United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
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Carlsbad, California 92011

In Reply Refer To:
FWS-IMP-10B0228-11F0453

APR 26 2012

Memorandum

To: District Manager, California Desert District Office, Bureau of Land Management, Moreno Valley, California

From: Field Supervisor, Carlsbad Fish and Wildlife Office
Carlsbad, California

Subject: Formal Section 7 Opinion on the Proposed Ocotillo Express Wind Project
Imperial County, California (3031-P) CAD000.06

This memorandum transmits our, the U.S. Fish and Wildlife Service (Service), biological opinion on proposed issuance of a right-of-way (ROW) grant by the Bureau of Land Management (BLM) that would authorize the construction, operation, and maintenance of the proposed 356.5 megawatt (MW) Ocotillo Express Wind Energy Facility (project) in Imperial County, California, and the proposed issuance of an individual permit for the project under section 404 of the Clean Water Act by the U.S. Army Corps of Engineers (Corps). In accordance with the National Environmental Policy Act, the BLM is the lead Federal agency and the Corps is identified as a cooperating agency for the project. This biological opinion analyzes the effects of the project on the federally endangered Peninsular bighorn sheep (*Ovis canadensis nelsoni*) and least Bell's vireo (*Vireo bellii pusillus*, "vireo") in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). Because no critical habitat for either species has been designated within the action area, no critical habitat would be adversely affected. Your request for formal consultation, dated May 25, 2011, was received on May 27, 2011.

This biological opinion is primarily based on information provided in the following documents and communications: revised biological assessment (Helix 2011a); draft plan amendment and draft environmental impact statement/environmental impact report (BLM 2011); and draft Carrizo Marsh restoration plan outline (Helix 2011b). The project file for this consultation is located at the Carlsbad Fish and Wildlife Office.

CONSULTATION HISTORY

Field meetings at the project site were held in February, March, and April 2011, with the Service, BLM, California Department of Fish and Game (CDFG), and Pattern Energy and its agents attending. Because the original biological assessment submitted with the request for formal

consultation lacked sufficient data to analyze project impacts on Peninsular bighorn sheep, the Service requested additional information in a memorandum dated July 6, 2011. BLM submitted a revised biological assessment addressing our concerns on August 2, 2011. After the initiation of consultation, the applicant proposed funding the restoration of Carrizo Marsh to meet permit requirements of the BLM, Corps, and CDFG, including compensation for impacts to Peninsular bighorn sheep. Because this action was added to the description of the proposed project and vireos have been documented in Carrizo Marsh, BLM added the vireo to the consultation for the proposed project.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following description of the proposed action is a summary of three documents (i.e., Helix 2011a and 2011b, and BLM 2011) and modifications based on comments received on the draft biological opinion. The proposed action is the issuance of a 12,458-acre (ac) ROW grant by BLM to the applicant that would authorize construction, operation and maintenance, and decommissioning of the 12,484-ac Ocotillo Wind Energy Facility. Issuance of an individual permit by the Corps in compliance with section 404 of the Clean Water Act is also required for approval of this project. The permit would authorize impacts to approximately 5.57 ac of waters of the U.S. associated with the proposed project. The BLM, acting as Federal lead agency for the purposes of this consultation, prepared the biological assessment on behalf of the Corps.

The proposed project is located at the western boundary of Imperial County, California. The project site is divided into two sections. The majority of Site 1 is situated north of Interstate 8 (I-8), from the Imperial County/San Diego County border on its western edge to approximately 1.5 miles (mi) northeast of the town of Ocotillo at its eastern edge. State Route (SR) S2 bisects Site 1. Site 2 is located approximately 1.1 mi south of Ocotillo and directly south of SR 98. Collectively, Sites 1 and 2 are hereafter referred to as the project site. All acreage is on BLM land except a single 26-ac parcel of private land adjacent to Site 1. The project would produce 356.5 MW of electricity.

The project site occurs within an area covered by BLM's California Desert Conservation Area (CDCA) Plan of 1980, as amended. Because the CDCA Plan does not specifically contemplate wind energy development, BLM is proposing an amendment to the CDCA Plan to allow potential authorization of the proposed project. Land in the area is classified as Multiple-Use Class L (Limited Use), which allows for wind energy development if the requirements of the National Environmental Planning Act (NEPA) are met.

As partial compensation for project impacts, Ocotillo Express LLC proposes to fund the removal of tamarisk or saltcedar (*Tamarix* spp.) from the approximately 318-ac Carrizo Marsh, in Anza-Borrego Desert State Park (State Park). A prescribed burn would be designed to remove about 171 ac of tamarisk. On approximately 128 additional ac, including where tamarisk is interspersed with native vegetation, tamarisk removal would be accomplished by a variety of

mechanical means, such as ripping plants out by the roots, stump cutting followed by herbicide application, or foliar herbicide application. Portions of the marsh with patches of native vegetation greater than 0.25 ac in size would be preserved, totaling approximately 19 ac of preserved vegetation. Following initial tamarisk removal, Carrizo Marsh would be monitored annually, with tamarisk control and other maintenance performed as needed.

Action Area

According to 50 CFR § 402.02, the "action area" means all areas to be affected directly or indirectly by the Federal action; the direct and indirect effects of the proposed action include associated physical, chemical, and/or biological effects of considerable likelihood (Service and NMFS 1998). The action area for the proposed wind farm includes all suitable Peninsular bighorn sheep habitat within the project site, including an area 600 yards wide and extending into suitable habitat outside the project site. The 600-yard area is delimited by the maximum expected area of habitat sheep are likely to react to wind turbine presence and associated impacts, as explained in the Effects of the Action section below. For the proposed restoration of Carrizo Marsh, the action area includes a 600-foot (ft) zone around the proposed restoration area. This zone is based on the 300-ft radius area of vegetation used within this biological opinion to define a vireo nesting territory. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon this action area.

Project Components

Construction

Facilities would consist of up to 155 wind turbines, above- and below-ground electrical transmission/collection systems for collecting the power generated by each turbine, a 2.1-ac electrical substation, an approximately 23.5-ac interconnection switchyard, a 3.3-ac operations and maintenance (O&M) building, 42 mi of access roads, three 262.5-ft meteorological towers, and an approximately 50-ft biological monitoring observation tower. Construction would also require a concrete batch plant. Disturbance acreages during construction for each component are detailed in Table 1. The 9- to12-month project would be built in a single phase.

Major construction activities at each turbine location include foundation construction, crane pad construction, wind turbine component unloading and laydown, and turbine erection. The total height of each wind turbine would be between 428 and 448 ft, depending on the type of rotor blades that are used. Each wind turbine would have a hub height of 262 ft and a rotor diameter of 351 to 371 ft. Turbines would be tapered tubular steel structures approximately 15 ft in diameter at the base. Each turbine would be supported by an excavated, steel-reinforced concrete foundation backfilled with native soil. Turbine components would arrive to each turbine site by truck. A crane would unload and stage each component in a location within the temporary construction area. Each turbine would include an approximately 300-ft diameter work area for the crane pad, equipment laydown, assembly of turbine blades, and other construction needs. Crane pads supporting the crane necessary for tower/turbine erection would be either

Table 1. Proposed Action Components and Maximum Disturbance Acreages

Facility component	Disturbance during construction, total (ac)	Disturbance from permanent structures, total (ac)	Construction disturbance in sheep habitat (ac)	Permanent structures disturbance in sheep habitat (ac)
turbine foundations and crane pads	218.4	15.6	50.5	3.6
access roads/collector lines/crane walk	248.6	104.8	59.9	31.2
substation/switchyard	0.7	31.7	0.7	8.3
O&M facility and biological monitoring tower	0	3.3		
batch plant and laydown/ parking/staging area†	29.4	0	12.3 (laydown only)	0
meteorological towers	2.0	0.1	0.7	0
Total	**499.1**	**155.5**	**124.1**	**43.1**

† batch plant/laydown area = 11.5 ac, staging area = 10.0 ac, storage areas = 7.9 ac

compacted native soil or compacted aggregate base gravel, and would remain in place throughout the life of the project in case needed for maintenance. Each pad is 40 ft by 100 ft.

Electricity would run from pad-mounted transformers beside each turbine to the underground collection system, which would connect to the proposed substation. Constructing the collection system would require digging a trench 2-ft wide and 4-ft deep, with a construction disturbance width of approximately 15 ft. This disturbance area would be adjacent to the 36-ft-wide construction roadway areas. The collection system would include 23 34.5-kV electrical collection system circuits connecting to the 500-kV main transformer at the proposed substation/switchyard.

The substation/switchyard would have a permanent footprint of 31.7 ac. The switchyard would be owned by San Diego Gas and Electric (SDG&E). An approximately 600-ft-long overhead transmission line would connect the switchyard to the new Sunrise Powerlink 500 kV transmission line now under construction and scheduled for completion in October 2012. The point of interconnection for the project would be next to the proposed substation. A 150-ft long overhead transmission line would connect the switchyard to the substation. No other overhead transmission lines are proposed for this project.

The project would include construction of 42 mi of roads for access to the O&M building and each turbine. Access roads would be cleared of vegetation and graded. Permanent road width would be 20 ft. During construction, these roads would be enlarged to 36-ft wide to facilitate access by the large tracked cranes used in turbine erection.

Temporary ancillary facilities required during construction include an 11.5-ac batch plant/ laydown area, 10-ac staging area, and 7.9 ac of storage areas. The 11.5-ac batch plant/laydown

area would be used to mix and prepare the concrete used for the foundations of the turbines, the substation transformers, the O&M building, and other project facilities. The batch plant/laydown area would be cleared, graded, and compacted and covered with gravel as needed. This area would include a mixing plant, areas for sand and gravel stockpiles, associated access roads, and truck loading and turn-around areas. Construction parking areas and office trailers would be located within the batch plant/laydown area and the substation area. The 10-ac staging area would be located along the existing railroad tracks within Site 1 and would be used to store large equipment and project materials. Smaller storage areas would be placed throughout the site to store small equipment in metal storage containers.

Up to three free-standing meteorological towers are proposed for the project site. The temporary guyed towers now on site would be removed. Construction would also include erection of an approximately 50-ft biological monitoring tower designed to detect bats and birds, including golden eagle (*Aquila chrysaetos*). The tower would also be used as part of sheep detection and monitoring efforts (see O&M Measures 1c, d, and e). The tower is included in the footprint of the O&M facility.

Impacts resulting in the discharge of fill material and requiring an individual permit include construction of the access roads, some turbine footings, associated maintenance areas, laydown areas, and the underground utility lines.

Operations and Maintenance

O&M would occur throughout the life of the project. Routine maintenance activities consisting of visual inspections of wind turbine components and fasteners, oil changes, and gearbox lubrication would result in regular truck traffic on access roads throughout the year. Access roads would be regraded as necessary to facilitate O&M. Major maintenance activities, like road grading, removal of turbine blades or components, or use of large equipment (e.g., cranes), would be scheduled to provide the least disturbance to sensitive biological resources noted for the site, including Peninsular bighorn sheep.

Decommissioning

The ROW grant for the proposed wind farm is 30 years, but the operational life of the facility may be longer or shorter depending on economic or other circumstances. If permanent closure is imminent, BLM would require a decommissioning plan be developed and implemented. The procedures provided in any decommissioning plan would be developed to ensure compliance with applicable laws and regulations and to ensure protection of public health and safety and the environment. The decommissioning plan would be submitted to the BLM for review and approval prior to a closure of the project site. According to the revised biological assessment, conservation measures developed for construction would also apply to comparable activities during decommissioning (Helix 2011a). Reclamation would include removal of the turbines, above-ground electrical tower components, and substation components. All below-ground infrastructures, such as tower foundations and electrical collection lines, would be removed to a

depth of 3 ft. Infrastructure deeper than 3 ft would be left in place. At BLM's discretion, roads would be removed. All roads and tower pads would be restored in accordance with the BLM-approved decommissioning plan. When the BLM begins to consider decommissioning, the agency would contact the Service to determine if additional consultation, pursuant to section 7(a)(2) of the Act, would be appropriate. The Corps is not including activities related to decommissioning in their review of an individual permit. If such a permit is determined necessary for decommissioning activities, the applicant would need to apply separately for that permit, and consultation initiated by the Corps, if appropriate.

Conservation Measures

The proposed action includes avoidance, minimization, and compensation measures that would be implemented by the applicant to reduce and offset potential adverse effects to Peninsular bighorn sheep and vireo. The Service, BLM, Corps, CDFG, and applicant worked closely on developing these measures. By agreement, the Corps will have jurisdiction over those measures pertaining to the restoration of Carrizo Marsh and associated impacts to the vireo, while the BLM will assume responsibility for compliance with all other measures.

Wind Farm and Associated Peninsular Bighorn Sheep Measures

Construction

Ocotillo Express LLC will implement the following measures (Construction Measures 1-13) prior to and/or during construction of the wind farm:

1. Speed limits along all access roads will not exceed 15 mi per hour.

2. Prepare and implement an integrated weed management plan to control nonnative weeds in cooperation with the BLM and County of Imperial. The plan will include procedures to help minimize the introduction of new weed species, an assessment of the invasive weed species known within the project area, and procedures to control their spread on site and to adjacent offsite areas. This plan will be submitted to the BLM and County of Imperial for review and approval prior to the start of construction and will be implemented for the life of the project.

3. Minimize night lighting during construction by using shielded directional lighting pointed downward, thereby avoiding illumination of adjacent natural areas and the night sky.

4. Prior to project initiation, a worker education awareness program (WEAP) will be developed and implemented and will be available in English and Spanish. The WEAP will be presented to all workers on the project site throughout the life of the project. Multiple sessions of the presentation may be given to accommodate training all workers. Wallet-sized cards summarizing the information will be provided to all construction and O&M

personnel. The WEAP will be approved by the BLM, Service, and CDFG, and will include the following:

a. A description of Peninsular bighorn sheep, including photos and how to identify them.

b. The biology and status of Peninsular bighorn sheep.

c. A summary of the Peninsular bighorn sheep-related construction measures described in this biological opinion.

d. An explanation of the function of flagging that designates authorized work areas.

e. Actions and reporting procedures to be used if a sheep is encountered.

5. Prior to ground-disturbing activities, an individual will be designated and approved by the Service and BLM as the Designated Biologist (i.e., field contact representative). The Designated Biologist must have: 1) a Bachelor's degree with an emphasis in ecology, natural resource management, or related science; 2) 3 years of experience in field biology or current certification by a nationally recognized biological society such as The Ecological Society of America or the Wildlife Society; 3) previous experience with applying terms and conditions of a biological opinion; and 4) an appropriate permit and/or training if conducting focused or protocol surveys for listed or proposed species. The Designated Biologist will be employed for the period during which ongoing construction and post-construction monitoring and reporting by an approved biologist is required, such as annual reporting on habitat restoration. The Designated Biologist will be responsible for overseeing successful implementation of all biological measures and reporting requirements, including those in this biological opinion. Each successive Designated Biologist will be approved by the BLM's Authorized Officer (i.e., BLM field manager, El Centro). The Designated Biologist will have the authority to ensure compliance with conservation measures for the Peninsular bighorn sheep set forth in this biological opinion and will be the primary agency contact for the implementation of these measures. The Designated Biologist will have the authority and responsibility to halt any project activities that are in violation of the conservation measures. A detailed list of responsibilities of the Designated Biologist is summarized below. To avoid and minimize effects to biological resources, the Designated Biologist will:

a. Notify BLM's Authorized Officer and Service at least 14 calendar days before the initiation of project ground-disturbing activities.

b. Immediately notify BLM's Authorized Officer and Service in writing if Ocotillo Express LLC does not comply with any conservation measures including, but not limited to, any actual or anticipated failure to implement conservation measures within the periods specified.

c. Conduct daily compliance inspections during ongoing construction during clearing, grubbing, and grading, as well as after clearing, grubbing, and grading are completed, and submit a monthly compliance report to BLM's Authorized Officer until construction is complete.

6. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of construction materials and spoils) will be delineated with stakes and flagging prior to disturbance. Spoils will be stockpiled in disturbed areas within the flagged project site that lack native vegetation or where habitat quality is poor, as recommended by the Designated Biologist. To the extent possible, disturbance of shrubs and surface soils due to stockpiling will be minimized. All disturbances, vehicles, and equipment will be confined to the flagged areas and outside of avoided waters of the U.S.

7. Biological Monitor(s) will be employed to assist the Designated Biologist in conducting preconstruction surveys and monitoring ground disturbance, grading, and construction, O&M as needed, decommissioning, and restoration activities. The Biological Monitor(s) will have sufficient education and field experience to understand Peninsular bighorn sheep biology and be able to identify sheep and sheep sign. The Designated Biologist will submit a resume, at least 3 references, and contact information for each prospective Biological Monitor to the BLM for approval. To avoid and minimize effects to biological resources, the Biological Monitor(s) will assist the Designated Biologist and Bighorn Sheep Monitor (Construction Measure 10) with the following:

   a. Be present during construction activities that take place in bighorn sheep habitat to avoid or minimize harm or injury to sheep (see Construction Measure 8-11).

   b. At the end of each work day, inspect all potential wildlife pitfalls (e.g., trenches, bores) for wildlife and remove wildlife as necessary and as permitted. If the potential pitfalls will not be immediately backfilled following inspection, the Biological Monitor will ensure that the construction crew slopes the ends of the excavation (3:1 slope) to provide wildlife escape ramps or will ensure that the construction crew completely and securely covers the excavation to prevent wildlife entry.

8. Construction of wind turbines and construction and use of access roads, with the exception of Dos Cabezas Road, within 0.75 mi of all identified bighorn lambing sites will be avoided during the lambing season (i.e., January 1 through June 30). The existing Dos Cabezas Road along the edge of the 0.75 mi area may be improved and used during the lambing season for project construction purposes. Eight turbines (turbines 22-28 and 77) and one access road to those turbines are proposed within 0.75 mi of lambing sites used in 2010 in the "I-8 Island" (i.e., the area between the eastbound and westbound lanes of I-8, the northern portion of which is in the project site). A direct line of sight exists between the lambing areas and proposed turbines. Four additional turbines (turbines 19-21 and 29) would not be constructed during the lambing season because the proposed access road to these turbines would also be restricted from use by vehicle traffic during the lambing

season. This restriction would apply even if the proposed access road is constructed outside of the lambing season. The Bighorn Sheep Monitor (Construction Measure 10) will coordinate with the Service and CDFG to help determine the locations of any nearby lambing sites being used prior to and during the construction period of the project. Construction activities would be avoided within 0.75 mi of both 2010 lambing areas and any lambing sites in use during the year of construction, as determined by the BLM, CDFG, and the Bighorn Sheep Monitor.

9. Prior to construction, a Peninsular bighorn sheep monitoring plan will be submitted to the BLM, Service, and CDFG for review and approval. This plan will describe in detail monitoring and reporting procedures related to immediate and long-term project effects during construction, operation, and maintenance phases.

10. A biological consultant approved by the BLM, Service, and CDFG will be retained by Ocotillo Express LLC to serve as the Bighorn Sheep Monitor of construction activities with a focus on suitable sheep habitat in the project area, in accordance with the bighorn sheep monitoring plan for the project (Construction Measure 9). The Bighorn Sheep Monitor will be present during all phases of construction and directly monitor construction activities. If a Peninsular bighorn sheep is observed within 325 yards of active construction, then construction activities will stop until the Bighorn Sheep Monitor verifies that the animal has moved of its own accord to at least 325 yards from construction activities at which time construction activities could proceed. The Bighorn Sheep Monitor will have complete access to the biological observation tower and radar and camera system (O&M Measure 1e). The Bighorn Sheep Monitor will prepare daily monitoring reports that will be submitted to the Designated Biologist and BLM, including the Service and CDFG, if requested.

11. A biological consultant approved by the BLM, Service, and CDFG will be retained by Ocotillo Express LLC to collect data on Peninsular bighorn sheep movements within the project boundary and 600 yards beyond during the construction phase. The study methods will be described in the bighorn sheep monitoring plan (Construction Measure 9).

12. All temporarily disturbed areas within the project site will be revegetated according to a habitat restoration/revegetation plan approved by the BLM, Service, and CDFG. This plan must be approved in writing prior to the initiation of any vegetation-disturbing activities. Restoration involves recontouring the land and replacing topsoil (if it was collected). Revegetation involves planting seed and/or container stock, maintaining the plantings (e.g., weeding, replacement planting, supplemental watering), and monitoring the restored/ revegetated areas for a period of 5 years (or less if the restoration/revegetation meets all success criteria prior to the end of 5 years). The plan will include measures for conducting revegetation/restoration in desert communities, including alleviating soil compaction, returning the surface to its original contours, pitting, or imprinting the surface to allow small areas where seeds and rain water can be captured, planting seedlings with root mass necessary to survive without watering, planting seedlings in the spring with herbivory

cages, broadcasting locally collected seed immediately prior to the rainy season, and covering seeds with mulch. If after 5 years of monitoring there are areas that do not meet the success criteria outlined in the plan, areas will be acquired and conserved off site at a 1:1 ratio of equal or better quality habitat compared to what was impacted.

13. Fencing installed around cultural sites will be standard temporary construction fencing, silt fencing, or chain-link fence at least 7 feet tall. If any other type of fencing is considered for use, that fence design will be approved by the BLM and Service as not likely to pose a threat to Peninsular bighorn sheep.

Operations and Maintenance

Ocotillo Express LLC will implement the following measures (O&M Measures 1-8) during the O&M of the wind farm:

1. The Designated Biologist, Biological Monitor(s), and/or Bighorn Sheep Monitor will evaluate and implement the best measures to minimize disturbance to Peninsular bighorn sheep. These measures will include:

    a. The Bighorn Sheep Monitor (Construction Measure 10) will monitor O&M activities in accordance with the measures described in the Peninsular bighorn sheep monitoring plan (Construction Measure 9). The Bighorn Sheep Monitor will be on site during all scheduled major maintenance activities (i.e., activities that require soil disturbance, removal of turbine blades or components, or use of large equipment such as cranes) conducted in suitable habitat for the life of the project. If sheep are observed or detected within 325 yards of O&M activities by the Designated Biologist, Monitoring Biologist, Bighorn Sheep Monitor, or any other means, those activities will stop and will not be resumed until the Bighorn Sheep Monitor verifies that the sheep has moved of its own accord to at least 325 yards away from these activities. In the event that unscheduled emergency repairs (i.e., those activities that would be necessary to protect human health and safety or prevent irreparable damage to wind turbines) are needed in suitable habitat, maintenance staff and/or biology staff will make an assessment of the presence of sheep in the vicinity of the repair site(s). Emergency repairs necessary to protect human health and safety or to prevent irreparable damage to wind turbines may proceed whether or not bighorn are present in the vicinity of the repair areas, although every effort will be made to minimize any impacts to bighorn through coordination between O&M staff and the Bighorn Sheep Monitor. If Peninsular bighorn sheep are not observed, the Bighorn Sheep Monitor will be notified by O&M staff within 24 hours of the start of repairs. If animals are observed on site, the Bighorn Sheep Monitor will be immediately called to the site to monitor repairs.

    b. The Bighorn Sheep Monitor (Construction Measure 10) and other biological monitors will be employed during the 9 to 12-month construction phase and as needed for the life of the project. As needed means that the Bighorn Sheep Monitor would be present for

any "major" O&M activity (i.e., activities that require soil disturbance, removal of turbine blades or components, or large equipment such as cranes) that occurs within suitable habitat for Peninsular bighorn sheep. Regular O&M activities, such as driving access roads, visually inspecting turbines, inspection of gear boxes, would not require the Bighorn Sheep Monitor to be present, since these activities would occur almost daily.

c. Ocotillo Express LLC will employ a biologist at the biological observation tower full time during daylight hours for the first 10 years of operation. The monitoring biologist will be approved by the BLM and Service. The primary responsibility of the biologist will be to monitor for raptors, but the biologist will also help to monitor for sheep in the project area.

d. Ocotillo Express LLC's proposed biological observation tower will be used to help monitor for Peninsular bighorn sheep, including raptor species and other wildlife. The biologist to be employed at the tower full time during daylight hours would focus on identifying golden eagles near the project site, but will also help to detect sheep presence within and adjacent to the project site. A Merlin Avian Radar System will be installed on top of the tower and would include horizontal-band and vertical-band radar and a high-resolution video camera. The radar and camera system will be programmed to monitor for raptors and not Peninsular bighorn sheep during O&M, although incidental detection of sheep is possible. The approximately 50-ft tall tower will include a 360-degree view of the site from an enclosed control room as well as radar monitors, and video monitors and controls for monitoring avian species. Ocotillo Express LLC will also contribute to the Service, BLM, and CDFG any Peninsular bighorn sheep data collected from its radar/camera monitoring system at the biological observation tower. Sheep movements detected within and adjacent to the project site will be used to determine the areas where O&M activities should be avoided, in accordance with O&M Measures1a and 5.

e. The Bighorn Sheep Monitor will have complete access to the biological observation tower and radar and camera system.

2. All vehicles will remain on designated access/maintenance roads and observe a 15 mph speed limit.

3. Invasive plant species will be controlled during O&M for the life of the project according to the measures provided in the integrated weed management plan.

4. Night lighting will be minimized by using directional lighting that is shielded down away from the surrounding natural areas and the night sky.

5. Routinely scheduled major maintenance activities of wind turbines 22-28 and 77, and the associated access roads between these turbines would be scheduled between July 1 and

December 31 (outside the lambing season). Major maintenance activities may include activities that require soil disturbance, removal of turbine blades or components, or use of large equipment such as cranes. Unscheduled major maintenance of roads and structural system may not be completely restricted during the lambing season due to safety of the public and protection of investment. In the event of a non-emergency but not routinely scheduled major maintenance need, the Bighorn Sheep Monitor will be called to the site to monitor the maintenance activities. Non-emergency maintenance will not begin until the monitor is on site. Regular, routine maintenance would not be constrained by the lambing season. Regular, routine maintenance would consist of work inside the tower and inspection of the external pad mount transformer. In addition, visual inspections of the operating turbines would need to be conducted regularly (daily) from the ground to ensure proper function of the components. Regular (scheduled and non-scheduled) maintenance inside the turbine towers cannot be restricted during the lambing season because regular maintenance is essential to ensure proper functionality of the turbines and to meet warranty requirements.

6. Ocotillo Express LLC will fence around the O&M building, substation/switchyard, and meteorological towers. Fencing will be approximately 7-ft tall, heavy-duty chain link. As deemed necessary for security, some fences will be outfitted with barbed wire or razor wire at the top.

7. Ocotillo Express LLC will prepare an O&M wildlife mortality reporting program to be approved by BLM, which will include among other measures, rules for identification and reporting of any dead or injured animals, of any species, observed by any employees or contractors during the O&M phase of the project. An appropriate reporting format and process for unlisted species will be developed in coordination with the Service's Migratory Bird Program and BLM. Required reporting for Peninsular bighorn sheep and vireo specimens is outlined in the Terms and Conditions section of the Incidental Take Statement.

8. Upon the closing and initial funding of the project financing (financial closing), Ocotillo Express LLC will provide $200,000 in funding towards a Peninsular bighorn sheep study or research program. In a meeting with Caltrans District 11 environmental staff, the Service, and a group of bighorn sheep experts, the top priority for that funding would be to develop a feasibility study for a land bridge across the eastbound lanes of I- 8, as a means of maintaining Peninsular bighorn sheep movement south of the interstate and improving the possibility of reconnection with populations in Mexico.

<u>Reporting</u>

Reporting during construction and O&M to demonstrate compliance with the conservation measures, to assess their effectiveness, and to make adjustments, if necessary, will include the following:

1. Environmental Compliance. Ocotillo Express LLC will hire a third party Environmental Compliance Manager during construction, per the requirements of the BLM. During O&M, Ocotillo Express LLC also will have an Operations Compliance Manager on staff that will be responsible for ensuring compliance with requirements and all conservation measures. These individuals would also be responsible for associated reporting.

2. Annual Compliance Report. No later than January 31 of each year, an annual report will be submitted to BLM, Service, and CDFG documenting the implementation of the following programs/plans as well as compliance/non-compliance with each conservation measure:
   - weed management plan
   - raven control plan
   - worker education awareness program
   - habitat restoration/revegetation plan
   - wildlife mortality reporting program
   - Peninsular bighorn sheep monitoring plan

3. Peninsular Bighorn Sheep Status Report. No later than January 31 of each of the first 3 years the project remains in operation, the Designated Biologist will provide the BLM's Authorized Officer, Service, and CDFG the subject report that will include at a minimum:
   - a general description of the status of peninsular bighorn sheep in the project site.
   - information from the annual compliance report documenting compliance/non-compliance with each conservation measure.
   - an assessment of the effectiveness of each conservation measure.
   - a summary and map of sheep sightings within and adjacent to the project site
   - and, recommendations on how the conservation measures might be changed to more effectively avoid or minimize future effects to bighorn sheep.

Carrizo Marsh Restoration and Associated Vireo Measures

In an effort to minimize and avoid impacts to the vireo, Ocotillo Express LLC will implement the following avoidance and minimization measures (Vireo Measures 1-12) for the approximately 318-ac Carrizo Marsh restoration project:

1. Ocotillo Express LLC will hire a qualified biologist to conduct focused surveys according to the Service's protocol for vireo in the 318-ac Carrizo Marsh project site. A qualified biologist will have knowledge of vireo biology and ecology, be able to identify vireo visually and acoustically, and have a minimum of 20 hours of survey experience for this species. Focused surveys will include 8 site visits approximately 10 days apart between April 10 and July 31 of the year in which initial restoration is to occur. A survey report with a map and summary of the results will be provided to the BLM, Service, Corps, CDFG, and State Parks.

2. Firebreaks will be created to maximize preservation of native species within and adjacent to the marsh. Creation of firebreaks is planned to occur from July through October using

various methods (e.g., a combination of mulching, mowing, cutting trees using chainsaws). Creation of firebreaks may occur prior to March 15 if project permits are obtained prior to that date. Tamarisk would be piled at the edge of the burn areas and allowed to dry out prior to the prescribed burn. Firebreak creation activities would take place at least 300 ft from the center point of the vireo use area documented during the focused surveys (Vireo Measure 1) or as approved by the Service for anything less than 300 ft.

3. Creation of firebreaks will be supervised by a Service-approved biologist to ensure these activities comply with the avoidance and minimization measures described here. The biologist will have the authority to direct maintenance crews to stop work if vireos are detected within 300 ft of work activities. A 300-ft setback from the center point of vireo use area would be created and maintained until the end of the breeding season (September 15) or until vireo nestlings have fledged and are no longer dependent on the nest site, as determined by the monitoring biologist.

4. Islands of preserved habitat approximately 6.5 ac in size will be established and centered on the center point of each territorial vireo documented during the focused surveys (Vireo Measure 1). A 6.5-ac island is considered adequate based on the typical vireo territory size, which ranges from 0.5 to 7.5 ac, as noted in the 1998 draft recovery plan for the species; this dimension also represents an approximately 300-ft radius around the center point of the estimated territory location. The islands will include as much native habitat [i.e., mesquite (*Prosopis* spp.), arrow-weed (*Pluchea sericea*)] as possible. The boundary of each of the 6.5-ac areas will be clearly marked with highly visible flagging.

5. Tamarisk within the island created around an occupied territory would be removed outside the vireo breeding season (March 15 through September 15) or once all vireos (adults and young of the year) have left the area as determined by the monitoring biologist.

6. If firebreaks are created during the vireo breeding season, the portions nearest to vireo territories will be the last to be created, thereby minimizing exposure of vireo to mechanized noise during the core of breeding season.

7. All work related to Carrizo Marsh restoration will be performed during daylight hours. No nighttime operations (with or without lighting) will occur.

8. Because of known site fidelity of vireos, patches of native habitat will be preserved within the marsh to encourage vireos to return to the marsh during the 5-year restoration effort. Two large patches (approximately 3.5 ac and 2.5 ac) and many smaller patches (approximately 1 ac) will be preserved.

9. In years subsequent to the initial burn, tamarisk removal associated with post-burn maintenance and spot treatment of resprouted individuals will be conducted outside of vireo breeding season as much as possible. When tamarisk removal must occur during the

breeding season, avoidance measures described above will be implemented to avoid and minimize impacts to the vireo.

10. During the 5-year maintenance and monitoring period subsequent to the initial burn, Ocotillo Express LLC will hire a qualified biologist to conduct focused vireo surveys in the 318-ac Carrizo Marsh project area. The survey approach would include three site visits each year approximately 10 to 14 days apart during the peak vireo breeding season (May 1 through June 15) to document the number and locations of breeding territories in the marsh. A survey report with a map and summary of the results will be provided to the Corps, BLM, Service, CDFG, and State Parks following surveys each year.

11. A final Carrizo Marsh restoration plan will be submitted to the BLM, Service, Corps, CDFG, and State Parks for review and approval at least 15 days prior to groundbreaking. The plan will include the finalized project description details described in this biological opinion and the draft offsite habitat restoration plan (Helix 2011b), and will not include any substantial changes that would lead to different effects on vireo than those analyzed in this biological opinion.

12. Ocotillo Express LLC agrees to restore the entire 318-ac Carrizo Marsh through the initial removal of tamarisk and 5-years of maintenance, monitoring and reporting with the understanding that the restoration would benefit the Peninsular bighorn sheep and satisfy mitigation requirements for impacts to Corps and CDFG jurisdictional habitats and sensitive vegetation communities associated with the Ocotillo Wind Energy Facility project. Ocotillo Express LLC agrees to fund up to a $500,000 endowment to ensure perpetual management of the 318-ac Carrizo Marsh. The endowment will be a long-term investment intended to 1) exist indefinitely and 2) fund necessary land management activities, to the extent practicable, from investment earnings on the interest rather than from the initial principal itself. Such an endowment would be in place prior to the start of any work in waters of the U.S., as determined by the Corps. Ocotillo Express LLC reserves the right to work with another party who may need jurisdictional mitigation for the Corps and CDFG as a funding partner to establish the funding of the non-wasting endowment. Ocotillo Express LLC would identify this partner immediately and provide the additional information to the Service, BLM, Corps, and CDFG immediately for their consideration.

STATUS OF THE SPECIES RANGE-WIDE

Peninsular Bighorn Sheep

The following discussion briefly summarizes information about Peninsular bighorn sheep relative to its legal status and biology, as discussed in the Service's (1) 5-year review for the species (Service 2011a) at http://ecos.fws.gov/docs/five_year_review/doc3637.pdf; (2) recovery plan (Service 2000) at http://ecos.fws.gov/docs/recovery_plan/001025.pdf; and (3) revised

critical habitat (74 FR 17288). Please refer to these documents for more detailed information on the Peninsular bighorn sheep.

Legal Status

Desert bighorn sheep in the Peninsular Ranges of the United States were federally listed as endangered on March 18, 1998 (63 FR 13134) as a distinct population segment (DPS) of the species *Ovis canadensis*. The Service revised this listing on April 14, 2009, to identify the listed unit as an endangered DPS of the subspecies (*Ovis canadensis nelsoni*) (74 FR 17288). A recovery plan was approved in October 2000. The California Fish and Game Commission listed bighorn sheep inhabiting the Peninsular Ranges as "rare" in 1971. In 1984, the designation was changed to "threatened" by the CDFG to conform to the terminology in the amended California Endangered Species Act. In addition, bighorn sheep in the Peninsular Ranges are "fully protected" under State law, per California Department of Fish and Game Code 4700, which generally does not allow "incidental take" of fully protected species.

Based largely on the recovery plan, the Service designated approximately 844,897 ac of critical habitat on February 1, 2001 (66 FR 8650). Following a challenge in court and a review of the best scientific information available at the time of the remand, the Service designated approximately 376,938 ac of revised critical habitat on April 14, 2009 (74 FR 17288). Please see the revised designation for a description of the primary constituent elements of critical habitat. Designated critical habitat in the southern Peninsular Ranges exists north, south, and west of the proposed project, outside the action area.

Habitat Affinities

Within the United States, the range of Peninsular bighorn sheep extends along the Peninsular Ranges from the San Jacinto Mountains in Riverside County south to the Mexican border. Bighorn sheep habitat in these mountain ranges is restricted to east-facing lower-elevation slopes that are typically below 4,600 ft along the northwestern edge of the Colorado Desert portion of the Sonoran Desert (Jorgensen and Turner 1975, DeForge et al. 1997). As described in the 5-year review, bighorn sheep in the Peninsular Ranges and elsewhere throughout the desert southwest have habitat requirements that relate to topography, visibility, water availability, and forage quality and quantity (Service 2011a).

Connectivity among different habitat types and discrete mountain ranges is important for maintaining functional metapopulations (Schwartz et al. 1986; Bleich et al. 1990, 1996) and access to the range of resources needed by sheep. Dispersal (one-way movements) across open, flat desert to colonize or re-colonize distant mountain ranges is documented (Simmons 1969, Boyce et al. 1999, and Epps et al. 2010) and continues to occur in areas where human activities and developments do not physically block bighorns or elicit behavioral avoidance reactions. For examples, please see the biological opinion for the Imperial Valley Solar (Solar Two) Project (Service 2010a). Colonizations of isolated mountain ranges by desert bighorn sheep, which required intermountain movements, have been reported in California (Epps et al. 2010).

As parturition approaches, ewes seek secluded sites with shelter, escape terrain, and unobstructed views (Turner and Hansen 1980). They isolate themselves from other females while bearing their lambs (Etchberger and Krausman 1999). Lambs usually are weaned by 6 months of age (Hansen and Deming 1980, Wehausen 1980). In ruminants, reproductive success is related to the mother's body weight, access to resources, quality of home range, and age (Etchberger and Krausman 1999). Survival of offspring also depends on birth weight and parturition date. When resources are scarce, female sheep reduce the care of lambs to favor their own nutritional requirements (Festa-Bianchet and Jorgenson 1996). Ewes that fail to acquire a minimum level of energy reserves (i.e., body weight) may not conceive (Wehausen 1984) or will produce smaller offspring with a poorer chance of survival (Price and White 1985).

Lamb and yearling age classes experience high mortality rates relative to adult bighorns. After reaching adulthood at 2 years of age, bighorn sheep survival is high until 10 years of age (Hansen 1980), or until shortly before the age of ecological longevity (Cowan and Geist 1971). For further description of the species' life history and habitat needs, please see the 5-year review (Service 2011a) and recovery plan (Service 2000).

Distribution

While the distribution and abundance of Peninsular bighorn sheep were dramatically reduced in the latter part of the twentieth century, the population has been progressing towards recovery since being listed in 1998. From a rangewide low of 276 animals in 1996 (Service 2011a), the population has expanded to an estimated 955 animals in 2010 (CDFG 2011). At least nine ewe groups (or populations) now exist in California. The population trajectory of each ewe group appears to be determined independently (Rubin et al. 1998). For further discussion of population distribution and trends, please see the 5-year review (Service 2011a).

Least Bell's Vireo

The following section summarizes information about the vireo relative to relative to its legal status and biology, as discussed in the Service's (1) 5-year review for the species (Service 2006) at http://ecos.fws.gov/docs/five_year_review/doc781.pdf, and (2) draft recovery plan (Service 1998) at http://ecos.fws.gov/docs/recovery_plan/980506.pdf. Please refer to these documents for more detailed information on the vireo.

Listing Status

In response to the dramatic decline of the vireo population and widespread loss of its riparian habitat, the vireo was listed as endangered on May 2, 1986 (51 FR 16474). Critical habitat was designated in February 2, 1994 (59 FR 4845). While a draft recovery plan was published in March 1998 (Service 1998), a final plan has not been issued. The Service's 5-year review for vireo (2006) indicated that, due to new information on the species and an improved understanding of ongoing recovery actions to reduce threats, the recovery goals and strategies should be modified and refined. In addition, we recommended that the vireo should be

downlisted from endangered status to threatened status because of a 10-fold increase in population size since its listing in 1986, expansion of locations with breeding vireo throughout southern California, and conservation and management of suitable breeding habitat throughout its range (Service 2006).

Habitat Affinities

Vireos are an obligate riparian species during the breeding season, and prefer diverse early successional riparian habitat. Vireos use a number of riparian habitat types, including cottonwood-willow woodlands/forests, oak woodlands, and mule fat scrub. Occupied breeding habitats include dense cover within 3 to 6 ft of the ground, where nests are typically placed, and a dense, stratified canopy for foraging. Plant species composition does not appear as important a determinant in nesting site selection as habitat structure. For more information on habitat requirements during breeding and migration, please see the draft recovery plan (Service 1998).

Distribution

The vireo historically occupied willow riparian habitats from Tehama County in northern California, southward to northwestern Baja California, Mexico, and as far east as Owens Valley, Death Valley, and the Mojave River (Grinnell and Miller 1944, Service 1998). Greater than 99 percent of the remaining vireos occur in southern California, south of the Tehachapi Mountains (Service 2006). Thus, despite a significant increase in overall population numbers, and a slight shift northward in the species overall distribution, the population remains restricted to the southern portion of its historic range (Service 2006). Abundance rangewide has been relatively constant since the last 5-year review was published (Lynn and Kus 2010, Pike et al. 2010, Jorgensen 2010, McDonald et al. in litt. 2011).

Species Abundance within the Vicinity of the Action Area

Anza-Borrego Desert State Park supports between approximately 85 and 120 territorial males annually. The State Park's efforts to remove brown-headed cowbirds (*Molothrus ater*) contribute to regional recovery of the vireo. Since the mid-1990s, the State Park's population has generally demonstrated an overall increase in average size (McDonald et al. in litt. 2011).

ENVIRONMENTAL BASELINE

Project Site

The project site is in the Yuha Desert, which is in the Colorado Desert portion of the larger Sonoran Desert. This region is characterized as a hot and dry climate with summer high temperatures up to 120°F and less than 3 inches of annual rainfall (ASDM 2010). Elevations in the project site range from approximately 1,490 ft above mean sea level in the southwest portion of the project site to 300 ft elevation in the northeast portion of the site. Elevation generally decreases from the west to the east.

The project site is dominated by desert scrub assemblages of brittlebush (*Encelia farinosa*), cheesebush (*Ambrosia salsola*), creosote bush (*Larrea tridentata*), teddy-bear cholla (*Cylindropuntia bigelovii*), white bursage (*Ambrosia dumosa*), and Wolf's cholla (*Cylindropuntia wolfii*). Other community components include desert agave (*Agave deserti*), desert lavender (*Hyptis emoryi*), four-wing saltbush (*Atriplex canescens*), mesquite, ocotillo (*Fouquieria splendens* subsp. *splendens)*, smoke tree (*Psorothamnus spinosus*) woodland, and badlands.

Several named, dry desert washes cut through the project site and run generally from west to east (i.e., Palm Canyon Wash through the center of Site 1, Myer Wash through the southern portion of Site 1, a portion of Coyote Wash through the northwest portion of Site 2). In addition, hundreds of additional unnamed washes cut through the project site. The named and unnamed washes on site intermittently convey water following rainfall events but are typically dry. The drainages that occur on site are considered waters of the U.S. and State and fall under the jurisdiction of the Corps and CDFG. No permanent or seasonal water sources (e.g., wetlands, guzzlers, tenajas) occur on the project site.

The project site occurs in a designated BLM limited use area in which motorized vehicles are restricted to designated routes of travel. Most of the project site is relatively undisturbed. Some areas are regularly used for camping and firearm activities. The U.S. Border Patrol regularly patrols the action area by vehicle and helicopter. BLM-designated routes-of-travel exist throughout the project site, and a maintenance road occurs along the existing 500 kV transmission line that traverses the middle of the project site running northeast to southwest. While SR S2 bisects the proposed project site, an unmaintained paved road runs along the majority of the southern part of Site 1. SR 98 traverses the action area immediately north of Site 2. In addition, I-8, including the westbound lanes that define the northern boundary of the I-8 Island, runs through the action area. Numerous paved roads associated with the town of Ocotillo exist outside the action area, but in the project vicinity. The San Diego and Arizona Eastern railroad tracks cross through both sites.

Off-highway vehicle (OHV) paths crisscross portions of the project site, most of which are designated routes. Approximately 27 designated routes exist on the project site, approximately 11 of which are within suitable Peninsular bighorn sheep habitat. Illegitimate use is minimal, particularly in vegetated areas not highly conducive to off-trail travel by the majority of OHV types. The majority of OHV users interested in the area choose to go to the sandy areas in the northeastern portion of the project site or to the designated open areas east of the proposed project. That area attracts large groups, organized competitive or commercial events, and most quad users. The BLM reported that only a couple of special recreational use permits have been granted in the vicinity of the proposed project and sheep habitat in the past 10 years (D. Meeks, pers. comm. 2011), and characterized users of OHV trails in sheep habitat and the western part of the proposed project as "the curious guy in his Jeep." OHV groups that attended the scoping meeting for the proposed project were small, local user groups with a history of maintaining a good relationship with the BLM. Although site-specific data are lacking, the action area receives relatively low levels of OHV use and associated impacts to vegetation are minimal compared to

surrounding areas (S. Tyson and A. Trouette, pers. comm. 2011; A. Davenport, pers. comm. December 1, 2011). Other areas of OHV use include Devil's Canyon and the Stagecoach Trail to Mountain Springs (W. Boyce, pers. comm. 2011), where non-authorized use may be increasing (Service 2011a). These areas are typically accessed from the project site or off I-8.

Surrounding land uses outside the action area include Anza-Borrego Desert State Park to the north and west and BLM-administered land to the north, east, and west. The Coyote Mountains Wilderness Area is located to the north, the Jacumba Wilderness Area is to the south, and the Yuha Basin Area of Critical Environmental Concern occurs to the southeast. The town of Ocotillo and several scattered residences outside of the town are located between Sites 1 and 2.

Status of the Species in the Action Area

Peninsular Bighorn Sheep

Past formal consultations

Reinitiation of formal consultation on the effects of the California Desert Conservation Area Plan, as amended, on Peninsular bighorn sheep, Riverside and Imperial counties, California (Service 2010b).

> To provide for management of recreational use, and to resolve other resource and public land use conflicts, section 602(d) of FLPMA directed the Secretary of the Interior to "prepare and implement a comprehensive, long-range plan for management use, development, and protection of the public lands within the California Desert Conservation Area." The CDCA Plan is an over-arching or programmatic plan from which activity-level or more site-specific plans are tiered. This biological opinion replaced the Service's December 2002 (FWS-ERIV/IMP-2810.2) opinion and also revised the January 2003 opinion on the effects of Western Colorado Amendment to the CDCA Plan, Bureau of Land Management route designation, Imperial County, California (FWS-IMP-3327.1).

Reinitiated biological opinion on the effects of the Sunrise Powerlink Transmission Line, Imperial and San Diego counties, California (Service 2010c).

> The entire project spans 120 mi between El Centro and southwestern San Diego County. The ROW bisects bighorn sheep habitat, including critical habitat within the I-8 Island. The construction phase of the project is likely to cause temporary displacement of bighorn sheep due to the numerous low-elevation helicopter flights and the elevated levels of human activity necessary to construct the project.
>
> The applicant reinitiated section 7 consultation to revise the Incidental Take Statement in light of additional survey data. Construction of the portions of the project in bighorn sheep habitat in the I-8 Island is expected to finish before the start of construction of the Ocotillo Wind Energy Facility. Construction of parts of the power line within the project site for

Ocotillo, but outside of suitable sheep habitat would co-occur with construction of the proposed wind facility.

The anticipated level of incidental take resulting from the actions analyzed in the consultations above has not been exceeded.

Species abundance

Peninsular bighorn sheep are wide-ranging mammals that use a wide variety of habitat types. As discussed below, sheep use of the action area is mostly seasonal, and the action area does not encompass the entirety of the home ranges of individuals likely to be affected by the proposed project. Consequently, to inform a determination of population-level impacts of the proposed project, we present here information about the population of sheep that use the action area in the context of the action area and its vicinity.

Peninsular bighorn sheep are present in Carrizo Canyon to the west of the project, Coyote Mountains to the north, Jacumba and In-Ko-Pah Mountains to the west and south, and I-8 Island to the south, including the southwestern portion of the proposed ROW. These sheep are considered part of the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains Recovery Region, the southernmost population described in the recovery plan (Service 2000). Available data indicate that Carrizo Canyon serves as the core use area for the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population of bighorn sheep. The two water sources for this population are Carrizo Creek and Mountain Springs, a water source historically used to fill car radiator coolant tanks on I-8.

The Coyote Mountains seasonally support about 50 bighorns that move in the fall from Carrizo Canyon to the Coyote Mountains, where they generally remain for 6 to 8 months. No water sources are known in the Coyote Mountains, and the group eventually returns to Carrizo Canyon where permanent water sources are available during the hot season. The Coyote Mountains may be used for lambing and rearing because predation risk from mountain lions is lower than Carrizo Canyon.

The Jacumba Mountains form the east side of Carrizo Canyon, and extend southward into Mexico. Peninsular bighorn sheep populations inhabiting this area were poorly known prior to 1968 (Weaver et al. 1968), when CDFG initiated a State-wide inventory of desert bighorn sheep. By 1968, the number of sheep in the area appeared reduced compared to earlier years. Based upon interviews and limited ground surveys, Weaver et al. (1968) estimated 12 animals used Devil's Canyon, 20 individuals used the area south of the I-8 corridor, and 20 animals inhabited Carrizo Gorge to the north. The Jacumba Mountains south of the I-8 corridor were mapped as containing a permanent population of bighorn sheep. The surveys were continued for 3 years and the final population estimate for the Jacumba Mountains was 83 animals total (Weaver 1972).

Helicopter surveys became the favored method for surveying bighorn sheep populations inhabiting remote, roadless areas in the 1980s. A limited number of flights occurred south of I-8, because few animals were regularly observed (Rubin et al. 1998). However, a small population of less than 25 animals was assumed to exist south of the Interstate as reported in 1994 (Torres et al. 1994) when regular biennial, rangewide helicopter surveys of the Peninsular Ranges were started by CDFG. A subsequent aerial survey of the area failed to find any bighorn sheep south of the Interstate or around the I-8 Island, and this population of bighorn was assumed to be extirpated by 1996 (Torres et al. 1996, Rubin et al. 1998, Service 2000). Therefore, subsequent aerial surveys spent minimal time south of Carrizo Gorge (Rubin et al. 1998). The construction of I-8 in the mid-1960s, railroad activity in Carrizo Gorge, livestock grazing, poaching, and fire suppression were suggested as the likely causes of the decline and disappearance of bighorn sheep in the I-8 area south to the Mexican border (Rubin et al. 1998).

Hicks (1978) reported a study that mentioned a sighting of bighorn sheep attempting to cross I-8 near Myer Creek during spring 1978. When questioned, highway maintenance crews said they had not observed sheep in the area since 1971. Additionally, the area around Mountain Springs and I-8 was mentioned as containing bighorn sheep by border crossing individuals from Mexico (Hicks 1978). The number of sheep inhabiting the In-Ko-Pah and Jacumba Mountains was estimated at 80 to 100 animals in the late 1970s. Cunningham (1982) studied bighorn sheep in the area soon after Hicks (1978), and observed that I-8 acted as a barrier to sheep movement. He reported that more than 30 bighorn sheep were believed to inhabit the area south of the Interstate. Cunningham (1982) speculated that the area around the I-8 Island was once important bighorn sheep habitat because six water sources existed relatively close to the freeway from In-Ko-Pah to Ocotillo. Local residents also reported that three of these springs had been used by bighorn sheep, and highway department personnel stated that bighorn sheep were common when construction of I-8 began. The freeway likely bisected a once continuous distribution of bighorn sheep (Cunningham 1982). In summary, populations in the Jacumba Mountains north of I-8 to Carrizo Gorge were well studied and documented by field biologists (see also Olech 1979 and Sanchez 1988). However, population estimates for the area from I-8 to the Mexican border were largely derived from interviewing local residents and highway department personnel.

Helicopter surveys conducted in the mid-1990s, in Baja California, Mexico, documented bighorn sheep south of the border in the Sierra Cucapa Mountains, although the number of bighorn sheep recorded was low (DeForge et al. 1993). Bighorn sheep are also known to inhabit the Sierra Juarez, which is located immediately south of the Jacumba Mountains in Mexico. The distance from the Coyote Mountains to the northern extent of the Sierra Cucapa Mountains is approximately 16 mi, and the distance from the Coyote Mountains to the Sierra Juarez is 20 mi.

For approximately 10 years, bighorn sheep were regarded as absent from the I-8 corridor and southern Jacumba Mountains. Starting in January 2006, bighorn sheep sightings began occurring on a regular basis in the Jacumba Mountains. The first sightings were from the Border Patrol, and they were centered on the Mountain Springs area, including the I-8 Island. The November 2006 CDFG aerial survey detected two ewes in Devil's Canyon and six ewes, four lambs, and four rams overlooking the eastbound lanes of I-8. Follow-up hikes through the area by Esther

Rubin and Service personnel revealed bighorn sheep tracks and fecal piles. Automatic cameras were set up at the permanent water source at Mountain Springs, and several groups of bighorn sheep were photographed and observed. The BLM also supplied photographs and point locations of bighorn sheep observed in the area. During 2007, several visits to the I-8 Island area were made by Service biologists and Caltrans personnel and each observed sheep tracks and fecal pellets. The November 17, 2008, CDFG aerial survey detected five groups of bighorn sheep totaling 30 individuals, which were located within the I-8 Island and just north of the westbound lane. Due to insufficient funds, the aerial survey did not cover the entire area south of I-8 to the international border. Bighorn sheep were subsequently reported south of I-8 by the Border Patrol and biological consultant Arthur Davenport. A field-trip to the border area on April 24, 2008, detected fecal pellets in lower Pinto Wash, which based upon the elevation, topography, and other habitat characteristics suggest bighorn sheep.

The access point most heavily used by sheep to cross the freeway into the I-8 Island from the north appears to be under the two relatively tall traffic bridges that span Devil's Canyon. Plentiful tracks indicate use of these bridges as underpasses to access the approximately 3,000-ac island of habitat between the eastbound and westbound lanes of I-8. No similar bridges exist on the eastbound side, only large culverts and small, low bridges. Questions remain as to whether the eastbound lanes pose a significant obstacle to sheep movement. However, several sightings of bighorn sheep crossing the freeway surface have been recorded (J. Collins, Naval Air Facility El Centro, in litt. 2007, 2008) and the California Highway Patrol confirmed that an adult ram was killed on the eastbound lanes on August 12, 2008. Tracks and sightings north of I-8 and within the I-8 Island suggest that sheep periodically cross the surface of westbound I-8 at its northern end, near where the freeway curves to travel due south, despite this crossing being less than 2 mi from Devils Canyon (Davenport 2010; N. Marks, Service, pers. obs. 2011). Sheep are regularly observed in habitat on the shoulder of I-8, and appear to have become habituated to the regular, high-speed vehicular traffic and associated noise.

In sum, the population that uses habitat in the action area appears to be increasing in abundance. Bighorn sheep have re-colonized the I-8 Island area and occasionally use areas south of the freeway. These sheep may have either moved to the area as the population in Carrizo Gorge expanded in numbers and geographic distribution, represent an increasing remnant of an original population, or are animals from the south, including Mexico. The population of sheep using the I-8 Island has been expanding, in part due to successful use of lambing areas in the northern portion of the island. The northeast portion of the I-8 Island, now used by bighorn as lambing habitat, is within the project ROW boundary and action area.

According to the revised biological assessment, historic sheep sign was documented within the proposed ROW along the western edge of Site 1 and the southwestern edge of Site 2. Observed sign included scat, tracks, bedding sites, and browse. Historic sign is defined as being older than 1 month. Sign and sheep were observed within the action area in and around the I-8 Island. All evidence of use was within the boundaries of expected suitable habitat.

Surveys for Peninsular bighorn sheep associated with the proposed project have documented sheep using the portion of the I-8 Island in the southwest corner of Site 1 during spring of 2010 and 2011. CDFG data indicate that in 2010, three of six radio collared ewes from the Carrizo Gorge/Tierra Blanca Mountains/Coyote Mountains population used the northern part of the I-8 Island as lambing habitat, directly south of proposed turbines 25 and 26. Near the proposed project site and within the action area, Helix Environmental Planning observed four adult ewes and one lamb less than 600 yards from proposed turbines 24 and 25 (Helix 2011). In addition, tracks and scat less than 1 month old were observed 355 yards from the nearest proposed turbine location, in the same vicinity as the observed sheep. In a Peninsular bighorn sheep report associated with the Sunrise Powerlink Project, one ram, one ewe, and one lamb were reported using the same area (Davenport Biological Services 2011). CDFG data indicate that use of the northern portion of the Island is seasonal, and generally coincides with the lambing season. At least eight lambs were born in the I-8 Island in 2011, suggesting use by a minimum of eight ewes (A. Davenport, pers. comm. October 20, 2011). Eight wind turbines (turbines 22-28 and 77) are proposed within 0.75 mi of lambing grounds included in the action area.

Threats to the species

According to the 5-year review, current threats experienced by the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population include development, roads and highways, mining, OHVs, nonnative plants, fire suppression, wildfire, disease, response to human disturbance, insufficient lamb recruitment, drought, and climate change (Service 2011a). For detailed discussion of each of these threats, please see the 5-year review. Some additional regionally-specific information on threats to this population follows.

The proposed project is less than 8 mi from the Mexican border. Because the Border Patrol is increasing its enforcement activity along the border and in the southern Peninsular Ranges, the overall level of human activity in the area has increased. Some immigrants travel through the Peninsular Ranges and camp at water sources where they may displace or occasionally kill and consume bighorn sheep. This scenario may cause bighorn sheep to avoid areas they once used and may compromise bighorn sheep population connectivity between the U.S. and Mexico. Further, the Border Patrol has constructed an intermittent fence along the border. The locations of the constructed portions will likely funnel border crossing individuals into the Jacumba Mountains, where no fence has been constructed. The number of individuals traversing this portion of the Peninsular Ranges may increase as a result of the border fence design, causing the Border Patrol to also increase their activities in this portion of sheep habitat.

Devil's Canyon and surrounding areas are used by OHV recreationists. Although designated off-road routes exist in the action area, use is substantially lighter than in areas farther east, and vegetation impacts appear minimal. Sheep avoidance of OHV use areas has not been documented in the action area. For discussion of other human recreational activities and their effects on sheep, please see the Service's 2010 reinitiation of formal consultation on the effects of the California Desert Conservation Area Plan, as amended, on Peninsular bighorn sheep, Riverside and Imperial counties, California (Service 2010b).

SDG&E is building the Sunrise Powerlink transmission line that runs through the I-8 Island and the transmission corridor that would inter-tie with the proposed project that has undergone section 7 consultation and was determined to not likely jeopardize or adversely modify the species or its designated critical habitat. Construction of the line involves use of low-flying helicopters, which elicits a strong flight response in sheep and has the possibility of causing sheep to avoid the area. Construction is underway and has been timed to minimize impacts to bighorn sheep. Once installed, the transmission line is not anticipated to adversely affect sheep. The project will permanently replace approximately 200 ac of critical habitat consisting of native desert plant communities with transmission towers and other structures.

Least Bell's Vireo

Past formal consultations

No previous consultations for least Bell's vireo have been conducted in the action area.

Species abundance

No vireos have been documented on or around the proposed wind farm site due to an absence of suitable habitat.

Within the action area, Carrizo Marsh has historically supported up to three territorial male vireos. Due to comparatively low occupancy, Carrizo Marsh has not been included in every annual survey by the State Park. In the May 2010 survey, the marsh supported two territorial males, one near the eastern outlet of the marsh and one in the northern finger of the western end of the marsh. In May 2011 survey, the marsh supported one territorial male. This individual established a territory in Carrizo Creek approximately 720 ft east (downstream) of the marsh and the boundary of the proposed restoration action. Although the observed location was not in the marsh itself, the location is close enough that the eastern edge of the marsh may have been part of vireo defended territory. Such territories are usually between 0.5 and 7.5 ac. Reproductive output and nesting success are unknown for any year. The maximum number of territorial males known to use the marsh in any given year is three.

EFFECTS OF THE ACTION

Effects of the action refer to the direct, indirect, and beneficial effects of an action on the species or critical habitat that would be added to the environmental baseline, along with the effects of other activities that are interrelated or interdependent with that action.

Peninsular Bighorn Sheep

The effects of the action not only depend upon the specific design elements of the proposed project, but also the behavioral responses of bighorn sheep to the action. The behavioral response of bighorn sheep to the proposed project can be categorized by their response to the

construction phase of the project, followed by their response to the actual structures and their continued operation and maintenance.

Direct Effects

Direct effects refer to the direct or immediate effects of the project on the species or its habitat. The project may directly adversely affect bighorn sheep by; 1) causing behavioral avoidance of the project site and surrounding habitat, 2) eliminating habitat used for foraging, 3) reducing the quality of habitat now used as lambing and rearing grounds or disrupting reproduction or lambing activities, and 4) causing direct mortality from construction equipment or fencing.

Behavioral avoidance

Loss of habitat can take two forms, direct loss due to habitat alteration or indirect loss due to behavioral or physical displacement from otherwise suitable habitat (Strickland et al. 2011). According to the revised biological assessment, permanent physical structures associated with the proposed project, including the turbines, would occupy 43.1 ac of suitable habitat. A further 124.1 ac would be disturbed during construction.

The residual habitat value of the interstitial spaces between turbines and within suitable habitat will depend on the behavioral response of Peninsular bighorn sheep to infrastructure and human presence. Although bighorn response to human presence and development has been studied, the behavioral response of wild bighorn sheep to wind turbines and, therefore, the level of disturbance the proposed wind turbines represent, has not been studied and is unknown. The handful of studies that address wind power impacts on ungulate species suggest that ungulates are relatively unaffected by the operation and maintenance of wind energy facilities (Walter et al. 2006, Flydal et al. 2004, Johnson et al. 2000). However, these studies examine semi-domestic herds or populations already acclimated to much higher levels of disturbance than are present at the proposed project site. Further, they treat species and habitats much different from bighorn sheep in the Colorado/Sonoran Desert. Consequently, these study results should be applied to the proposed project with caution. The lack of data concerning ungulate behavior around wind turbines underscores the importance of monitoring efforts in the project vicinity. Bighorn sheep have evolved to deal with occasional disruptions of their usual behavioral patterns, such as the presence of a predator.

As described in the 5-year review (Service 2011a), bighorn response to human activity is variable and depends on many factors, including but not limited to; the type and predictability of the activity, presence of domestic dogs, previous experience with humans, size or composition of the bighorn sheep group, location of bighorn sheep relative to the elevation of the activity, distance to escape terrain, and distance to the activity (Weaver 1973; McQuivey 1978; Hicks 1977, 1978; Hicks and Elder 1979; MacArthur et al. 1979, 1982; King and Workman 1986; Wehausen 1980; Hamilton et al. 1982; Whittaker and Knight 1998; Papouchis et al. 1999). In addition to spatial displacement, human activity can result in physiological responses, such as elevated heart rate, even when no behavioral response is discernible, and the cumulative

energetic cost of such responses may potentially affect the nutritional status of individuals and potentially populations (Stemp 1983, MacArthur et al. 1979, 1982). Response varies between individual sheep and among populations. Thus attraction, habituation, and avoidance are context-dependent behavioral events that are difficult to generalize.

Construction and decommissioning activities would result in substantially increased noise and activity levels in the project site. The environment would be subject to increased human presence and vehicular traffic, artificial light, dust, construction noise, and vibrations from heavy equipment. Although the site now accommodates OHV recreationists and Border Patrol agents, the total number of humans using the site on any given day is low (S. Tyson pers. comm. 2011). According to the revised biological assessment, approximately 246 employees working 60 or more hours a week would be on site during construction (Helix 2011), a substantial increase over existing use. As discussed in the Description of the Proposed Action section, construction would occur over a period of 9 to 12 months. Construction activities would be centered in different areas of the project site at any given point in time. Further, construction encompasses a range of different activities, each requiring different equipment and patterns of movement. Because of diverse and high levels of activity, use of heavy machinery on site, and an increase in human presence, construction and decommissioning represent disturbances to which sheep likely would not habituate, and their avoidance of the project site during these activities is probable.

Sheep behavioral responses to O&M of the wind energy facility could range from continuation of currently observed levels of foraging and dispersal, to avoidance of the facility and surrounding areas. If the former, lost foraging habitat would be only the permanent footprint and areas disturbed during construction. If the latter, all 3,692 ac of suitable habitat on the project site would no longer be available for continued use by bighorn sheep. Depending on the width of the avoidance buffer to which sheep adhere, suitable habitat outside the project site but within the action area could also be lost. Should sheep habituate with time, the local population would experience a temporally limited reduction of available habitat.

Several factors could contribute to the extent and nature of sheep avoidance of the project site after construction. First, facility operation would increase human use levels on the relatively undisturbed project site. During O&M, Ocotillo Express LLC expects to employ a maximum of 28 to 30 full-time employees (BLM and County of Imperial 2011), about half of whom would work directly on the turbines and half of whom would remain at the O&M facility (S. Howard pers. comm. 2011). Thus, O&M activities typically would be concentrated around the O&M facility or in a single area of the project site at a time, usually distant from the closest sheep habitat, given that most of the wind farm lies on the central valley floor. Sheep often demonstrate greater avoidance and startle responses to human pedestrians than to vehicles (see references in Service 1999). Given that sheep can startle and withdraw from the presence of even one or two hikers, and are known to avoid areas of high human use, the proposed number of employees may be enough to incite behavioral avoidance responses when working in the western portions of the project site. However, in some cases, sheep habituate to certain human activities, especially at lower levels of disturbance. See the 5-year review for more information on habituation (Service 2011a). The population of sheep near the project site now experiences

periodic human disturbance from a variety of sources, as discussed above. Thus human activity associated with O&M likely represents functionally similar levels of human activity now present on the project site. Consequently, increased human presence for the purpose of O&M likely would not have long-term adverse effects on the local sheep population.

Second, turbine O&M would generate low frequency noise, which bighorn sheep are not now exposed to on site. The effect on ungulates of vibrations associated with such noise is unknown, which may contribute to habitat avoidance. However, decibel levels of other types of noise are already quite high in sheep habitat surrounding the project because of the presence of I-8, OHV use, and Border Patrol helicopter and vehicle patrols. Ambient noise near the westbound lanes of I-8 is between 60 and 80 decibels (Helix 2011a). Individual sheep in the local population have demonstrated an ability to adapt to constant noise, as illustrated by their apparent ease around vehicles travelling at speed on I-8. In addition, the hearing ability of bighorn sheep in the wild often is impeded by presence of a large number of mites and ticks in the ears of sheep (Norrix et al. 1995, Boyce and Weisenberger 2005), which supports other evidence that vision is more important than hearing for the detection of predators. Consequently, noise likely represents a disturbance to which sheep would habituate, and likely would be less of a disturbance than the visual presence of the turbines.

Third, the tall, moving turbines would represent a novel visual disturbance in sheep habitat. Vision is the primary sense used by bighorn sheep to detect predators. The location of a threat relative to individual sheep that perceive it is important in determining behavioral responses. For example, bighorn sheep exhibited the highest heart rates and strongest startle or flight behavioral response to an approaching human when the person was accompanied by a dog or approached from over a ridge (MacArthur et al. 1979, 1982). However, unlike unexpected movement above them, such as a hiker at higher elevation, not all sheep demonstrate aversion to permanent, stationary overhead structures. For example, several populations of bighorn appear relatively undisturbed by the installation of transmission lines through their habitat (Bleich et al. 1990, 1997, Epps et al. 2003, Smith et al. 1986). Nonetheless, the proposed wind turbines would be substantially taller than any other novel structures in sheep habitat. Further, unlike stationary power lines, turbine blades would be in constant motion. GIS analysis suggests the turbines would likely be visible up to 22 mi from the project site into sheep habitat. We assume that the combination of the blades' continuous movement, the flickering shadows blade movement would produce, and the above factors would at least initially be perceived by bighorn sheep as a threat and lead to habitat avoidance in areas closest to the turbines.

Although each individual factor of wind turbine presence may not rise to the level of harming individual sheep, the collective effect of increased human disturbance and vehicle access, low-frequency noise, and visual disturbance in the form of tall structures, moving blades, and flickering shadows may cause sheep to avoid the project and its vicinity. As mentioned earlier, data describing bighorn response to wind turbines are lacking. However, a previous study recommended development associated with a ski lift be located a minimum of 350 yards from or out of the direct line of sight of habitat used by adult bighorn sheep (Light and Weaver 1973). Though ski lifts represent fewer acres of disturbance and higher levels of human activity than the

proposed turbines, ski lifts involve moving overhead structures like turbines. In the absence of better data, for the purposes of discussing habitat avoidance by bighorn sheep due to turbine presence alone, the 350-yard disturbance buffer around ski lifts may provide a reasonably analogous circumstance. However, because of seasonal and individual variation in sensitivity to disturbance, the recommended 350-yard disturbance buffer likely would not suffice during the lambing season, as discussed in a separate section below.

Assuming bighorn sheep avoid using suitable habitat on the project site and within the 350-yard disturbance buffer, approximately 5,156 ac of habitat would not be used in the future and functionally lost. To assess the effects of such loss to the rangewide status of Peninsular bighorn sheep, several factors warrant consideration. The project site now is only sporadically used by sheep, as described in the Environmental Baseline section. Though bighorn sheep apparently have not been using the project site on a regular or year-long basis, ewes are lambing within the action area (see Environmental Baseline above) and the area provides habitat that would support future population expansion and recovery of the species. However, the loss of this habitat (1) is not within critical habitat, (2) represents a small fraction of comparable habitat otherwise available to the population, and (3) would not disrupt population connectivity or cause other significant impacts, as discussed in the Indirect Effects section below. Given the above, avoidance of the project site as described here would not represent a substantial loss of habitat for Peninsular bighorn sheep nor threaten its recovery. See the sections below for further consideration of the population-level implications of avoidance of the project site, as well as discussion of whether individual impacts associated with behavioral avoidance would rise to the level of take.

Forage resources

Because desert bighorn sheep rely on steep, rugged terrain to evade predators, their distribution is tied to mountainous topography. However, desert bighorn also use less precipitous portions of the landscape, such as washes that support forage resources and other values. In the Peninsular Ranges, bighorn sheep use a wide variety of plants as their food source (Weaver et al. 1968, Jorgensen and Turner 1973). The greater available soil moisture present in washes results in a greater diversity and quantity of vegetation with higher nutritional content (Leslie and Douglas 1979). In arid regions, small changes in plant moisture content can result in marked changes in plant nutritional content and diet quality (Epps et al. 2004). In summer and times of drought, wash vegetation can remain greener longer than forages found on mountainsides, thus providing forage higher in nutrients and digestibility (Andrew 1994, Crawley 1983, Laycock and Price 1970). Additionally, bighorn sheep prevented from using preferred foraging areas such as by frequent human disturbance may experience less than adequate nutrition, which can also adversely affect reproduction and the immune system (Festa-Bianchet 1988, Wagner and Peek 1999). Forage plants in the large wash near proposed turbine 25, where sheep have been documented, likely provide high nutritional value that may become more important during times of drought and limited forage availability.

As discussed in the 5-year review and recovery plan (Service 2000, 2011a), the time period surrounding late gestation, lambing, and nursing is demanding in terms of the energy and protein required by bighorn ewes. Failure to acquire sufficient nutrients during late gestation and during nursing adversely affects the survival of newborn ungulates (Thorne et al. 1976, Julander et al. 1961, Holl et al. 1979, Douglas 2001). Crude protein and digestible energy values of early green-up species are usually much higher than those of dormant forages during the critical late gestation, lambing, and rearing seasons (Crawley 1983, White 1983, Wehausen 1980, Berger 1991). With their higher nutrient content, even minor volumes of these forages, within the overall diet composition, may contribute important nutritional value at critical life stages (Wagner 2000). During the reproductive season, these forages typically are concentrated on specific sites, such as alluvial fans and washes.

The proximity of known lambing sites to such forage habitat on and adjacent to the project site suggests availability of quality foraging habitat. A group of lambs and ewes have been observed foraging near the boundary of the proposed ROW (Davenport 2010). Although they were within the I-8 Island when observed, tracks were observed north of the westbound lanes in this area. Individual ewes have also been observed foraging in this area (R. Botta 2009, N. Marks, Service, pers. obs. 2011). However, the few tracks and limited other sign found on the project site suggests forage use by sheep is sporadic.

Permanent physical structures associated with the proposed project, including the turbines, would occupy 43.1 ac of suitable habitat. An additional 124.1 ac would be disturbed during construction and subsequently revegetated (Construction Measure 12). In addition to revegetation, impacts to foraging habitat would be minimized by controlling the introduction and spread of nonnative plant species (Construction Measure 2 and O&M Measure 3), educating workers (Construction Measure 4), monitoring construction (Construction Measures 5, 7, and 9) and O&M (O&M Measure 1) activities, and delineating areas of allowed disturbance (Construction Measure 6). Monitoring and worker education would ensure workers stay within the delineated areas, thereby minimizing lost foraging habitat.

However, because vegetation recovery in the desert can take decades or longer, revegetation and restoration efforts following construction and decommissioning may not replace the 167.2 ac of suitable habitat and this acreage may remain ecologically unsuitable. Vasek et al. (1975) found that in the Mojave Desert transmission line construction and O&M activities resulted in a permanently de-vegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly, but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert could require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran Deserts, Abella (2010) found that reestablishment of perennial shrub cover (to amounts found on undisturbed areas) generally occurs within 100 years but no fewer than 40

years in some situations. He also found that a number of variables likely affect vegetation recovery times, including but not limited, to climate (e.g., precipitation, temperatures), invasion by nonnative plants, and magnitude and extent of ongoing disturbance. Nonetheless, because the potential 167.2 ac of lost habitat are a subset of that discussed above under the Behavioral Avoidance section, the extent of this loss is extremely small compared to the rangewide distribution of Peninsular bighorn sheep, and is unlikely to affect survival or recovery.

Lambing grounds

Bighorn sheep ewes tend to associate in groups most of the year. Near parturition, however, individual ewes tend to seclude themselves from the group in the parts of their home ranges with isolated, steep, rugged terrain (Etchberger and Krausman 1999, Turner and Hansen 1980), often in the most precipitous terrain where they and their lambs will be safest (Geist 1971). Ewes seek secluded sites with shelter, escape terrain, and unobstructed views (Turner and Hansen 1980). Ewes with lambs typically are more sensitive to disturbance (Light and Weaver 1973, Wehausen 1980) than groups without young.

As described in the Environmental Baseline section, radio collar data from CDFG indicate that a subset of ewes from the Carrizo Canyon population use as lambing grounds the northern part of the I-8 Island, directly adjacent to the project site. Construction of the eight turbines within 0.75 mi of lambing grounds and use of the associated access road during construction will not occur during lambing season (Construction Measure 8). Comparable measures would be implemented during decommissioning. Given existing human activity levels in the action area, this conservation measure should be sufficient to ensure abandonment of lambing sites during construction or decommissioning is unlikely, and that ewes are likely to continue to access relevant resources such as foraging areas that support lamb rearing.

Wind plant operation would lead to increased human presence on the project site. Although employees would likely be within a direct line of sight of historically used lambing grounds, they would be downslope and relatively far away, which generally reduces the level of threat perceived by sheep (MacArthur et al. 1982). Further, vehicles used for maintenance would be either north of I-8 (for Site 1) or across I-8 on access roads approximately 3.2 mi east of known lambing sites (for Site 2). Thus, no personnel or roads used for the project would be in lambing habitat on the I-8 Island. Per O&M Measure 5, routinely scheduled major maintenance on turbines 22-28 and 77 would occur outside of lambing season whenever possible, limiting extent and duration of activities within 0.75 mi of lambing grounds. As described in the Behavioral Avoidance section, the levels of human activity associated with routine maintenance activities is not anticipated to represent a substantial increase over current levels of periodic human use, and consequently is not anticipated to adversely affect existing sheep behavioral patterns or habitat use. Also per O&M Measure 5, nonemergency major maintenance activities would be monitored by a Bighorn Sheep Monitor to ensure no sheep are in the area of activity. Per O&M Measure 1, emergency repairs would also be conducted in coordination with the Bighorn Sheep Monitor, though repairs may proceed immediately without waiting for the Bighorn Sheep Monitor to arrive on site. We anticipate that the combination of the above provisions and the

levels of use expected from the proposed action would be sufficient to ensure that abandonment of lambing areas due to increased human and vehicular presence is unlikely. Thus, human presence is not expected to affect ewe behavior during the lambing season or reproduction on the adjoining lambing grounds.

Once operational, turbines would be a source of low-frequency noise and visual disturbance within a direct line of sight of the lambing grounds. As described in the Behavioral Avoidance section above, sheep behavioral response to the presence of wind turbines is unknown. However, as described in that section, numerous aspects of the turbines themselves may interact to cause habitat avoidance. Ewes are particularly sensitive to disturbance during the lambing season. Experts have recommended a minimum 400-1,200 yard buffer between sheep lambing grounds and activities associated with urban development (Culbertson, Adams, and Associates 1991). CDFG recommended a 400- to 600-yard buffer between development and the lambing pens at the Bighorn Institute (S. Torres in Service 2011b). Consistent with this recommendation, the Service's 2011 biological opinion for the Cornishe at Bighorn project in Palm Desert, California defined a 600-yard disturbance buffer from development to the Bighorn Institute's lambing pens (Service 2011b). Reflecting the increased sensitivity of ewes to disturbance during lambing season, these buffers for disturbance near lambing areas are larger than the distance of anticipated sheep avoidance during other life phases, described in the Behavioral Avoidance section. Two turbines, 24 and 25, occur within 600 yards of fresh sign and sheep observations in the I-8 Island. Near the proposed project site and within the action area, pre-project studies observed four adult ewes and one lamb less than 600 yards from proposed turbines 24 and 25 (Helix 2011). In addition, tracks and scat less than 1 month old were observed about 355 yards from the nearest proposed turbine location, in the same vicinity as the observed sheep. In a Peninsular bighorn sheep monitoring report associated with the Sunrise Powerlink Project, one ram, one ewe, and one lamb were reported using the same area (Davenport Biological Services 2011). Given expert opinion and previously recommended and generally accepted buffers between lambing areas and disturbance, wind turbine presence likely would impair essential behavioral patterns related to breeding activities of a small subset of individuals. However, this impairment is not likely to threaten the survival or recovery of the population segment as a whole, as discussed below.

Based on the above discussion, we assume ewes are likely to abandon use of the northern end of the I-8 Island in favor of other isolated areas. Lambing areas are a subset of a ewe group's year-round home range. If the project precludes use of historically used lambing areas, ewes may need to expend additional energy to find new lambing areas within their home range. Given the established connection between ewe nutritional health and lamb survival, it is reasonable to suspect that increased energy expenditure searching for alternative lambing sites and moving away from favored foraging areas would have a negative impact on reproductive success. In a more extreme case, the ewes could shift their home ranges to find acceptable lambing areas. Lambing in unfamiliar or suboptimal habitat may increase the risk of predation to ewes and lambs. Predation is one of the largest sources of mortality for young bighorn sheep. Mountain lions are the primary predators of Peninsular bighorn sheep (Service 2000) but the relative distribution of predation risk in areas in and near the I-8 Island is unknown. Though alternate

lambing sites could be more, equally, or less suitable as lambing and rearing areas, we assume ewes typically select the most secure lambing and rearing areas available; therefore, secondary sites likely would be of lesser quality and at higher predation risk. The temporal persistence of the effects of displacement from current lambing areas depends in part on the extent of sheep habituation to turbine presence, as discussed above in the section on impacts to behavior.

In summary, a reasonable likelihood exists that the turbines, a form of habitat modification, would cause pregnant ewes to avoid currently used lambing and rearing areas that occur within 600 yards of proposed turbines. This habitat modification would not directly cause death or injury to the affected sheep. However, affected ewes likely would select alternative lambing and rearing grounds in less secure habitat and potentially be exposed to increased predation risk**,** resulting in higher lamb and ewe mortality, and/or ewes being unable to meet the higher protein nutritional requirements of gestation and rearing, resulting in higher lamb mortality rates. Thus, survivorship through either mechanism is likely to decline in at least the first year of turbine operations. Three possible scenarios exist for years subsequent to the first year of operations. First, affected ewes could find other, equally-suitable or better habitat for lambing and rearing grounds within the general area of their home range. In this case, they could successfully rear young, and the possibility of death or injury would not continue beyond the first year of turbine operations. Second, ewes eventually could habituate to the turbines and return to presently-used lambing and rearing areas. In this case, ewes and their offspring would be subject to the baseline levels of predation and forage availability once they resumed use of traditional habitats. Thus, the probability of death or injury above baseline levels would not continue beyond the period of habituation. Third, ewes may not habituate to the turbines in the near term, if ever, and abandon the traditionally used lambing and rearing areas, thereby continuing to be exposed to increased predation risk and/or reduced nutritional levels. As ewes typically carry one lamb, and nearly all ewes gestate annually, we assume potential effects to one lamb for each ewe affected.

The potential reproductive loss represented under any of these three scenarios would not significantly affect the survival or recovery of the DPS. As described in the Status of the Species section and 5-year review (Service 2011a), the population of Peninsular bighorn sheep is currently growing, and has nearly tripled in numbers since the time of listing. The Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population has grown from an estimated 28 individuals in 1998 to an estimated 232 individuals in 2010 (Service 2011a, CDFG 2011) and is now the largest of the nine populations described in the recovery plan (Service 2011a). The lambing grounds in the I-8 Island support the expansion of the Carrizo Canyon/ Tierra Blanca Mountains/Coyote Mountains population and progress towards regional recovery goals. While potential abandonment of these lambing grounds may adversely affect ongoing southward range expansion, radio collar data suggests that some ewes in the I-8 area use lambing areas that are outside of the action area. The five ewes within the action area represent approximately 2 percent of the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population and a much smaller percentage of the rangewide population of Peninsular bighorn sheep. Given this small percentage and the current rate of population growth, effects from the proposed project would not be likely to significantly affect survival or recovery, as other ewes give birth in other areas with similar potential for southward dispersal.

Mortality from equipment and infrastructure

Individual Peninsular bighorn sheep may face minor injury or mortality from direct collision with equipment used during construction or decommissioning, though this threat is minimized and avoided by Construction Measures 1, 4, 5, 7, 10, and 11. We anticipate that the construction monitoring and worker education and awareness training described in these measures would be sufficient to ensure no mortality or injury occurs from interactions with construction equipment.

Wire fences or even a single strand of wire may kill or injure bighorn sheep. Bighorn rams can become entangled when wire becomes trapped within the curl of their horns. If this takes place, the animals frequently panic, fight the strange object, and eventually strangle themselves. In addition, bighorn sheep have been killed while attempting to crawl under wire fences. Bighorns have crawled through small gaps along the bottom of wire fences constructed in the Rancho Mirage area of the Coachella Valley (A. Byard, pers. comm., as cited in Service 2010a).

Any fencing installed at the project site may be a threat to Peninsular bighorn sheep if improperly designed. The perimeter of the project site would not be fenced during construction or operation. However, a permanent fence would be installed around the substation/utility switchyard, the O&M building, and meteorological towers. Further, the DEIS allows the possibility of temporary security fencing and/or protective fencing around construction areas. O&M Measure 6 specifies a fence design that will not harm bighorn sheep.

Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. The project may indirectly adversely affect bighorn sheep by: 1) degrading bighorn sheep habitat, and 2) impeding the dispersal of bighorn sheep between mountain ranges.

Habitat degradation

The proposed action could degrade Peninsular bighorn sheep habitat through the introduction of nonnative plant species. Nonnative plants are generally lower quality forage for bighorn than natives. Nonnative species have the potential to outcompete native species, thereby potentially altering the quality of forage available for sheep. Invasive nonnative plants, particularly grass species and Sahara mustard (*Brassica tournefortii*), also can alter the natural fire regime of the area, primarily through increased frequency and intensity of fires. The mustard is present on and in the vicinity of the project site. The threat of the establishment of nonnative species is minimized by the implementation of the applicant's weed control plan (Construction Measure 2), such that the proposed project would not substantially increase the risk of fire or forage degradation from nonnative species presence or abundance. The worker education program (Construction Measure 4) also would minimize the establishment of nonnative plants, as it would promote worker decisions that would minimize the potential for introduction. Thus, the potential introduction of nonnative plants is not expected to adversely affect sheep in the action area.

OHV use

The proposed project site is designated by BLM as a limited use area. The 11 designated routes of travel in suitable bighorn sheep habitat would be closed to the public during construction but reopened thereafter (BLM and County of Imperial 2011). For discussion of current use levels and characteristics, please see the Status of the Species and Environmental Baseline sections. OHV user groups have expressed interest in the potential impacts of the proposed project. New access roads associated with the proposed project may facilitate human and vehicle entry into parts of sheep habitat now difficult to reach due to challenging terrain and lack of access points. For example, OHV recreationalists may use washes illegally to connect BLM designated routes with project roads. If access is facilitated by permanent project roads, sheep likely would experience increased habitat disturbance on and surrounding the project site. Disturbance could be in the form of forage lost to vegetation crushing or uprooting, or behavioral avoidance due to increased human disturbance. However, damage to sheep forage likely would be minimal because OHV users tend to avoid shrubs that may damage vehicles or tires.

Although some potential for behavioral avoidance exists in the project vicinity, numerous roads, paved and unpaved, exist in the area (see Environmental Baseline section). These roads are used by Ocotillo residents, Border Patrol, BLM, recreational campers, and OHV users. Consequently, intrusion into the more rugged parts of sheep habitat already occurs. Because the project site is largely in flat valley areas, restricting access to probable areas of illegal use on the project site itself would be difficult, as there are no natural barriers to help control vehicle use. Ongoing OHV use is characterized largely by individuals or small groups who tend to stay on designated routes (see Environmental Baseline section). Because the rough, rocky terrain characteristic of surrounding areas and sheep habitat, the group of interested users is limited compared to sandy, designated open areas outside of sheep habitat and east of the project, where OHV use and associated vegetation impacts are far more substantial. The rough terrain also naturally limits the possibility of proliferating illegal trails in sheep habitat. For all these reasons, we conclude that while the proposed project may change patterns of OHV use, these patterns are not likely to significantly increase beyond current vehicular use levels. Therefore, OHV use would continue to pose relatively minor impacts on bighorn sheep habitat use patterns.

Intermountain movement

Bighorn sheep are large wide-ranging mammals living in a harsh desert environment. Compared to some species, bighorns require large areas to find the resources required to maintain themselves. Conservation of expansive areas of intact habitat and specific key resources are required for bighorn sheep to persist. This includes areas of open flat desert that connect the mountain ranges more traditionally thought of as sheep habitat (Bleich et al. 1990). The movement of rams and occasional ewes between ewe groups maintains genetic diversity and augments populations of individual ewe groups (Brown and Kodric-Brown 1977, Soulé 1980, Krausman and Leopold 1986, Schwartz et al. 1986, Burgman et al. 1993).

Connectivity corridors north of the proposed project site are not likely to be affected by the proposed action. Known locations indicate the route through Sweeney Pass that Peninsular bighorn sheep use for seasonal migration between Carrizo Gorge and Coyote Mountains is approximately 6 mi northwest of Site 1. Sweeney Pass is outside the line of sight of the project site and outside the action area, suggesting it is far enough away that the visual disturbance of turbines and increased human presence would not affect sheep use of this corridor.

The relative value of the project site as a travel corridor is uncertain due to OHV routes in the area, barriers presented by I-8 and the town of Ocotillo, and lack of telemetry data or sign clearly illustrating intermountain movements. In particular, I-8, which forms the southern boundary of Site 1, is a barrier to sheep except where the lanes split to form the Island. Consequently, any north-south dispersal in the area is likely limited to the Island.

Sheep are not likely to cross I-8 southeast of the proposed project site, as that is where the east- and westbound lanes of I-8 are adjacent to one another. However, the majority of the proposed project is directly north of the I-8 Island, which is known to serve as a connectivity corridor for intermountain movement by sheep. Any project effects on intermountain movements would thus be expected to be in the southwest corner and western side of the project, north of the I-8 Island, and contingent upon the extent of bighorn avoidance of habitat surrounding the turbines.

The degree of connectivity between the Carrizo Gorge/Tierra Blanca Mountains/Coyote Canyon population of Peninsular bighorn sheep and that in Baja California is largely unknown and understudied. The eastbound lanes of I-8, which lack major undercrossings such as exist for westbound lanes, is likely a barrier to unimpeded dispersal out of the Jacumba Mountains. However, some sheep are known to cross the road surface of the westbound and eastbound lanes of I-8. As a result, the barrier posed by I-8 is partially penetrable. As such, preservation of open expanses between mountain ranges is important for facilitating connectivity of the Peninsular Ranges populations across the international border.

The primary north-south corridor connecting the Carrizo Gorge population of Peninsular bighorn sheep with the mountains of Mexico is likely south of the project site, within designated critical habitat. Sheep likely also use the mountains east of Devil's Valley and adjacent to Site 2, although surveys for this region are lacking. No suitable habitat exists east of Site 2 or north of Site 2 to I-8. Site 2 lies at the lowest elevation and easternmost extent of sheep habitat, and is likely used much less than the steeper topography to the west. Therefore, Site 2 is peripheral geographically and likely not as important to movement patterns as more rugged habitat farther west. Given that sheep dispersal is likely limited to west of Site 2, and that this site is east of likely crossing points of I-8, the turbines of Site 2 are not likely to substantially impede dispersal south from the I-8 Island towards the United States-Mexico border.
Dispersal through areas outside the action area is not expected to be affected by the proposed action. The areas historically most heavily used to cross under the westbound lanes of I-8, around Devil's Canyon, are outside of the action area. Given the buffers laid out above, sheep use of the Devil's Canyon underpasses is not likely to be affected by the proposed action. Sheep thus would be able to continue to access the I-8 Island. Given that no favorable locations are

available to cross the eastbound lanes of I-8 out of the Island, the proposed project is not likely to affect the ability of sheep to cross to areas south of I-8. Due to topography, parts of the I-8 Island would be out of sight of all project turbines, and most of likely threatening aspects of turbines would be imperceptible in the majority of the Island. Turbine presence should not affect sheep use in areas currently used to cross I-8. Finally, few other projects are planned in the rugged habitat surrounding the project site. O&M Measure 8 investigating the feasibility of constructing a wildlife overpass over I-8 supports the development of actions that would promote connectivity. Although sheep may avoid the easternmost portion of the I-8 Island, the most likely areas for dispersal activity into the I-8 Island and to points south are not likely to be affected by the proposed project. Thus, while wind facility presence may affect sheep dispersal, it is not expected to do so to such an extent as would impede regional population connectivity.

Effects of the Proposed Habitat Restoration

To offset the numerous potential adverse effects of the proposed action, the applicant proposes to restore desert riparian habitat by removing tamarisk from Carrizo Marsh, Anza-Borrego Desert State Park. Carrizo Marsh was historically used by bighorn sheep as a primary source of water in the region. Carrizo Creek continues to be the primary water source for the sheep that migrate during the hot season from the Coyote Mountains, where no standing water is known to exist, to Carrizo Gorge. Sheep then center their activity on standing water for the hot season, suggesting that vegetation alone may not provide sufficient water during the hot season, and that at least in some mountain ranges, standing water is a requirement. Carrizo Creek and Mountain Springs radiator water tank are the two primary sources of water for bighorn sheep in the area. As water has been documented as a limiting resource for desert-dwelling sheep (see Service 2000), ensuring adequate quality and quantity of water is an important factor sustaining the overall capacity of the population growth and expansion. See the 5-year review for further discussion of the importance of freestanding water to Peninsular bighorn sheep (Service 2011a).

Bighorn sheep will avoid habitat in which dense vegetation reduces visibility and therefore increases predation risk (Risenhoover and Bailey 1985, Etchberger et al. 1989). Water sources are most valuable to bighorn sheep if they occur in proximity to adequate escape terrain with good visibility. Therefore, the juxtaposition of open escape terrain to water sources is an important factor in their utilization (Cunningham 1989, Andrew 1994). In addition to providing water, several rocky outcrops are present in the vicinity of Carrizo Marsh. These outcrops can serve as escape terrain or provide a vantage point for sheep to detect predators. The marsh thus has both characteristics of a potentially important water source for sheep.

Carrizo Marsh is overrun by tamarisk, which is identified as a threat to Peninsular bighorn sheep in the 5-year review (Service 2011a) and recovery plan (Service 2000). This nonnative plant has rapid reproductive and dispersal rates (Sanchez 1975, Lovich et al. 1994), enabling it to out compete native plant species in canyon bottoms and washes. Tamarisk has the following negative effects on bighorn sheep: 1) reduces or eliminates the standing water on which bighorn sheep depend; 2) out-competes plant species on which bighorn sheep feed; 3) occurs in thick, often impenetrable stands that block access to water sources; and 4) provides cover for predators.

The tamarisk in Carrizo Marsh may lower the water table, thereby reducing the quantity of surface water available to wildlife, including bighorns. Further, tamarisk is denser than native vegetation, and consequently provides ideal shelter for sit-and-wait predators of bighorn sheep, primarily mountain lion. For the above reasons, Carrizo Marsh is an important but degraded resource for the Carrizo Gorge population of bighorn sheep, which includes the subgroups that would be affected by the proposed project.

Removal would be part of a broader program within the State Park to eliminate tamarisk. Because tamarisk is the dominant form of degradation present in Carrizo Marsh, its removal is expected to substantially restore ecological function to the marsh (see Helix 2011b). For bighorn sheep, removing the tamarisk in Carrizo Marsh is anticipated to have two primary effects; 1) raise the water table to historical levels and 2) increase visibility around and within the marsh. By raising water levels, additional surface water will become available for wildlife use. Increasing the availability of water is likely to increase the carrying capacity for bighorn sheep in this region, allowing the continuation of the ongoing population increase in the Coyote Canyon/ Carrizo Gorge population of bighorn. By increasing visibility in and around the marsh, bighorn sheep likely will be better able to perceive predators, thereby reducing risk of mortality when they come to drink. Further, bighorn sheep likely will more readily use Carrizo Marsh for water, because of the perceived reduction in predation risk. As water availability and predation are known to limit the growth of some bighorn sheep populations, all of the above are likely to benefit population growth and range expansion.

The primary adverse effects to bighorn sheep from the proposed project are linked to the potential loss of lambing areas in the I-8 Island. The proposed restoration, on the other hand, is anticipated to increase regional habitat carrying capacity because of increased water availability and decreased predation pressure. Recent trends in warming and drying (Lane et al. 1994, Weiss and Overpeck 2005) have prompted concern for the persistence of desert bighorn sheep, especially in the drier mountain ranges of the southwest (Epps et al. 2004). A warmer and dryer climate may result in reduced sources of water and nutritious forage. Because the restoration effort would be maintained in perpetuity, the restoration is anticipated to support long-term increases in overall productivity of the regional population. Thus, although providing a different type of resource than would be directly impacted by the proposed wind farm, the proposed restoration likely would offset any loss of productivity anticipated from the proposed action.

Carrizo Marsh is not near any known lambing habitat or other sensitive resources for bighorn sheep. Conservation measures associated with minimizing impacts to vireos, such as restricting restoration activities to daylight hours and outside of vireo breeding season (the hottest time of year, when water is most critical), would also minimize and avoid adverse effects to sheep. As a result, activities associated with restoration should not adversely affect Peninsular bighorn sheep.

Effect on Recovery

Section 2(b) of the ESA states the primary purposes of the Act are to provide a means whereby the ecosystems upon which listed species depend may be conserved, and to provide a program

for the recovery of listed species. In section 2(c), Congress establishes a policy requiring all Federal agencies to use their authorities to recover listed species and further the purposes of the Act. Consistent with these purposes and Congressional policy, sections 3(5), 4(f), 7(a)(1), implementing regulations (50 CFR 402.02) to section 7(a)(2), and related preamble at 51 FR 19926-19957 require Federal agencies to further the survival and recovery of listed species in the use of their authorities. Pursuant to these mandates, our analysis below assesses (1) whether the proposed project adequately offsets its adverse effects to the environmental baseline, and (2) the extent to which the proposed project would cause "significant impairment of recovery efforts" or adversely affect the "species' chances for survival to the point that recovery is not attainable" (51 FR 19934).

The recovery strategy for Peninsular bighorn sheep, as outlined in the recovery plan (Service 2000), included three delisting criteria:

1. At least 25 ewes must be present in each of the nine regions described in the recovery plan, during each of 12 consecutive years, without continued population augmentation.

2. The rangewide population must average 750 individuals (adults and yearlings) with a stable or increasing population trend over 12 consecutive years.

3. Regulatory mechanisms and land management commitments have been established that provide for long-term protection of Peninsular bighorn sheep and all suitable habitat. In addition, connectivity among all portions of habitat must be established and assured through land management commitments such that bighorn sheep are able to move freely throughout the Peninsular Ranges

As described in the Environmental Baseline section, the ewe group that uses the I-8 Island is in the process of recovery and is expanding in population numbers and spatial distribution. The Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population now numbers about 232 individuals, including presumably far more than 25 ewes if one assumes a relatively balanced sex ratio. This population is the largest of the nine populations identified in the recovery plan. The population thus contributes to the overall recovery of Peninsular bighorn sheep and progress towards criteria 1 and 2. As described in the Effects of the Action section, impacts to the five ewes in the action area are not expected to lead to a substantial decline in population numbers or alter the continued southward range expansion. Further, as described in the 5-year review (Service 2011b), the southern populations of Peninsular bighorn sheep face a lower degree of threat and higher rates of recovery than the northern populations. Finally, the restoration of Carrizo Marsh would restore an historic resource for sheep, which would support further expansion of the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains population. As a result, the proposed action is not likely to adversely affect the contribution of the affected population to rangewide progress towards achieving recovery criteria 1 and 2. As described in the Indirect Effects section, the proposed project is not likely to impede connectivity between the I-8 Island and suitable habitat to the south.

While the proposed action includes an amendment to the CDCA Plan to allow development of the proposed project, the primary regulatory mechanisms protecting Peninsular bighorn sheep would not change. Sheep would continue to be protected by the Federal and California Endangered Species Acts, which currently provide the most protection to the population (Service 2011b). Further, the proposed CDCA amendment would affect only the project site, which, as concluded above, is not likely to impair the survival or recovery of the listed population as a whole. Consequently, the proposed action would not impair future achievement of recovery criterion 3. Given all of the above, the proposed project is not likely to significantly impair recovery of Peninsular bighorn sheep.

Least Bell's Vireo

Direct Effects

Possible direct effects to the vireo from the proposed project include; 1) loss of breeding habitat, 2) loss of forage habitat, and 3) disturbance during restoration activities.

<u>Loss of breeding habitat the year of restoration</u>

Carrizo Marsh has been documented to support up to three territorial males. Surveys by the State Park focused only on territorial males as a measure of population size and did not attempt to confirm breeding pairs or nesting activity. This lack of data for breeding vireos at Carrizo Marsh does an absence of such activity. For birds, the number of territorial males is often used as an indicator of the number of pairs on a given site. Consequently, three territorial males in Carrizo Marsh implies that a maximum of three breeding pairs and associated young of the year may be present. The vireo is one of the few bird species demonstrated to nest in tamarisk stands (Sogge et al. 2008, Brown 2010). While it is unknown if Carrizo Marsh has historically supported successful nesting pairs, territorial males have been found there during the previous two breeding seasons and sporadically previous to 2010. As such, the potential for reproduction exists within the restoration site. Nonetheless, vireo is known to commonly use mesquite and other native desert riparian vegetation and biologists generally agree that restoration of native vegetation will improve habitat suitability for the species.

The precise timing of the prescribed burn to remove tamarisk largely would depend on when the California Department of Forestry and Fire (Cal Fire) allows the burn to proceed. If compatible with Cal Fire's requirements, the prescribed burn would also be completed outside of the breeding season. Regardless, Vireo Measure 1 requires the area to be surveyed prior to work commencing. If vireos are present in the marsh during the year when the burn is to occur, all vireo conservation measures will ensure that all project activities are observed by a qualified vireo biologist and that appropriate measures are implemented to avoid occupied vireo habitat. Tamarisk within 300 ft of known vireo locations would be removed after the vireos leave for wintering grounds (Vireo Measure 5). The proposed action thus is not likely to adversely affect vireo reproduction or numbers during the year in which initial tamarisk removal occurs.

Loss of forage habitat the year of restoration

Vireos typically require dense, stratified riparian vegetation for foraging opportunities. If vegetation removal occurs while vireos are on site, Vireo Measures 2, 3, and 4 ensure that a 300-ft buffer around observed vireo locations would be undisturbed. Such a buffer would preserve approximately 6.5 ac of habitat within each vireo territory. As the average vireo territory is 0.5 to 7.5 ac (Service 1998), the proposed action should preserve sufficient forage to avoid adversely affecting vireos. Per Vireo Measure 5, tamarisk within vireo territories would be thinned after the end of breeding season or after the birds are no longer present.

Disturbance during restoration activities

Vireo surveys will be conducted to determine if vireos are present during the year in which initial restoration is to occur (Vireo Measure 1). We anticipate that damage to active nests, including eggs and nestlings, will be avoided because riparian vegetation in areas with vireos present will be removed outside the breeding season, when vireos are not expected to be present (Vireo Measure 5). Vireo Measures 3 and 4 ensure that if the burn occurs during the vireo breeding season, a 300-ft buffer around vireo nests would be observed, such that activities would not disturb nesting birds. The same buffer would be observed when creating firebreaks, an activity that will be monitored by a biomonitor (Vireo Measure 2 and 3). Areas within the firebreak that are closest to vireo nests would be cleared last, thereby minimizing vireo exposure to mechanized noise during the height of breeding season (Vireo Measure 6). If compatible with the requirements of Cal Fire, the prescribed burn also would be completed outside of the breeding season. The draft habitat restoration plan for the marsh targets October for burning, when no vireos would be present (Helix 2011b).

RECON (San Diego Association of Governments and RECON 1990) estimated that noise levels above 60 dBA Leq from March 15 to September 15 may impact vireo reproductive success. While vireos often continue to occupy areas subject to noise levels above 60 dBA, above some yet unknown noise threshold, vireos may abandon an otherwise suitable habitat area. Greaves (1989) hypothesized that the lack of breeding vireos in apparently suitable habitat is due to human disturbances (e.g., bulldozers, OHVs, hiker travel). Because vireos apparently use songs and calls to establish and maintain a territory, maintain contact between the pair and young, and alert the female to danger or trespassers (Barlow 1962), construction noise has the potential to detrimentally affect vireos by masking songs and calls that may be essential for survival and successful reproduction (Barrett 1996). Surveys conducted by a biological monitor would identify the presence of vireo nesting, incubation, or brood rearing activities in the project vicinity (Vireo Measure 1). To avoid potential disturbance to nesting vireos, the portion of firebreak vegetation removal nearest vireo territories will occur last (Vireo Measure 6). This measure will minimize exposure to noise during core breeding times and should be sufficient to ensure vireos do not abandon surrounding habitat. In sum, the vireo measures discussed above should be sufficient to ensure that no direct effects to vireos occur during restoration activities.

Indirect effects

Possible indirect effects to the vireo from the proposed project include; 1) loss of breeding habitat, 2) loss of foraging habitat, and 3) disturbance during maintenance activities.

Loss of breeding habitat after restoration

Vireos are highly site tenacious and tend to return year after year to the same area to nest. Extensive thinning or removal of vegetation from nest sites can preclude breeding at that location in the year after removal. This impact represents a disturbance to normal vireo behaviors associated with reproduction, even if all thinning occurs outside of breeding season.

Typically, if a portion of a pairs' territory is removed during the non-breeding season, the returning pair will continue to use remaining habitat in the area, although they may experience reduced productivity until additional habitat becomes available. For example, surveys conducted over two breeding seasons on San Diego Creek, Orange County, where habitat had been removed to address flood risk documented reduced productivity following removal of much of the riparian vegetation along a stretch of creek occupied by vireos. Four territories where habitat was removed produced a total of 5 young (1.25 young/pair). Two other territories, which did not have habitat removed, produced a total of 8 young (4 young/pair) (Chambers Group, Inc. 2005).

Vireos require dense vegetation 3 to 6 ft tall to build nests. About 19 ac of sufficiently developed native vegetation in Carrizo Marsh would not be subject to thinning or burning and will continue to provide habitat for vireo while other parts of the Carrizo Marsh receive tamarisk treatments. Tamarisk would be removed from 128 ac of habitat that includes both native vegetation and tamarisk by methods other than burning. The remaining native habitat in these 128 ac will also continue to provide habitat for vireo. The majority of these areas are larger than 0.5 ac, the minimum average breeding territory size; the largest single patch of preserved habitat would be approximately 3.5 ac (Vireo Measure 8). Further, habitat downstream from the marsh, where the territorial male was observed in 2011, would be undisturbed. Consequently, the affected vireos may use habitat either near the 2011 territory or adjacent to 2010 territories. Because some suitable habitat would remain, it is unlikely that all of the three historical territories would be abandoned. In particular, at least the territorial male that has historically used the far eastern portion of the action area is likely to continue to use the area, because the majority of its territory is presumably outside the action area. Any pairs present may experience reduced productivity or increased risk of mortality for several years due to reduced foraging and breeding habitat, increased exposure to potential predation, and increased territorial interactions. The short-term effects of tamarisk removal from the marsh thus could impair essential breeding behavior and may cause the death or injury of remaining birds. This risk is minimized by conservation measures, as described above.

Should the up to two other potential pairs choose to search for a territory elsewhere, vireos may also face increased exposure to predation and risk losing competitive advantage by being late to establish a territory. Further, the alternate nest site selected may be subject to higher risk of nest

predation by brown-headed cowbirds than at Carrizo Marsh, which has been part of the State Park's cowbird monitoring and removal program. Thus the proposed action may adversely affect vireo reproductive success in Carrizo Marsh in the first few years after initial restoration efforts. Territorial males that are not part of a breeding pair would be expected to survive dispersal. However, because increasing dispersal distance and duration increases the mortality risk for birds (Johnson et al. 2009), and dispersing vireos may face decreased nesting success, dispersal from Carrizo Marsh to find an alternate breeding site is likely to impair essential breeding behavior and may cause the death or injury of dispersing birds.

Vireo populations have been expanding over the past decade, as described in the 5-year review for the species (Service 2006). Population recovery has been sufficient to recommend downlisting. The State Park's metapopulation contributes to this overall trend. Numbers in the State Park have been increasing as well. As discussed further in the Effect on Recovery section below, the potential loss of the breeding territories is not expected to adversely impact the continued existence or recovery of the species.

Loss of forage habitat after restoration

Vireos typically require dense, stratified riparian vegetation for foraging opportunities. About 147 acres of largely native riparian vegetation greater than 0.25 ac in size would be excluded from burn and firebreak treatments. Although the habitat would be thinned through removing interspersed tamarisk, some of these stands are sufficiently developed that vireos may still use these areas for foraging during the year after initial tamarisk removal. Further, habitat downstream of the marsh, which supported the only territorial male observed in the marsh vicinity during 2011, would be undisturbed. Thus, the area will likely still contain sufficient vegetation in the year after tamarisk removal to support one to two vireo territories. Longer term, the absence of tamarisk will promote the reestablishment of native riparian vegetation characteristic of optimal vireo foraging habitat. Development of vegetation structure from bare ground typically requires 3 to 5 years in riparian vegetation communities used by vireos (Service 2006). Consequently, as native habitat regrows, vireos are likely to experience up to 3 to 5 years of minor habitat degradation due to reduced biomass in the marsh, followed by establishment of better habitat than is present (see Effect on Recovery, below). Because of the continued availability of forage in the vicinity, the loss of vegetation due to the proposed restoration is not expected to result in death or injury of individual birds.

Disturbance by habitat maintenance

Per Vireo Measure 9, any subsequent maintenance and monitoring in the project site, including removal of resprouted tamarisk plants, would occur outside of the vireo breeding season to the extent possible. The vast majority of tamarisk would be removed by initial clearing efforts. Less work would be required each subsequent year. Maintenance tamarisk removal is not anticipated to remove a large enough quantity of vegetation as to adversely affect vegetation structure required for vireo breeding or foraging. Maintenance efforts may include spot-application of herbicides. Application methods will be localized and targeted at nonnative plants, which

minimizes damage to native plants. Herbicides would be used in small quantities, minimizing any possible exposure of vireos or the native plants upon which they depend. Consequently, use of herbicides to support removal efforts is not expected to adversely affect vireos. We do not anticipate any adverse effects to the vireo from project maintenance.

Effect on Recovery

The draft recovery plan for the vireo is the most recent document prepared to guide recovery. This plan gave the following delisting criteria:

1. Stable or increasing populations/metapopulations are protected and managed at the following sites: Tijuana River, Dulzura Creek/Jamul Creek/Otay River, Sweetwater River, San Diego River, San Luis Rey River, Camp Pendleton/Santa Margarita River, Santa Ana River, an Orange County/Los Angeles County metapopulation, Santa Clara River, Santa Ynez River, and an Anza-Borrego Desert State Park metapopulation.

2. Stable or increasing populations/metapopulations have become established and are protected and managed at the following sites: Salinas River, a San Joaquin Valley metapopulation, and a Sacramento Valley metapopulation.

3. Threats are reduced or eliminated so that vireo populations/metapopulations listed above are capable of persisting without significant human intervention, or perpetual endowments are secured for cowbird trapping and nonnative plant, giant reed (*Arundo*), control in occupied riparian habitat.

The last 5-year review recommended the vireo for downlisting to threatened status. Part of this evaluation included an assessment of population status at each of the locations specified in criterion 1. The State Park metapopulation was determined to be healthy and contributing to the overall recovery of the species. In accordance with recovery guidance, the population is monitored throughout the State Park. The anticipated beneficial effects of the proposed action would contribute to the ongoing protection and management of the State Park's metapopulation and vireo recovery. Continued implementation of recovery criterion 1 therefore would not be adversely affected by the proposed action. Recovery criterion 2 is regionally specific and outside this action area and therefore unaffected by the proposed action. Finally, the proposed action would further attainment of recovery criterion 3 by reducing and eventually eliminating tamarisk in Carrizo Marsh. The narrative expansion of recovery criterion 3 includes tamarisk as a threat to vireo, and suggests that its removal, along with other nonnative species, should be a priority. As such, the proposed action supports attainment of criterion 3.

Removal of tamarisk from Carrizo Marsh would benefit vireos long term and further vireo recovery. Tamarisk removal likely will help restore historical water table levels and promote native species regeneration and spread, thereby restoring the historical value of the marsh as wildlife habitat. Native habitat includes greater structural diversity than monocultures of tamarisk, which increases habitat value to vireos. Given the expected rise in the water table

following tamarisk removal and the high growth rate of riparian vegetation in the presence of water, foraging habitat is likely to attain comparable or greater quality to present conditions within several years after initial tamarisk removal. Tamarisk removal in perpetuity, through the establishment of management-specific endowments, is a recommended recovery action for vireo (Service 1998). Presence of nonnative species, namely tamarisk, is the only major threat to vireo recovery that exists in the action area; the habitat is otherwise ideal. Human use is light and irregular, the marsh is on protected land within the State Park, and nest predation by the brown-headed cowbird is low and monitored by the State Park. Disturbance in the surrounding landscape, which has been identified as adversely affecting nest success, is exceptionally low in the restoration area. For all these reasons, removal of tamarisk and the re-establishment of native species in the marsh would improve the quality of available habitat for nesting and migrating vireos, thereby supporting regional recovery efforts that include sustaining a healthy metapopulation of vireo within the State Park. Given the above, while the short-term effects of the proposed action will affect up to three pairs of vireos, the long-tern effect of the project will promote recovery of the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered here because they require separate consultation pursuant to section 7 of the Act.

Peninsular Bighorn Sheep

Bighorns may react strongly to low-flying aircraft, especially helicopters (Bleich et al. 1990). Military and private aircraft often fly over the Peninsular Ranges, including the action area, and low elevation flights may disturb bighorn sheep. Such aerial sources of disturbance are not covered in BLM land management plans. However, we do not have any specific project information to analyze potential direct and indirect impacts of this activity on bighorn sheep.

Routine maintenance of highways and other structures can temporarily disturb bighorn sheep and potentially cause them to avoid an area during maintenance activities. The Service is not aware of any such planned projects in the action area.

Cumulative effects are not expected to impede sheep population connectivity between/among the Coyote, In-Ko-Pah, Jacumba, and southern mountain ranges in the action area.

Least Bell's Vireo

The Service is not aware of any such effects in the Carrizo Marsh that may affect the vireo.

CONCLUSIONS

After reviewing the current status of the species, environmental baseline for the action area, effects of the proposed action, and cumulative effects on Peninsular bighorn sheep and least Bell's vireo, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of either species for the reasons discussed below:

Peninsular Bighorn Sheep

1. While the proposed project is adjacent to habitat with high value resources and heavy sheep use on three sides, sheep sign and sightings indicate that sheep use the project site irregularly.

2. Sheep continue to use habitat on and around the action area despite relatively high levels of human and vehicular use of the area (e.g., Border Patrol, OHVs, and I-8). Because this population of bighorn sheep likely has become accustomed to some degree to human presence and noise in their environment, we expect that neither human use nor the prevalence of noise is expected to increase substantially during O&M over baseline levels.

3. The effects of construction, O&M, and decommissioning would be minimized by implementation of conservation measures described above in the Description of the Proposed Action section.

4. The relatively pristine rugged mountain habitat on three sides of the project, which includes critical habitat, will continue to provide necessary resources for sheep.

5. The range expansion of Peninsular bighorn sheep into an area that reportedly was no longer occupied by 1996 demonstrates the ability of this population to regain former movement patterns and recolonize their historic range.

6. The potential functional loss of up to 5,156 ac of habitat, if avoided by sheep, represents a small fraction of comparable habitat otherwise available to the population and this potential loss would not disrupt population connectivity or cause other significant impacts.

7. The potential for reproductive loss due to avoidance of lambing grounds in the action area would not be significantly impact the survival or recovery of the DPS as a whole.

8. The proposed project is not likely to impede connectivity between the I-8 Island and suitable habitat to the south, as primary movement corridors are outside the action area.

9. The proposed removal of tamarisk from Carrizo Marsh would represent a significant contribution in support of the range-wide recovery of the species.

Least Bell's Vireo

1. No suitable vireo habitat occurs in the proposed wind farm portion of the action area.

2. The proposed removal of tamarisk from Carrizo Marsh furthers the recovery of vireo, consistent its draft recovery plan.

3. Potential adverse impacts to vireos would be limited to the time required for native vegetation to reestablish and grow to suitable height and structural complexity for vireo breeding. During this time, habitat will continue to be available in the project vicinity, within and immediately adjacent to the project site.

4. Proposed conservation measures would minimize or avoid impacts to nesting vireos during the proposed removal of tamarisk.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not 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.

The measures described below for Peninsular bighorn sheep and vireo are non-discretionary. Measures for Peninsular bighorn sheep must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. Measures for the vireo must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM; 1) fails to assume and implement the terms and conditions, or 2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable stipulations that are incorporated into the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the BLM and Corps 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)].

AMOUNT AND EXTENT OF TAKE

Peninsular Bighorn Sheep

The anticipated level of incidental take for Peninsular bighorn sheep is based on the number of individuals seen within 600 yards of proposed turbine sites, and the value of associated habitat. If the anticipated level of incidental take is exceeded, it will trigger reinitiation of consultation. Take of Peninsular bighorn sheep is exempted as follows:

As described in more detail below, the Service anticipates that up to five adult ewes and five lambs could be taken as a result of the proposed action. Take is anticipated due to behavioral avoidance of portions of currently occupied home ranges, including lambing and rearing habitat, which are within the I-8 Island and within 600 yards of the nearest turbines. As discussed in the Effects of the Action section, behavioral responses of bighorn sheep to various human activities can take different forms depending on the activity and inherent variation in the behavior of individual bighorn sheep. As also discussed, sheep demonstrate varying levels of habituation to infrastructure and reoccurring disturbances. The effects of wind turbines and associated human activities on bighorn sheep have not been studied and empirical evidence is lacking. However, given the sensitivity of bighorn sheep to other forms of human disturbance, we conclude that turbine presence is reasonably certain to represent a modification or degradation of habitat likely to significantly impair essential behavioral patterns pertaining to breeding, feeding, or sheltering.

As described in the Effects of the Action section, bighorn ewes have particular habitat and nutritional requirements during the period surrounding parturition, when they also demonstrate increased sensitivity to disturbance. Operation of the proposed wind farm would create increased human disturbance and vehicle access, a novel source of low-frequency noise, and visual disturbance in the form of tall structures, moving blades, and flickering shadows. If the ewes closest to the turbines shift their home ranges to avoid associated disturbances, their existing lambing areas would likely be in the territory abandoned. Loss of lambing and rearing habitat from project disturbance and the increased energy expenditure needed to find new lambing areas farther from the proposed project would disrupt reproductive behavior and may lead to reproductive failure for the year. If ewes give birth in suboptimal habitat, lambs and ewes would also be exposed to increased risk of predation, increasing the risk of death or injury to the ewes and their lambs in the first year of turbine operations. As discussed in the Effects of the Action section, the perpetuation of increased risk of death or injury depends on the relative habitat value of new lambing and rearing areas, and ewe habituation to turbine presence.

As described in the Effects of the Action section, experts have recommended a 400 to 1,200-yard buffer between activities associated with urban development and bighorn sheep lambing areas. Since we are not aware of more definitive information, we have based our analysis on the concepts underlying expert recommendations. Due to uncertainty in how sheep would respond to wind turbines, we reason that an intermediate value within the recommended range may be most appropriate. In accordance with past practice and species biology, we choose 600 yards as a likely buffer distance of behavioral avoidance during the period when ewes select lambing

areas, seclude themselves and their lambs, and are particularly sensitive to various forms of disturbance. Near the proposed project site and within the action area, Helix Environmental Planning observed four adult ewes and one lamb less than 600 yards from proposed turbines 24 and 25 (Helix 2011). In addition, tracks and scat less than 1 month old were observed 355 yards from the nearest proposed turbine location in the same vicinity as the observed sheep. In a Peninsular bighorn sheep report associated with the Sunrise Powerlink Project, one ram, one ewe, and one lamb were reported as using the same area (Davenport Biological Services 2011). Numerous individuals of unknown sex and age, including a single sighting of 14 sheep, have been observed south of this area. However, this location was about 740 yards from proposed turbines and is separated topographically from the two sightings described above. This information, along with that presented in the Environmental Baseline section, indicates numerous bighorn sheep are using the general area bordering the project site, and that a subset of these sheep have portions of their home ranges within 600 yards of proposed wind turbines 24 and 25. Based on the fact that ewes generally are more sensitive to disturbance than rams and that a minimum of five ewes have been documented within the 600-yard disturbance buffer zone, we estimate that the proposed project could significantly impair essential behavioral patterns of five ewes, potentially resulting in the injury or death of the ewes and/or their lambs. As each ewe typically has one lamb a year, and gestation rates are high, we assume five ewes would correspond to five lambs.

No take of Peninsular bighorn sheep is anticipated or exempted for actions associated with the proposed restoration of Carrizo Marsh in the State Park.

Least Bell's Vireo

The anticipated level of incidental take for least Bell's vireo is based on the number of vireos potentially affected and amount of suitable habitat impacted. If the anticipated level of incidental take is exceeded, it will trigger reinitiation of consultation. Take of vireos is exempted as follows:

The Service anticipates that up to three vireo pairs could be taken as a result of the proposed action. Take is anticipated due to the temporal loss of habitat between the removal of 299 ac of tamarisk that now serves as vireo breeding habitat and the re-establishment of sufficiently large stands of tall, dense, and structurally diverse native vegetation that would support successful vireo breeding. The anticipated level of incidental take will be exceeded if for any 3 of the 5 years of vireo monitoring (Vireo Measure 10), no vireo pairs are observed by the vireo qualified biologist (Vireo Measures 1, 3, and 10) while conducting compliance monitoring on or near the Carrizo Marsh project site. No direct injury or mortality of eggs, nestlings, or adults is anticipated or authorized.

As described in the Effects of the Action section, vireos require a minimum of 1- to 2-meter tall, structurally diverse vegetation for successful nesting and foraging. Nonnative tamarisk is suitably tall and thick, and territorial male vireos have been documented using it as habitat in Carrizo Marsh. Removing tamarisk thus constitutes a temporal loss of habitat, until surrounding

native riparian vegetation has had time to attain sufficient height and structure as to be suitable vireo habitat. Islands of predominantly native habitat will be preserved and will likely serve as sufficient seed bank as to facilitate revegetation of the marsh with natives subsequent to tamarisk removal. However, because of high site fidelity, short-term habitat loss is likely to impair essential breeding behaviors. Individuals may experience reduced productivity for several years due to reduced foraging and breeding habitat and increased territorial interactions. Those vireos that choose to move and search for a territory elsewhere may risk losing competitive advantage by being late to establish a territory or face increased exposure to predation and a resultant risk of death or injury.

Given the extent of known historic use of the action area by territorial males, the Service anticipates the marsh is likely to support up to three territorial males in 2012, when the proposed action would occur. Territorial males are often used as an indicator of pair presence in birds. Consequently, three territorial males could correspond to up to three breeding pairs. Given all of the above, we estimate that the proposed action could adversely affect up to three breeding pairs, or six adult birds, through modification of breeding habitat so as to significantly impair essential behavioral patterns associated with breeding, feeding, or sheltering. We anticipate that the one to two pairs of vireos assumed likely to remain on site will be subject to take in the form of decreased productivity due to reduced foraging and breeding habitat and increased territorial interactions. Take in the form of death or injury is exempted for the remaining one to two pairs who choose to search for a territory elsewhere. In these forms, take is exempted for up to three pairs of vireos.

Ongoing maintenance associated with tamarisk control is not anticipated to remove sufficient vegetation as to adversely affect the vireo. Consequently, no take is anticipated or exempted for ongoing maintenance activities in the marsh. In addition, no take of vireo is anticipated or exempted for the proposed wind farm site near Ocotillo. Should any vireos be found on that project site, reinitiation of formal consultation with the Service may be necessary.

IMPACT OF THE INCIDENTAL TAKING OF THE SPECIES

In the accompanying biological opinion, the Service determined that these levels of anticipated take associated with this project are not likely to jeopardize the continued existence or significantly impair the recovery of the Peninsular bighorn sheep or vireo.

REASONABLE AND PRUDENT MEASURES

The BLM and applicant will ensure implementation of numerous conservation measures as part of the proposed action to minimize the incidental take of Peninsular bighorn sheep. The Corps and applicant will do the same to minimize the incidental take of least Bell's vireo. Our evaluation of the proposed action is based on the assumption that the actions as set forth in the Conservation Measures section of this biological opinion will be implemented. Any changes to the conservation measures proposed by BLM, Corps, or applicant or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If

this modification causes an effect to Peninsular bighorn sheep or vireo that was not considered in this opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted. The following reasonable and prudent measure supplements and clarifies select conservation measures included as part of the proposed action. The reasonable and prudent measure is necessary and appropriate to minimize the impact of take of Peninsular bighorn sheep. We did not identify any additional reasonable and prudent measures necessary or appropriate to minimize impact of take of the vireo.

1) The BLM and applicant shall ensure that the level of incidental take of Peninsular bighorn sheep associated with the proposed action is commensurate with the analysis in this biological opinion.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the BLM and applicant, and all agents and/or contractors, must comply with the following terms and conditions, which implement the reasonable and prudent measure described above, and are intended to minimize the impact of incidental take on the Peninsular bighorn sheep. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

   a. For the first 5 years of the project's operation and maintenance, the applicant shall fund a biologist to monitor Peninsular bighorn sheep use of areas within 600 yards of any turbine within suitable sheep habitat. This includes areas outside of the project ROW, including a portion of the I-8 Island. The biologist shall be approved by the Service, and will have demonstrable experience surveying for bighorn sheep and associated credentials. This biologist may be the same individual whose job is described in Construction Measure 11. Monitoring will include looking for fresh sign, including tracks, scat, bedding areas, or browse of vegetation, in addition to live animals. Monitoring shall be conducted within the entire action area surrounding the wind project site, not just the known territories of the five ewes described in the Amount and Extent of Take section. Monitoring shall be conducted with binoculars and include walking the area on and surrounding the project site, as well as using techniques used for preconstruction surveys. Monitoring data will be combined with any bighorn sheep data that may be gathered through use of the biological observation tower. The applicant shall include in the bighorn sheep monitoring plan (Construction Measure 9) a description of the field monitoring protocol to be used by this biologist. The protocol will be submitted to and approved by the BLM, Corps, Service, and CDFG.

   b. For the first year of O&M surveys, the biologist shall be on site at least 8 hours every 2 weeks and surveys shall be conducted such that the entirety of the action area within 600 yards of the project site shall be surveyed for sheep use at least once per month. The monitoring interval for the remaining 4 years shall be determined annually based

on the results of the monitoring surveys the prior year, and shall be subject to approval by the BLM and Service. The schedule above shall be repeated if indicated, or a less intense monitoring schedule (i.e. conducting monitoring surveys monthly, bimonthly, or quarterly) implemented if approved by the BLM and Service.

c. Any sign of use will be documented and reported in writing to the Service, BLM, and CDFG within normal reporting requirements (see Conservation Measures section). Documentation will be included as part of the annual Peninsular Bighorn Sheep Status Report submitted to the Service, BLM's Authorized Officer, Corps, and CDFG.

REPORTING REQUIREMENTS

Any sightings of Peninsular bighorn sheep or vireo on or near the project site or within the Carrizo Marsh restoration area by project employees or contractors shall be reported immediately to the Designated Biologist and/or Biological Monitor, whoever is available first. The Designated Biologist and/or Biological Monitor shall forward the information in writing to the BLM, who shall provide the Palm Springs Fish and Wildlife Office (PSFWO) with an annual report summarizing species occurrences on the project site and actions taken that affect listed species, as described in the Conservation Measures section.

DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

Any dead, injured, or sick Peninsular bighorn sheep or vireo should be immediately reported to: our Division of Law Enforcement at 619-557-2997 or 310-328-1516; PSFWO at 760-322-2070; and CDFG at 909- 659-6464, 760-771-0375, or 916-358-1464. Written notification should be submitted within 5 calendar days to the PSFWO, 777 E. Tahquitz Canyon Way, Suite 208, Palm Springs, California 92262. To the extent known, written or verbal notification should include the date, time, and location of the incident; number of discovered specimens; cause of injury or death; and any other pertinent information. Injured animals, if deemed treatable, should be transported under humane conditions to a qualified veterinarian or certified wildlife care facility, with the PSFWO apprised of the final disposition. Care must be taken in handling sick or injured individuals to ensure effective treatment and care can be administered, and in handling dead specimens to preserve biological material in the best possible state. The finding and relevant details should be immediately reported to the PSFWO.

The PSFWO should also be notified immediately at 760-322-2070 if any endangered or threatened species not addressed in this biological opinion is located in the project or restoration areas during the ROW term. The same reporting requirements also shall pertain to any healthy individual(s) of any threatened or endangered species located in the action area that requires handling to move the individual(s) out of harm's way.

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.

4. We recommend that BLM work with Ocotillo Express LLC to eliminate proposed turbines 24 and 25. These turbines are the closest to critical habitat, documented sign, and sightings of live animals. Moreover, these turbines are within the 600-yard buffer defined in the incidental take statement as the area now used for lambing and forage that is likely to be avoided by sheep following construction. Turbines 24 and 25 occur in a wash that represents some of the best forage habitat that occurs on the project site.

5. We recommend that BLM work with Ocotillo Express LLC and proponents of other planned renewable energy projects in or near Peninsular bighorn sheep habitat to fund the design and construction of a wildlife overpass across I-8 at locations determined by species experts and the wildlife agencies to be most likely to benefit the species. An overpass would reduce the risk of mortality from collision with vehicles on I-8, promote regional connectivity, and would assist the affected ongoing southward expansion of the population.

REINITIATION NOTICE

This concludes formal consultation on the BLM's proposal to issue a ROW grant and the Corps' proposal to issue an individual permit under section 404 of the Clean Water Act to Ocotillo Express LLC for construction of the Ocotillo Express Wind Energy Facility Project in Imperial County, California. Consistent with 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of take specified in the incidental take statement 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 that was not considered in this biological opinion; and 4) a new species is listed or critical habitat designated that may be affected by the action. In addition, if any of the stated assumptions used in our analysis are invalidated, the BLM and Corps must reinitiate consultation. If you have any questions regarding this biological opinion, please contact Nisa Marks at the PSFWO at 760-322-2070, extension 208.

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PERSONAL COMMUNICATIONS

Botta, R. (CDFG). October 17, 2011. Conversation with N. Marks (Service) at a meeting about bighorn sheep and potential mitigation projects.

Boyce, W. October 20, 2011. Email to B. Martin, N. Marks (Service), P. Sorensen (Service), B. April (Caltrans), W. Tippets (The Nature Conservancy), E. Rubin (Arizona Game and Fish Department), J. Dice (Anza-Borrego Desert State Park), J. Calaway (Pattern Energy LLC), K. Marsden (BLM), M. Jorgensen, M. McDonald (Anza-Borrego Desert State Park), N. McCue (Pattern Energy LLC), R. Botta (CDFG), R. A. James (Caltrans), S. Howard (Helix Environmental Planning), W. Vickers. Re: October 17, 2011, bighorn meeting synopsis – potential for an overpass over I-8, and recreation in the vicinity of the proposed Ocotillo Express Wind Farm.

Colton, A. (SDG&E). October 20, 2011. Email to E. Porter (Service) about SDG&E Sunrise Powerlink construction schedule.

Davenport, A. October 20, 2011. Phone call with N. Marks (Service) about sheep use of the I-8 Island as lambing grounds.

Davenport, A. December 1, 2011. Phone call with N. Marks (Service) about OHV recreation in the vicinity of the proposed Ocotillo Express Wind Farm.

Howard, S. (Helix Environmental Planning). October 27, 2011. Phone call with N. Marks (Service) about human presence on site during O&M of the wind facility.

Marks, N. (Service). August 22, 2011. Personal observation of a sheep near I-8 Island, north of I-8, near ROW boundary. Field notes.

Meeks, D. (Bureau of Land Management). November 29, 2011. Phone call with N. Marks (Service) about recreation in the vicinity of the proposed Ocotillo Express Wind Farm.

Tyson, S. (BLM). October 20, 2011. Phone call with N. Marks (Service) about recreation in the vicinity of the proposed Ocotillo Express Wind Farm.

Tyson, S. (BLM) and A. Trouette (BLM). November 29, 2011. Phone call with N. Marks (Service) about OHV recreation in the vicinity of the proposed Ocotillo Express Wind Farm.

Appendix 1: Table of required biological monitors for Ocotillo Express Wind Farm

Biomonitor Title	Species	When Needed	Description of Duties
Designated Biologist	Peninsular bighorn sheep	-construction -post-construction monitoring and reporting period	Construction Measure 5 Construction Measure 6 O&M Measure 1 Reporting Measure 3
Biological Monitor(s)	Peninsular bighorn sheep	-construction -O&M as needed	Construction Measure 7 O&M Measure 1
Bighorn Sheep Monitor	Peninsular bighorn sheep	-construction -O&M as needed	Construction Measure 8 Construction Measure 10 O&M Measure 1 O&M Measure 5
Sheep movement monitor	Peninsular bighorn sheep	-construction -first 5 years of O&M	Construction Measure 11
Biological Observation Tower	Primarily avian species, secondarily Peninsular bighorn sheep	-first 10 years of O&M	O&M Measures 1c and 1d
Environmental Compliance Monitor	all environmental effects	-construction (third party) -O&M (on staff)	Reporting Measure 1
Qualified Vireo Biologist	least Bell's vireo	-season prior to tamarisk removal, Carrizo Marsh -5 survey seasons following removal	Vireo Measure 1 Vireo Measure 10
Vireo Construction Monitor (may be the same individual as the Qualified Vireo Biologist)	least Bell's vireo	-tamarisk removal, Carrizo Marsh	Vireo Measure 2 Vireo Measure 3 Vireo Measure 4 Vireo Measure 5 Vireo Measure 6 Vireo Measure 7 Vireo Measure 8