could be affected by airborne dust (Laird in litt. 2018). Additional appropriate habitat, consisting of coastal scrub, maritime chaparral, and cismontane woodlands on modified old dunes, is found throughout the Action Area within areas that include the new desalinated water pipeline, Castroville pipeline, and source water pipeline alignments. Potential habitat is also found in the coastal dunes at the site of the proposed intake slant wells. AECOM (2018) concluded that there is a low to moderate potential for additional populations of Monterey gilia to be found in these sections of the Action Area, as it may (like many annual species) spend years dormant in the seed bank, then germinate

following a disturbance, or when specific environmental conditions are suitable. However, Monterey gilia was not detected in these areas during surveys within its flowering period in 2014, 2015, and 2016. Monterey gilia was found flowering at a site visit to a nearby reference population⁵ in May 2016 (AECOM 2018).

Yadon's piperia

AECOM (2018) concluded that Yadon's piperia has a moderate potential to occur within the Action Area. It was not observed in surveys conducted from 2014 to 2016, and at least one survey per year was conducted during its flowering period. It was found flowering during a visit to a reference population in June 2016. Marginally suitable closed-cone coniferous forest dominated by Monterey pines is found in patches throughout the Action Area. However, these tree stands were likely planted or naturalized, and are not part of the natural Monterey pine forests on the Monterey Peninsula, where Yadon's piperia is primarily found. Patches of suitable maritime chaparral habitat also occur throughout much of the Action Area, but this species was not observed in those areas during surveys, and no records of Yadon's piperia have previously been reported within them (AECOM 2018). As discussed in the status of the species section, Yadon's piperia may grow underground for several years before flowering and could therefore be present in portions of the Action Area where it could not be observed in surveys.

Menzies' wallflower

Suitable coastal dune habitat for Menzies' wallflower is only found within the Action Area in the vicinity of the proposed intake slant wells. AECOM (2018) concluded that the species has a moderate potential to occur within the Action Area. Menzies' wallflower populations (subspecies *yadonii*) are known extant within portions of the Cemex Property north of the Action Area and on Marina State Beach to the south of the Action Area (Service 2008b) and the population of unknown status on Monterey Peninsula Regional Parks property (as mentioned in the Status of the Species) is/was approximately 0.2 mile south of the proposed intake well site 5. Menzies' wallflower was not observed by AECOM biologists in surveys of the Action Area conducted from 2014 to 2016, and at least one survey per year was conducted during its flowering period. It was found flowering during visits to reference populations at Marina State Beach in April of 2014, May of 2015, and April 2016. Occupied habitats at Marina State Beach are similar to the coastal dunes at the proposed intake slant wells. As discussed in the Status of the Species section, Menzies wallflower is not thought to have a persistent underground seedbank, but seed may be dispersed by wind. Thus, the species may be found in the Action Area if: 1) it is currently present but was missed during 2014-2016 surveys; or, 2) suitable but currently unoccupied habitat is colonized by wind-dispersed seed during the life of the Project.

⁵ A reference population, also known as a reference site (see California Department of Fish and Game 2009, p. 4), is a population that is known to be extant at a known location and can be surveyed to confirm that a plant species is identifiable at the time of a survey. Thus, if a plant species is observed in a reference population, but is not observed at a nearby survey site, the negative survey results are more reliable.

Smith's blue butterfly

Numerous occurrences of the Smith's blue butterfly have been recorded within the Action Area (AECOM 2018). Appropriate vegetation types for the species are present throughout most of the Action Area. AECOM's (2018) field surveys revealed Smith's blue butterfly food plants (coast buckwheat and seacliff buckwheat) in coastal scrub and mixed chaparral habitat in the Action Area at Fort Ord Dunes State Park, along Del Monte Boulevard in the city of Marina and community of Neponset, and at the Cemex Property. Surveys for host plants within the Action Area are incomplete due to access and time constraints and specific surveys for the Smith's blue butterfly were not conducted for the biological assessment. There are no known occupied localities of the species within the Action Area east of California Highway 1; there are known occupied localities at Fort Ord Dunes State Park and at the Cemex Property.

Recovery

Monterey spineflower

The Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan (Service 1998, pp. 90-91) indicates that the Monterey spineflower can be considered for delisting when permanent protection plans are developed, funded, and implemented to protect the species' habitat within the former Fort Ord, California State Parks, and private lands throughout its current range. Service (1998) indicates that the proposed conservation strategy (Corps 1997) for base re-use of the former Fort Ord appears adequate to conserve the interior occurrences of the Monterey spineflower. Service (1998) also indicates that coverage of beach and dune populations of the Monterey spineflower, on California State Parks and private land, under a permanent management plan is necessary for recovery of the species. Occurrences of Monterey spineflower within the Action Area are at both dune and interior locations.

California tiger salamander

The Action Area is within the Central Coast Range Recovery Unit and overlaps both the Fort Ord and Carmel Valley Management Units for the California tiger salamander (Service 2017, p. V-6). Some habitat protection has occurred within the Central Coast Recovery Unit; however, most populations are not protected and have not been monitored for population status, trends, and threats. The primary threat to populations within this recovery unit is hybridization with non-native tiger salamanders. Maintaining the genetic integrity of Central California tiger salamanders within this recovery unit is a priority. The recovery target for the Fort Ord Management Unit is to designate at least two preserves that protect at least 6,796 acres of habitat for the species. The recovery target for the Carmel Valley Management Unit is to designate at least three preserves that protect at least 10,194 acres of habitat for the species.

California red-legged frog

The Action Area is within Recovery Unit 5 (Central Coast) and overlaps the southern end of Recovery Core Area 19 (Watsonville Slough-Elkhorn Slough; Salinas River-Pajaro River)⁶ and the northern end of Recovery Core Area 20 (Carmel River-Santa Lucia) for the California red-legged frog (Service 2002). Core areas 19 and 20 were designated because they are currently occupied by the species, provide connectivity between occupied areas, and are inhabited by stable populations that may provide dispersing individuals that colonize other areas.

Western snowy plover

The Action Area overlaps recovery unit 4, which extends along the coast of California from Sonoma through Monterey Counties, exclusive of the San Francisco Bay (which constitutes recovery unit 3). The Cemex Property (formerly known as Lone Star beach), including the area where the proposed intake wells would be constructed, is identified as an important breeding area for the western snowy plover, with a management potential to support 32 breeding adults (Service 2007, appendix B).

Monterey gilia

The Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan (Service 1998) identifies general recovery measures to secure, manage, monitor, and restore habitat for all of the endangered plant species it addresses; these measures must be met to allow downlisting of the species to threatened. Service (1998) further identifies delisting criteria for Monterey gilia, which include management of 12 specific sites (as identified in the California Natural Diversity Database (CNDDDB)) to protect populations of specified sizes to assure viability of the species. Of those 12 populations, only 1 (CNDDDB occurrence number 21) overlaps the Action Area. Service (1998) prescribes management of CNDDDB occurrence number 21 for a minimum of 1,000 individual plants.

Yadon's piperia

The Recovery Plan for Five Plants from Monterey County, California (Service 2004) identifies 5 areas where self-sustaining populations of Yadon's piperia should be maintained to allow downlisting of the species. Linear portions of the project area run north-south inland of the Monterey Peninsula and overlap Area 2 as identified in Service (2004). Service (2004) indicates that at least 3 populations of the species should be protected within Area 2. Surveys (AECOM 2018) did not detect Yadon's piperia within the Action Area, but potentially suitable habitat would be affected and this habitat would be within Area 2.

⁶ Recovery Core Area 19 is named inconsistently in the California red-legged frog recovery plan (Service 2002). The map on page 51 names it as "Watsonville Slough-Elkhorn Slough" while the text on page 55 names it as "Salinas River-Pajaro River". The mapping on page 51 and the text on page 55 are both correct and some or all of all four drainages are encompassed within the core area; only the names are inconsistent.

Menzies' wallflower

The Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan (Service 1998) identifies general recovery measures to secure, manage, monitor, and restore habitat for all of the endangered plant species it addresses; these measures must be met to allow downlisting of the species to threatened. Service (1998) further identifies delisting criteria for Menzies' wallflower, which include protection of occupied dune systems from impacts due to recreation, invasive weeds, and development. The Action Area only overlaps the range of subspecies *yadonii*. Service (1998) indicates that, to allow delisting of the species, management of subspecies *yadonii* must allow for: 1) continued occupancy throughout its current range, 2) the persistence of at least 3 populations with at least 300 individuals, and, 3) the persistence of at least 2 populations with at least 5000 individuals. Additional criteria for other subspecies would also need to be met to allow delisting of the species.

Smith's blue butterfly

The general recovery needs of the Smith's blue butterfly include conserving and managing existing habitat, maintaining and improving connectivity between areas of habitat, and increasing the amount of occupied habitat through restoration efforts. Habitat management and restoration activities are ongoing at Fort Ord Dunes State Park (Corps 1997).

Condition (Status) of Critical Habitat in the Action Area

California red-legged frog

Critical habitat for the California red-legged frog is present within the Action Area only at the proposed Carmel Valley pump station and the site of the Hidden Hills interconnection improvements (AECOM 2018). These Project components overlap critical habitat unit MNT-2. No aquatic habitat (PBFs 1 or 2) would be affected in these areas. Upland (PBF 3) and dispersal (PBF 4) habitat are present at the proposed Carmel Valley pump station site. Hidden Hills interconnection improvements would be implemented within existing developed areas (booster stations and roadways); at best, the roadways could possibly serve as dispersal habitat, but no other PBFs are present.

Western snowy plover

Critical habitat for the western snowy plover is present within the Action Area only on its seaward edge at the site of the existing MRWPCA ocean outfall. All four PBFs are present in this area. The proposed replacement of seals within the existing outfall would affect a small portion of critical habitat unit CA 22.

EFFECTS OF THE ACTION

Effects of the Proposed Action on the Monterey spineflower

The Proposed Action is likely to cause disturbance of habitat and mortality of Monterey spineflowers through vegetation clearing, grading, and trenching. Construction activities would also mobilize dust, which could adversely affect Monterey spineflowers within the Action Area, but outside the Project footprint. We are aware of no studies of the effects of dust on the Monterey spineflower, but for other plant species dust has been shown to: decrease the amount of pollen received by flowers (Waser et al. 2017), reduce vegetative growth, block stomata, and damage leaves (Farmer 1993 and references therein). Monterey spineflower habitat would be permanently removed during construction of the proposed desalination plant, ASR wells, and associated above-ground infrastructure. Maintenance activities at the proposed intake well sites would result in ongoing habitat disturbance; maintained areas are included in the acreage permanently impacted, as described in the next paragraph.

AECOM (2018) indicated⁷ that 78.24 acres of potential habitat for the Monterey spineflower would be temporarily impacted during construction of the Project and an additional 17.29 acres would be permanently impacted (95.53 acres total). Field surveys of accessible areas revealed that 4.60 acres of this habitat are occupied. None of the 4.60 acres of occupied habitat would be permanently impacted. In summary, 95.53 acres of potential habitat for the Monterey spineflower would be impacted by the Project, of which at least 4.6 acres are currently occupied.

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently-destroyed habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the California tiger salamander

The only potential breeding habitat for the California tiger salamander within the Action Area is at the pipeline crossing of Tembladero Slough. The California tiger salamander primarily breeds in vernal pools and ponds and Tembladero Slough would be atypical breeding habitat if it were used by California tiger salamanders. As discussed regarding tidewater goby, we believe that the proposed avoidance measures will be sufficient to avoid adverse effects to species and habitats within Tembladero Slough. We therefore expect no adverse effects to California tiger salamander eggs or larvae.

Potentially occupied upland habitat for California tiger salamanders would be impacted by construction of the desalination plant and several of the associated pipelines. Clearing, grading,

⁷ Field surveys for listed plants were conducted throughout most of the Action Area and surroundings. Some areas were not surveyed due to access restrictions or time constraints. In addition to field surveys, AECOM (2018, section 5.2) modeled potentially suitable habitat for all species addressed in this biological opinion and overlaid the modeled habitat with the Action Area in a GIS. Field surveys generally found less occupied habitat than the modeled potential habitat. We therefore consider the modeled potential habitat impacted to be a good estimate of the maximum potential adverse effects of the proposed action by area, and generally expect the actual effects to the species to be smaller.

trenching, and construction activities could cause injury or mortality to the species if equipment or materials come into direct contact with California tiger salamander adults or juveniles. The most likely adverse effect is mortality of individual California tiger salamanders if they are dug up or crushed within small mammal burrows during trenching, grading, or construction activities. Construction activities would also generate temporary noise, vibration, and artificial light, which could cause disturbance of California tiger salamanders. Artificial lighting associated with construction activities could also facilitate increased predation of California tiger salamanders.

AECOM (2018) indicated that 35.04 acres of potential habitat for California tiger salamanders would be temporarily impacted during construction of the Project and an additional 14.73 acres would be permanently impacted (49.77 acres total).

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently-destroyed habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the California red-legged frog

The only potential breeding habitat for the California red-legged frog within the Action Area is at the pipeline crossings of Tembladero Slough and the Salinas River. As discussed regarding tidewater goby, we believe that the proposed avoidance measures will be sufficient to avoid adverse effects to species and habitats within Tembladero Slough and the Salinas River. We therefore expect no adverse effects to California red-legged frog eggs or larvae.

Construction of the desalination plant, Carmel Valley pump station, and associated pipelines would impact potential upland habitat for the California red-legged frog. Grading, and trenching in the Action Area would cause disturbance to upland habitat for California red-legged frogs. These actions could also cause California red-legged frog injury or mortality if individuals are present in upland habitat during construction. Construction activities would also generate temporary noise, vibration, and artificial light, which could cause disturbance of California red-legged frogs. Artificial lighting associated with construction activities could facilitate increased predation of California red-legged frogs.

AECOM (2018) indicated that 3.93 acres of potential habitat for the California red-legged frog would be temporarily impacted during construction of the Project and an additional 0.47 acre would be permanently impacted (4.40 acres total).

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently-destroyed habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the western snowy plover

Construction of the proposed intake wells and associated pipelines would result in temporary disturbance and permanent destruction of known occupied western snowy plover nesting habitat.

The intake wells have been sited within a previously-mined area behind the beach and foredunes at the Cemex Property, to minimize their effects on the species (which primarily uses the beach and ocean facing dune front at the Cemex Property). But suitable nesting habitat is present within the Action Area and nests have been found there, including one in 2017. Furthermore, more inland habitat, such as that which would be impacted by the Project, is likely to become more important as beaches and dunes erode due to climate change (AECOM 2018).

Construction of the proposed intake wells and associated pipelines could result in direct mortality of western snowy plovers if they are struck or crushed by vehicles, heavy equipment, or worker foot traffic. Eggs and chicks are less mobile than adults and juveniles and would therefore be more vulnerable to these effects. Construction activities could also result in disturbance to adult western snowy plovers that causes them to abandon eggs or chicks, which would result in mortality of the eggs or chicks. Disturbance due to construction, maintenance, and operations may also exclude western snowy plovers that may have otherwise nested within the Action Area or roosted there during the non-nesting season. Cal-Am has proposed a suite of minimization measures, as detailed in the Description of the Proposed Action section, which we expect will be effective in minimizing direct mortality. But, the potential for mortality cannot be completely eliminated when working year-round in occupied nesting habitat.

AECOM (2018) indicated that 8.83 acres of potential habitat for the western snowy plover would be temporarily impacted during construction of the Project and an additional 3.75 acres would be either permanently impacted or repeatedly disturbed on a 5-year cycle during maintenance of the intake wells. The 3.75-acre area includes 1.93 acres that would be converted to aboveground infrastructure (including electrical enclosures, pump-to-waste basins, and an access road) plus surrounding areas that would be disturbed during well maintenance.

The long-term behavioral response of western snowy plovers to the proposed construction and maintenance of the intake wells is unknown. Aboveground infrastructure (electrical enclosures and pump to waste basins) would not be suitable habitat and the footprints of these facilities would be avoided. Maintenance of the Project's intake wells and an access road to those wells would adversely affect western snowy plover habitat on a recurring basis and we expect little to no use of the maintained areas. Historical information (Point Blue Conservation Science 2017, Figure 2) indicates that approximately 11 acres⁸ in the back dunes portion of the Cemex Property has been used by the species for nesting. Aerial photos indicate the presence of additional sparsely vegetated back dune areas (approximately 32 acres)⁹ that could potentially be used for nesting; these areas are currently or historically used in the sand mining operation, but could be

⁸ The 11-acre figure is a rough measurement, from aerial photos using Google Earth, of the sparsely vegetated back-dunes area where nests have been found historically. This area was mined historically, but is not currently used in the mining operation.

⁹ The 32-acre figure is a rough measurement, from aerial photos using Google Earth, of sparsely vegetated back-dunes areas where nests have not been historically documented. Much of this area is used in the current mining operation. Planning for future use of the Cemex Property is in its early stages and these areas may or may not be more suitable for the species under future management.

valuable to nesting western snowy plovers in the future. In a best case scenario, permanent effects to western snowy plovers would be limited to the areas of aboveground infrastructure and ongoing maintenance (3.75 acres total). In a worst case, ongoing habitat disturbance may cause western snowy plovers to avoid the back dunes portions of the Cemex Property.

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently impacted habitat (the 3.75 acres) will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the Monterey gilia

The Proposed Action is likely to cause disturbance of potential habitat and possibly mortality of Monterey gilia (if the species is present within portions of the modeled suitable habitat) through vegetation clearing, grading, and trenching. Construction activities would also mobilize dust, which could adversely affect Monterey gilia within the Action Area but outside the Project footprint. We are aware of no studies of the effects of dust on the Monterey gilia, but for other plant species dust has been shown to: decrease the amount of pollen received by flowers (Waser et al. 2017), reduce vegetative growth, block stomata, and damage leaves (Farmer 1993 and references therein). Monterey gilia habitat would be permanently removed during construction of the proposed ASR wells, desalination plant, and associated aboveground infrastructure. Maintenance activities at the proposed intake well heads would result in ongoing habitat disturbance; maintained areas are included in the acreage permanently impacted in the next paragraph.

AECOM (2018) indicated that 67.04 acres of potential habitat for the Monterey gilia would be temporarily impacted during construction of the Project and an additional 12.95 acres would be permanently impacted (79.99 acres total). Field surveys of accessible areas did not reveal the species within the Project footprint.

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently impacted habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the Yadon's piperia

The Proposed Action is likely to cause disturbance of habitat and could cause mortality (if the species is present within portions of the modeled suitable habitat) of Yadon's piperia through vegetation clearing, grading, and trenching. Construction activities would also mobilize dust, which could adversely affect Yadon's piperia within the Action Area but outside the Project footprint. Yadon's piperia potential habitat would be permanently removed during construction of the proposed Carmel Valley pump station and associated aboveground infrastructure.

AECOM (2018) indicated that 22.99 acres of potential habitat for the Yadon's piperia would be temporarily impacted during construction of the Project and an additional 0.58 acre would be permanently impacted (23.57 acres total). Field surveys of accessible areas did not reveal the species within the Action Area.

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently impacted habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the Menzies' wallflower

The Proposed Action is likely to cause disturbance of habitat and could cause mortality (if the species is present within portions of the modeled suitable habitat) of Menzies' wallflower through vegetation clearing, grading, and trenching. Construction activities would also mobilize dust, which could adversely affect Menzies' wallflower within the Action Area but outside the Project footprint. We are aware of no studies of the effects of dust on the Menzies' wallflower, but for other plant species dust has been shown to: decrease the amount of pollen received by flowers (Waser et al. 2017), reduce vegetative growth, block stomata, and damage leaves (Farmer 1993 and references therein). Menzies' wallflower potential habitat would be permanently removed during construction and repeatedly disturbed by maintenance of the proposed intake wells and associated aboveground infrastructure.

AECOM (2018) indicated that 24.52 acres of potential habitat for the Menzies' wallflower would be temporarily impacted during construction of the Project and an additional 1.04 acres would be permanently impacted (25.56 acres total). Field surveys of accessible areas did not reveal the species within the Action Area.

As proposed by Cal-Am, temporarily-disturbed habitat will be restored at a 1:1 ratio and permanently impacted habitat will be mitigated for at a 3:1 ratio.

Effects of the Proposed Action on the Smith's blue butterfly

Construction activities, including vegetation clearing, grading, trenching, and drilling could kill Smith's blue butterflies, of all life stages, when equipment disturbs or removes host plants (coast buckwheat and/or seacliff buckwheat) or soil associated with the host plants. Smith's blue butterflies would also be killed if adults are struck by vehicles or heavy equipment. Disturbance to or removal of host plants or associated soil may also adversely affect Smith's blue butterflies through habitat loss and habitat fragmentation, which could limit foraging, movement, and oviposition. Construction and operation of equipment and vehicles would mobilize dust, which could cause injury or mortality to Smith's blue butterflies and could degrade habitat.

Removal of scattered host plants adjacent to larger areas of habitat is likely to result in mortality of Smith's blue butterflies and loss of small amounts of habitat. But, we do not expect such impacts to have substantial effects on Smith's blue butterflies at the population level. However, if large and/or isolated patches of Smith's blue butterfly habitat are removed during construction, such removal could result in more substantial effects to the size of and connectivity between populations.

AECOM (2018) indicated that 79.97 acres of potential habitat for the Smith's blue butterfly would be temporarily impacted during construction of the Project and an additional 17.65 acres would be permanently impacted (97.62 acres total). In this case, potential habitat refers to appropriate vegetation types, but not all areas have been surveyed for seacliff and coast buckwheat (which are essential components of Smith's blue butterfly habitat). Surveys of accessible areas revealed 2.13 acres of habitat with seacliff and/or coast buckwheat would be impacted within the Action Area.

Effects of the Proposed Action on Critical Habitat of the California red-legged frog

Construction at the Carmel Valley Pump Station would permanently degrade 0.58 acre of critical habitat containing PBFs 3 (upland habitat) and 4 (dispersal habitat). Construction at the Hidden Hills interconnection may have some small and temporary effects on PBF 4, as an active construction site would be more difficult for frogs to disperse through than a paved road. But, because activities at the Hidden Hills interconnection site are proposed in existing developed areas and paved roads, we expect no permanent effects to critical habitat there.

Effects of the Proposed Action on Critical Habitat of the western snowy plover

Replacement of seals within the existing MRWPCA ocean outfall would require excavation of beach habitat within 0.123 acre of designated critical habitat. All PBFs would be adversely affected during the proposed seal replacement. The area would be restored following seal replacement. There would be lasting (but not permanent) effects to PBFs 2 and 3, as it would take an unknown amount of time for food and cover resources to recover to pre-project conditions following restoration.

Effects on Recovery

Monterey spineflower

Although the Project would kill Monterey spineflowers and would have both temporary and permanent effects to habitat for the species, we do not expect these effects to be of a magnitude that would preclude development of permanent protection plans for the species as prescribed in its recovery plan. Cal-Am's proposed mitigation should contribute to implementation of permanent protection for the species within the Cemex Property.

California tiger salamander

Although the Project would adversely affect upland habitat for the California tiger salamander and may kill individuals, we do not expect these effects to be of a magnitude that would affect our ability to designate preserves that would protect habitat for the species, as prescribed in the recovery plan. We do not expect the Project to have any effect on our ability to manage the hybridization threat to the California tiger salamander.

California red-legged frog

Although the Project would adversely affect upland habitat for the California red-legged frog and may kill individuals, we do not expect these effects to be of a magnitude that would affect the ability of Recovery Core Areas 19 and 20 to remain occupied by the species, provide connectivity between occupied areas, or provide dispersing individuals to colonize other areas.

Western snowy plover

Although the Project would adversely affect occupied nesting habitat for the western snowy plover, we do not expect these effects to be of a magnitude that would preclude us from meeting recovery goals for the species. In a worst case scenario, nesting in the back dunes portion of the Cemex Property could be precluded. However, locating the proposed intake wells within the formerly-mined back dunes area avoids impacts to beach and foredune portions of the Cemex Property, which are more heavily used by nesting western snowy plovers. Furthermore, Cal-Am's proposed mitigation for impacts to the species should contribute to implementation of permanent protection and management for the species within beach and foredune areas. We believe that with proper management of other ongoing threats (including: uncontrolled access by humans and dogs, invasive plants, and predation), the Cemex Property can be managed to meet its potential to support 32 breeding adult western snowy plovers even with the impacts to habitat that would occur due to the Project.

Monterey gilia

Of those Monterey gilia populations with specific management goals in the recovery plan (Service 1998), only 1 (CNDDDB occurrence number 21) overlaps the Action Area. Service (1998) prescribes management of CNDDDB occurrence number 21 for a minimum of 1,000 individual plants. This site could be affected by pipeline construction along its western edge, but we expect impacts to be relatively small and mostly temporary and do not expect that they would preclude management at this location to meet the recovery goal of 1,000 plants. Furthermore, Cal-Am's proposed mitigation should benefit the species at CNDDDB occurrence number 27, which is outside the Action Area, but partially within the Cemex Property. CNDDDB occurrence number 27 also has a management goal of at least 1,000 individuals.

Yadon's piperia

The Project would have temporary and permanent effects on potential habitat for the Yadon's piperia and could cause mortality of individuals. However, no known occupied habitat would be affected and we do not expect the effects of the Project to be of a magnitude that would prevent us from protecting at least 3 populations within recovery area 2, as prescribed in the recovery plan (Service 2004).

Menzies' wallflower

The Project would have temporary and permanent effects on potential habitat for the Menzies' wallflower and could cause mortality of individuals. However, no known occupied habitat would be affected and we do not expect the effects of the Project to be of a magnitude that would prevent management of subspecies *yadonii* to allow for: 1) continued occupancy throughout its current range, 2) the persistence of at least 3 populations with at least 300 individuals, or, 3) the persistence of at least 2 populations with at least 5000 individuals. No other subspecies of Menzies' wallflower would be affected. Furthermore, Cal-Am's proposed mitigation should benefit the species at the occupied location within the Cemex Property to the north of the Action Area.

Smith's blue butterfly

The Project would have temporary and permanent effects on known occupied and potential habitat for the Smith's blue butterfly and would likely cause mortality of individuals. However, we do not expect these effects to be of a magnitude that would prevent conservation and management of habitat or increases in the amount of occupied habitat or connectivity between occupied habitats, as would be needed to affect recovery of the species. Furthermore, Cal-Am's proposed mitigation should benefit the species at the occupied location within the Cemex Property to the north of the Action Area.

Summary of Effects

Monterey spineflower

The Proposed Action would result in temporary and permanent impacts to potential and known occupied habitat for the Monterey spineflower and would kill individuals of the species. We do not expect that populations of the species would be affected to a magnitude that would prevent those populations from sustaining themselves. We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of Monterey spineflower habitat. We do not expect the Project to have effects of a magnitude that would preclude development of permanent protection plans for the species as prescribed in its recovery plan.

California tiger salamander

The Project would have no adverse effects to California tiger salamander breeding habitat, eggs, or larvae. The Project would cause both temporary disturbance and permanent destruction of likely-occupied upland habitat, which could result in mortality of juvenile and adult California tiger salamanders. We do not expect that populations of the species would be affected to a magnitude that would prevent those populations from sustaining themselves. We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of California tiger salamander habitat. We do not expect

the Project to have effects of a magnitude that would affect our ability to designate preserves that would protect habitat for the species, as prescribed in the recovery plan. We do not expect the Project to have any effect on our ability to manage the hybridization threat to the California tiger salamander.

California red-legged frog

The Project would have no adverse effects to California red-legged frog breeding habitat, eggs, or larvae. The Project would cause both temporary disturbance and permanent destruction of likely-occupied upland habitat, which could result in mortality of juvenile and adult California red-legged frogs. We do not expect that populations of the species would be affected to a magnitude that would prevent those populations from sustaining themselves. We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of California red-legged frog habitat. We do not expect the Project to have effects of a magnitude that would affect the ability of Recovery Core Areas 19 and 20 to remain occupied by the species, provide connectivity between occupied areas, or provide dispersing individuals to colonize other areas.

Western snowy plover

Construction of the proposed intake wells and associated pipelines would result in temporary disturbance and permanent destruction of known occupied western snowy plover nesting habitat. Construction and maintenance of the proposed intake wells and associated pipelines could result in direct mortality of western snowy plovers or exclude western snowy plovers that would otherwise have nested or roosted within the Action Area. We do not expect that the local population of the species would be affected to a magnitude that would prevent it from sustaining itself. We believe that, with proper management of other ongoing threats, as would be facilitated by Cal-Am's proposed mitigation, the Cemex Property can be managed to meet its potential to support 32 breeding adult western snowy plovers, as identified in the recovery plan.

Monterey gilia

The Proposed Action would result in temporary and permanent impacts to potential and known occupied habitat for the Monterey gilia and could kill individuals of the species. We do not expect that populations of the species would be affected to a magnitude that would prevent those populations from sustaining themselves. We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of Monterey gilia habitat. Only one population of Monterey gilia that has a specific management goal identified in the recovery plan could be affected by the Project; we do not expect the Project to have effects on that population of a magnitude that would preclude us from meeting its management goal.

Yadon's piperia

The Proposed Action would have temporary and permanent impacts to potential habitat for the Yadon's piperia and could kill individuals of the species if that habitat is occupied. However, no known occupied habitat would be affected and we do not expect the effects of the Project to be of a magnitude that would prevent us from protecting at least 3 populations within recovery area 2, as prescribed in the recovery plan (Service 2004). We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of Yadon's piperia habitat.

Menzies' wallflower

The Proposed Action would have temporary and permanent impacts to potential habitat for the Menzies' wallflower and could kill individuals of the species if that habitat is or becomes occupied. However, no known occupied habitat would be affected and we do not expect the effects of the Project to be of a magnitude that would prevent management (as identified in the recovery plan) of subspecies *yadonii* to allow for: 1) continued occupancy throughout its current range, 2) the persistence of at least 3 populations with at least 300 individuals, or, 3) the persistence of at least 2 populations with at least 5000 individuals. No other subspecies of Menzies' wallflower would be affected. We expect that Cal-Am's proposed mitigation, which will include preserving 3 acres of habitat for every acre removed, would compensate for the loss of Menzies' wallflower habitat.

Smith's blue butterfly

The Proposed Action would have temporary and permanent impacts to potential and known occupied habitat for the Smith's blue butterfly and would likely kill individuals of the species. However, with implementation of Cal-Am's proposed minimization and mitigation measures, we do not expect these effects to be of a magnitude that would have substantial permanent adverse effects to the size of Smith's blue butterfly populations. We do not expect the Project's effects to be of a magnitude that would prevent conservation and management of habitat or increases in the amount of occupied habitat or connectivity between occupied habitats, as would be needed to affect recovery of the species. Furthermore, Cal-Am's proposed mitigation should benefit the species at the occupied location within the Cemex Property to the north of the Action Area.

Critical Habitat of the California red-legged frog

Construction at the Carmel Valley Pump Station would permanently degrade 0.58 acre of critical habitat containing PBFs 3 (upland habitat) and 4 (dispersal habitat). Construction at the Hidden Hills interconnection may have some small and temporary effects on PBF 4. Although PBFs 3 and 4 would be permanently lost from a small area of critical habitat unit MNT-2, we do not expect this loss to have substantial effects to the conservation function of this unit.

Effects of the Proposed Action on Critical Habitat of the western snowy plover

Replacement of seals within the existing outfall would require equipment access to and excavation of beach habitat within 0.123 acre of designated critical habitat. All PBFs would be adversely affected during the proposed seal replacement. The area would be restored following seal replacement. There would be lasting (but not permanent) effects to PBFs 2 and 3, as it would take an unknown amount of time for food and cover resources to recover to pre-project conditions following restoration. Although there would be adverse effects to all PBFs within a portion of critical habitat unit CA 22, these effects would be limited to a small area and would be temporary such that we do not expect substantial effects to the conservation function of this unit.

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. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act. We are not aware of any non-Federal activities that are reasonably certain to occur in the Action Area.

CONCLUSION

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the Monterey spineflower’s, California tiger salamander’s, California red-legged frog’s, western snowy plover’s, Monterey gilia’s, Yadon’s piperia’s, Menzies’ wallflower’s, and Smith’s blue butterfly’s statuses as the basis to assess the overall effect of the proposed action on the species.

Monterey spineflower

Reproduction

Construction and maintenance of the Project would permanently remove areas of habitat for the Monterey spineflower and would make additional areas temporarily unavailable to the species. These areas would otherwise be available for the species to carry out its life cycle, which includes reproduction. Dust mobilized during construction and maintenance activities could also interfere with reproduction of the Monterey spineflower if it covers flowers and thereby interferes with pollination. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Furthermore, we expect that those habitat areas that are temporarily impacted can be effectively restored, such that they will

again become available to the species for reproduction. Even though the proposed action would reduce the availability of habitat within the project footprint and could interfere with pollination elsewhere within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the Monterey spineflower.

Numbers

Construction and maintenance of the Project would permanently remove areas of habitat for the Monterey spineflower and would make additional areas temporarily unavailable to the species. Where these effects occur in currently occupied habitat, individual plants would be killed and this would cause a reduction in the number of plants. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Furthermore, we expect that those habitat areas that are temporarily impacted can be effectively restored, such that they will again become available to the species and its numbers will recover in those areas. Even though the proposed action would reduce the number of Monterey spineflowers within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction and maintenance of the Project would permanently remove small areas of habitat for the Monterey spineflower. This would represent a minor reduction in the distribution of the species. We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action would reduce the distribution of Monterey spineflowers within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project would kill Monterey spineflowers and would have both temporary and permanent effects to habitat for the species, we do not expect these effects to be of a magnitude that would preclude development of permanent protection plans for the species as prescribed in its recovery plan. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the Monterey spineflower, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the Monterey spineflower.

California tiger salamanderReproduction

We expect little to no effect on California tiger salamander reproduction. Adverse effects to breeding habitat should not occur. Construction activities would generate temporary noise, vibration, and artificial light within upland and dispersal habitat, which could cause disturbance of California tiger salamanders. Construction activities would also have temporary and permanent effects to upland and dispersal habitat that could make them more difficult for California tiger salamanders to move through. These effects have potential to interfere with California tiger salamander movement to breeding sites, which could reduce reproduction. However, considering the proposed minimization measures, including post-construction restoration of most disturbed areas, we expect such effects to reproduction to be uncommon and largely temporary such that they would not reduce appreciably the likelihood of both the survival and recovery of the species.

Numbers

Construction within likely-occupied upland and dispersal habitat may result in mortality of a few adult and/or juvenile California tiger salamanders, which would reduce the number of individuals in the Action Area. However, considering the relatively small amount of habitat to be affected and the proposed minimization measures, we expect such effects to be limited such that they would not reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction of the Project would permanently remove small areas of habitat for the California tiger salamander. This could represent a minor reduction in the distribution of the species (if the removed habitat is currently occupied). We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action could reduce the distribution of California tiger salamanders within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project could kill California tiger salamanders and would have both temporary and permanent effects to habitat for the species, we do not expect these effects to be of a magnitude that would prevent designation of habitat preserves or management of hybridization threats, as prescribed in the species' recovery plan. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the California tiger salamander, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the California tiger salamander.

California red-legged frog

Reproduction

We expect little to no effect on California red-legged frog reproduction. Adverse effects to breeding habitat should not occur. Construction activities would generate temporary noise, vibration, and artificial light within upland and dispersal habitat, which could cause disturbance of California red-legged frogs. Construction activities would also have temporary and permanent effects to upland and dispersal habitat that could make them more difficult for California red-legged frogs to move through. These effects have potential to interfere with California red-legged frog movement to breeding sites, which could reduce reproduction. However, considering the proposed minimization measures, including post-construction restoration of most disturbed areas, we expect such effects to be uncommon and largely temporary such that they would not reduce appreciably the likelihood of both the survival and recovery of the species.

Numbers

Construction within likely-occupied upland and dispersal habitat may result in mortality of a few adult and/or juvenile California red-legged frogs, which would reduce the number of individuals in the Action Area. However, considering the relatively small amount of habitat to be affected and the proposed minimization measures, we expect such effects to be limited such that they would not reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction of the Project would permanently remove small areas of upland and dispersal habitat for the California red-legged frog. This could represent a minor reduction in the distribution of the species (if the removed habitat is currently occupied). We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action could reduce the distribution of California red-legged frogs within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project could kill California red-legged frogs and would have both temporary and permanent effects to habitat for the species, we do not expect these effects to be of a magnitude that would affect the ability of Recovery Core Areas 19 and 20 to remain occupied by the

species, provide connectivity between occupied areas, or provide dispersing individuals to colonize other areas, as prescribed in the species' recovery plan. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the California red-legged frog, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project, and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog.

Western snowy plover

Reproduction

Construction and maintenance of the proposed intake wells and associated pipelines would result in temporary disturbance and permanent destruction of known-occupied western snowy plover nesting habitat. Disturbance due to construction and maintenance may also exclude western snowy plovers that may have otherwise nested within the Action Area. Construction activities could result in destruction or abandonment of western snowy plover eggs. However, the proposed intake wells have been located in a previously-mined back dune area to avoid effects in more heavily used beach and foredune nesting areas. Furthermore, we expect that the proposed minimization measures will be effective in avoiding most direct effects to breeding western snowy plovers and their eggs and that the proposed mitigation will protect and improve management of more heavily used beach and foredune nesting areas. Although the proposed action would have temporary and permanent adverse effects on nesting habitat and could destroy some eggs, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Numbers

Construction within occupied habitat may result in mortality of a few western snowy plovers. However, considering the proposed minimization measures, we expect such mortality to be very uncommon such that it would not affect the number of individuals in a way that would reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction of the proposed intake wells would permanently remove small areas of habitat for the western snowy plover. Maintenance of the proposed intake wells would result in recurring disturbance of areas surrounding the wells. In a best case, permanent effects would be limited to areas occupied by above-ground infrastructure and the immediately surrounding areas affected by maintenance. In a worst case, western snowy plovers may avoid the entire back dunes portion of the Cemex Property. Although there is potential for substantial effects to the distribution of

the western snowy plover, if the species permanently abandons the inland portion of the Cemex Property, we expect that Cal-Am's proposed protection and management of other portions of the same property will be effective in mitigating these effects. Even though the proposed action would reduce the distribution of western snowy plovers within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project could kill western snowy plovers and would have both temporary and permanent effects to habitat for the species, we do not expect these effects to be of a magnitude that would prevent management of the Cemex Property to meet its potential to support 32 breeding adult western snowy plovers as identified in the species' recovery plan. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the western snowy plover, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the western snowy plover.

Monterey gilia

Reproduction

Construction and maintenance of the Project would permanently remove areas of habitat for the Monterey gilia and would make additional areas temporarily unavailable to the species. These areas would otherwise be available for the species to carry out its life cycle, which includes reproduction. Dust mobilized during construction and maintenance activities could also interfere with reproduction of the Monterey gilia if it covers flowers and thereby interferes with pollination. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Furthermore, we expect that those habitat areas that are temporarily impacted can be effectively restored, such that they will again become available to the species for reproduction. Even though the proposed action would reduce the availability of habitat within the project footprint and could interfere with pollination elsewhere within the Action Area, we do not expect these effects to reproduction to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the Monterey gilia.

Numbers

Construction and maintenance of the Project would permanently remove areas of habitat for the Monterey gilia and would make additional areas temporarily unavailable to the species. If these effects occur in currently occupied habitat, individual plants would be killed and this would

cause a reduction in the number of plants. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Furthermore, we expect that those habitat areas that are temporarily impacted can be effectively restored, such that they will again become available to the species and its numbers will recover in those areas. Even though the proposed action could reduce the number of Monterey gilia within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction and maintenance of the Project would permanently remove small areas of habitat for the Monterey gilia. This could represent a minor reduction in the distribution of the species if those areas are currently occupied. We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action could reduce the distribution of the Monterey gilia within the Action Area, we do not expect this effect to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project would have temporary and permanent effects on habitat for the Monterey gilia and could kill individuals of the species, we do not expect these effects to preclude management of CNDDB occurrence number 21 for a minimum of 1,000 individual plants. Furthermore, Cal-Am's proposed mitigation should benefit the species at CNDDB occurrence number 27, which is outside the Action Area, but partially within the Cemex Property. No other sites identified in the recovery plan would be affected by the Project. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the Monterey gilia, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the Monterey gilia.

Yadon's piperia

Reproduction

Construction of the Project would permanently remove areas of habitat for the Yadon's piperia and would make additional areas temporarily unavailable to the species. These areas would otherwise be available for the species to carry out its life cycle, which includes reproduction. Dust mobilized during construction activities could also interfere with reproduction of the Yadon's piperia, if it covers flowers and thereby interferes with pollination. However, the areal

extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Even though the proposed action would reduce the availability of habitat within the project footprint and could interfere with pollination elsewhere within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the Yadon's piperia.

Numbers

Construction of the Project would permanently remove areas of habitat for the Yadon's piperia and would make additional areas temporarily unavailable to the species. If these effects occur in currently occupied habitat, individual plants would be killed and this would cause a reduction in the number of plants. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Even though the proposed action could reduce the number of individuals of the Yadon's piperia within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction and maintenance of the Project would permanently remove small areas of habitat for the Yadon's piperia. This could represent a minor reduction in the distribution of the species, if those areas are currently occupied. We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action could reduce the distribution of the Yadon's piperia within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project would have temporary and permanent effects on habitat for the Yadon's piperia and could kill individuals of the species, we do not expect these effects to preclude protection of at least 3 populations within recovery area 2, as prescribed in the recovery plan. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the Yadon's piperia, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the Yadon's piperia.

Menzies' wallflowerReproduction

Construction and maintenance of the Project would permanently remove areas of habitat for the Menzies' wallflower and would make additional areas temporarily unavailable to the species. These areas would otherwise be available for the species to carry out its life cycle, which includes reproduction. Dust mobilized during construction and maintenance activities could also interfere with reproduction of the Menzies' wallflower if it covers flowers and thereby interferes with pollination. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Furthermore, we expect that those habitat areas that are temporarily impacted can be effectively restored, such that they will again become available to the species for reproduction. Even though the proposed action would reduce the availability of habitat within the project footprint and could interfere with pollination elsewhere within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the Menzies' wallflower.

Numbers

Construction and maintenance of the Project would permanently remove areas of habitat for the Menzies' wallflower and would make additional areas temporarily unavailable to the species. If these effects occur in currently occupied habitat, individual plants would be killed and this would cause a reduction in the number of plants. However, the areal extent of these effects would be relatively small in comparison with the amount of occupied habitat for the species. Even though the proposed action could reduce the number of individuals of the Menzies' wallflower within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction and maintenance of the Project would permanently remove small areas of habitat for the Menzies' wallflower. This could represent a minor reduction in the distribution of the species, if those areas are currently occupied. We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action could reduce the distribution of the Menzies' wallflower within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project would have temporary and permanent effects on habitat for the Menzies' wallflower and could kill individuals of the species, we do not expect the effects of the Project to be of a magnitude that would prevent management of subspecies *yadonii* to allow for: 1) continued occupancy throughout its current range, 2) the persistence of at least 3 populations

with at least 300 individuals, or, 3) the persistence of at least 2 populations with at least 5000 individuals. No other subspecies of Menzies' wallflower would be affected. Furthermore, Cal-Am's proposed mitigation should benefit the species at the occupied location within the Cemex Property to the north of the Action Area. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the Menzies' wallflower, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the Menzies' wallflower.

Smith's blue butterfly

Reproduction

The Smith's blue butterfly requires seacliff and/or coast buckwheat plants for reproduction because they serve as oviposition sites and are the obligate food source of larvae. Construction and maintenance of the Project would permanently remove areas of habitat for the Smith's blue butterfly and would make additional areas temporarily unavailable to the species. This habitat removal would affect reproduction of the species by removing seacliff and/or coast buckwheat plants. However, the area of habitat to be removed is small relative to the amount of habitat available to the species and we expect that areas temporarily affected can be effectively restored. Even though the proposed action would reduce the availability of habitat needed for reproduction, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the Smith's blue butterfly.

Numbers

Construction and maintenance of the Project would permanently remove areas of habitat for the Smith's blue butterfly and would make additional areas temporarily unavailable to the species. In areas where these activities occur in occupied habitat, they are likely to kill Smith's blue butterflies of all life stages. However, the area of habitat to be removed is small relative to the amount of habitat available to the species and we expect that areas temporarily affected can be effectively restored. We therefore expect that the reduction in numbers of Smith's blue butterflies that is likely due to the Project will be small, and largely temporary, such that it would not reduce appreciably the likelihood of both the survival and recovery of the species.

Distribution

Construction and maintenance of the Project would permanently remove small areas of habitat for the Smith's blue butterfly. This would represent a minor reduction in the distribution of the species. We have no evidence to indicate that this minor reduction would have any substantial population-level effects on the species. Even though the proposed action would reduce the

distribution of the Smith's blue butterfly within the Action Area, we do not expect these effects to be of a magnitude that would reduce appreciably the likelihood of both the survival and recovery of the species.

Recovery

Although the Project would have temporary and permanent effects on habitat for the Smith's blue butterfly and would likely kill individuals of the species, we do not expect these effects to be of a magnitude that would prevent conservation and management of habitat or increases in the amount of occupied habitat or connectivity between occupied habitats, as would be needed to affect recovery of the species. We therefore conclude that the proposed action is consistent with the goals of, and would not appreciably reduce the likelihood of, recovery of the species.

After reviewing the current status of the Smith's blue butterfly, the environmental baseline for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project, and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to jeopardize the continued existence of the Smith's blue butterfly.

California Red-legged Frog Critical Habitat

PBFs 1 and 2 of critical habitat for the California red-legged frog would not be affected by the proposed action. A small area (0.58 acre) of critical habitat unit MN-2 containing PBFs 3 and 4 would be permanently degraded and there may be some additional small and temporary adverse effects to areas containing PBF 4. We expect these effects to be minor relative to the total amount of these habitat components available within unit MN-2 and rangewide. In summary, we expect adverse effects to California red-legged frog critical habitat, but we expect them to be limited in geographic scope such that they would have no substantial effects to the conservation function of unit MN-2 or designated critical habitat rangewide.

After reviewing the current status of the critical habitat of the California red-legged frog, the environmental baseline of critical habitat for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project on critical habitat, and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the California red-legged frog because:

1. The effects on the various physical and biological features would be small and partially temporary; and
2. The effects on the conservation value and function of critical habitat would be minimized.

Western Snowy Plover Critical Habitat

A small area (0.123 acre) of western snowy plover critical habitat unit CA 22, containing all PBFs, would be adversely affected during the proposed action. The affected area would be restored following construction. There would be lasting (but not permanent) effects to PBFs 2 and 3, as it would take an unknown amount of time for food and cover resources to recover to pre-project conditions following restoration. We expect these effects to be minor relative to the total amount of these habitat components available within unit CA 22 and rangewide. In summary, we expect adverse effects to western snowy plover critical habitat, but we expect them to be limited in geographic and temporal scope such that they would have no substantial effects to the conservation function of unit CA 22 or designated critical habitat rangewide.

After reviewing the current status of the critical habitat of the western snowy plover, the environmental baseline of critical habitat for the Action Area, the effects of the proposed Monterey Peninsula Water Supply Project on critical habitat, and the cumulative effects, it is the Service's biological opinion that the Monterey Peninsula Water Supply Project, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the western snowy plover because:

1. The effects on the various physical and biological features would be small and temporary; and
2. The effects on the conservation value and function of critical habitat would be minimized.

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 wildlife 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 wildlife by significantly impairing essential behavioral patterns, including 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 the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement. In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an Incidental Take Statement [50 CFR 402.14(g)(7)], from "...if such take may occur" to "...if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that

take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

We anticipate that some California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies could be taken as a result of the proposed action. We expect the incidental take to be in the form of capture, injury (wound), mortality (kill), and/or harm.

We cannot quantify the precise number of California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies that may be taken as a result of the actions that NOAA has proposed because California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies move over time; for example, animals may have entered or departed the Action Area since the time of pre-construction surveys. Other individuals may not be detected due to their cryptic nature, small size, and low mobility. The protective measures proposed by NOAA are likely to prevent mortality or injury of most individuals. In addition, finding a dead or injured California tiger salamander, California red-legged frog, western snowy plover, or Smith's blue butterfly is unlikely because individuals killed are likely to be crushed or buried by construction equipment or eaten by scavengers.

Consequently, we are unable to reasonably anticipate the actual number of California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies would likely be low given the nature of the proposed activities, and we, therefore, anticipate that take of California tiger salamanders, California red-legged frogs, western snowy plovers, and Smith's blue butterflies would also be low. We also recognize that for every California tiger salamander, California red-legged frog, western snowy plover, or Smith's blue butterfly found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Similarly, for estimating the number of California tiger salamanders, California red-legged frogs, and Smith's blue butterflies that would be taken by capture, we cannot predict how many may be encountered for reasons stated earlier. While the benefits of relocation (i.e., minimizing mortality) outweigh the risk of capture, we must provide a limit for take by capture at which consultation would be reinitiated because high rates of capture may indicate that some important information about the species in the Action Area was not apparent (e.g., it is much more

abundant than thought). Conversely, because capture and relocation can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinitiation would be triggered before the effects of the activity were greater than what we determined in the Effects Analysis.

Therefore, if: a) 3 individuals of any life stage of the California tiger salamander or California red-legged frog, b) 6 eggs or chicks or one adult or juvenile of the western snowy plover, or c) 10 individuals of any life stage of the Smith's blue butterfly are found dead or wounded, or if d) 10 individuals of any life stage of the California tiger salamander or California red-legged frog are captured and relocated, NOAA must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions. We do not anticipate that capture and relocation of western snowy plovers would be necessary or beneficial. Smith's blue butterfly pupae or larvae may be captured and relocated during relocation of plants, duff, and soil as proposed by Cal-Am; but, considering the small size and cryptic nature of these life stages we do not anticipate that the number of individuals captured and relocated can be effectively quantified.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants from areas under Federal jurisdiction, the malicious damage or destruction of such plants on areas under Federal jurisdiction, and the destruction of listed plants on non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by the NOAA or made binding conditions of any grant or permit issued to Cal-Am, as appropriate, for the exemption in section 7(o)(2) to apply. The NOAA has a continuing duty to regulate the activity covered by this incidental take statement. If the NOAA (1) fails to assume and implement the terms and conditions or (2) fails to require Cal-Am to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the NOAA 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)]. The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of the California tiger salamander, California red-legged frog, western snowy plover, and Smith's blue butterfly:

- 1) Take of all species must be minimized by using qualified individuals and procedures to implement the minimization and mitigation measures proposed by Cal-Am and NOAA included in the Description of the Proposed Action section of the Biological Opinion and those prescribed in the following terms and conditions.

- 2) Measures to ensure that Smith's blue butterflies can colonize habitat restored following construction must be implemented.
- 3) Vehicles and equipment must drive slowly within habitat areas to minimize the chance of listed wildlife being struck or crushed.
- 4) The Service must be provided sufficient time to review, and consider approval of, the future plans and reports proposed by Cal-Am and NOAA to minimize the adverse effects of the Project.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the NOAA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

The following term and condition implements reasonable and prudent measure 1:

- a) Only qualified biologists(s), approved by the Service under the auspices of this biological opinion, may conduct monitoring and minimization measures for the California tiger salamander, California red-legged frog, western snowy plover, and Smith's blue butterfly. We acknowledge that Cal-Am has proposed to seek our approval of qualified biologists and include this term and condition to clarify approval procedures. NOAA or Cal-Am must request our approval of any biologist(s) they wish to employ for activities with the California tiger salamander, California red-legged frog, western snowy plover, and Smith's blue butterfly. The request must be in writing and received at least 30 days prior to the initiation of activities. Although NOAA and Cal-Am are free to choose any qualified personnel they wish to employ, activities with the western snowy plover must be coordinated with Point Blue Conservation Science (the organization that leads a long-term research and monitoring program for the species throughout the Monterey Bay area).

The following terms and conditions implement reasonable and prudent measure 2:

- a) If the pre-construction surveys for Smith's blue butterfly habitat, as proposed by Cal-Am, indicate that an entire patch of habitat would be temporarily removed during construction, then the distance to the nearest occupied habitat patch must be determined and the Service must be consulted.
- b) If the information gathered under term and condition 2. a. indicates that no source population of Smith's blue butterflies is available to colonize an area after habitat is restored, Cal-Am and NOAA must either develop a plan to relocate Smith's blue butterflies into the restored habitat or consider the impacts to habitat permanent (i.e., we believe that affected Smith's blue butterfly habitat can be restored, but if the species is not able to re-occupy the restored areas then the impacts of the incidental take of the species would not be minimized).

The following terms and conditions implement reasonable and prudent measure 3:

- a) When working within western snowy plover or Smith's blue butterfly habitat, all vehicles and equipment must observe a 10 miles per hour speed limit.
- b) When working within California red-legged frog or California tiger salamander habitat, all vehicles and equipment must observe a 10 miles per hour speed limit unless the area has already been fenced and surveyed for the species, as proposed by Cal-Am.

The following terms and conditions implement reasonable and prudent measure 4:

- a) Cal-Am or NOAA must provide the proposed "frac-out" contingency plan to the Service at least 30 days before any HDD activities are scheduled to begin. HDD activities must not begin until the Service provides written approval (an exchange of electronic mail messages would be sufficient) of the "frac-out" contingency plan.
- b) Cal-Am or NOAA must provide the proposed relocation plans for the Smith's blue butterfly, California red-legged frog, and California tiger salamander to the Service at least 30 days before any construction activities within habitat for these species. Construction activities within habitat for these species must not begin until the Service provides written approval (an exchange of electronic mail messages would be sufficient) of these plans.
- c) Cal-Am or NOAA must provide the proposed HMMP at least 60 days prior to the scheduled beginning of construction within habitat for any listed wildlife species. Construction activities must not begin until the Service provides written approval (an exchange of electronic mail messages would be sufficient) of the HMMP. The Service may, at our discretion, provide partial approval of the HMMP (e.g., approval for work in specific locations or with specific species).

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), NOAA must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. A report must be submitted to the Service's Ventura Fish and Wildlife Office (2493 Portola Road, Suite B; Ventura, California 93003) by the end of each calendar year in which Project activities are implemented. This report will include: 1) the results of the surveys and monitoring proposed by NOAA and Cal-Am and prescribed in the terms and conditions; 2) a summary of how the terms and conditions of this biological opinion and the protective measures proposed by the NOAA and Cal-Am worked; and 3) any suggestions of how these measures could be revised to improve conservation of the California tiger salamander, California red-legged frog, western snowy plover, and Smith's blue butterfly, while facilitating compliance with the Act.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured the California tiger salamander, California red-legged frog, western snowy plover, or Smith's blue butterfly, initial notification within 3 working days of its finding must be

made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

The NOAA or Cal-Am must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The NOAA or Cal-Am must transport injured animals to a qualified veterinarian. Should any treated California tiger salamander, California red-legged frog, western snowy plover, or Smith's blue butterfly survive, NOAA or Cal-Am must contact the Service regarding the final disposition of the animal(s).

The Service should be contacted to determine the appropriate disposition location for any dead specimens that are identified.

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) As discussed in the Description of the Proposed Action section of the biological opinion, Cemex has reached an agreement with the California Coastal Commission to phase out sand mining on their ocean-front property in Marina, California, and to transfer the property into conservation ownership. Cal-Am has proposed to contribute to efforts to conserve and manage the Cemex Property as part of its proposed mitigation for effects of the Project. Cal-Am and NOAA should also continue to participate in planning for the future of the Cemex Property and should use their authorities and resources to contribute to long-term conservation and management of the listed species and native habitats found there.
- 2) Cal-Am has worked with the Service for many years to implement beneficial actions for the California red-legged frog on the Carmel River, including rescue of stranded larvae when water levels are low. Although the Project should improve conditions for the California red-legged frog by reducing the amount of water that Cal-Am needs to withdraw from the Carmel River drainage, Cal-Am's continued withdrawals may continue to affect the species. Thus, Cal-Am and NOAA should work with us to continue beneficial actions for this species within the Carmel River drainage.

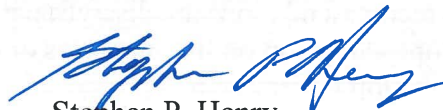
The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could 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 about this biological opinion, please contact Jacob Martin of my staff at (805) 677-3327, or by electronic mail at jacob_martin@fws.gov.

Sincerely,



Stephen P. Henry
Field Supervisor

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