United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
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IN REPLY REFER TO:
08EVEN00-2013-F-0249

May 8, 2013

Memorandum

To: Supervisory Projects Manager, Renewable Energy Coordination Office, California Desert District, Bureau of Land Management, Moreno Valley, California

/s/: Diane K, Noda

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

Subject: Biological Opinion for the Alta East Wind Project, Kern County, California (3031 (P), CACA-052537, CAD000.06)) (8-8-13-F-19)

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Land Management's (Bureau) proposed issuance of a right-of-way grant to Alta Windpower Development, LLC (Alta Windpower), for the Alta East Wind Project (project) and its effects on the federally endangered California condor (*Gymnogyps californianus*) and Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), and the threatened desert tortoise (*Gopherus agassizii*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The proposed project involves construction, operation, maintenance, and decommissioning of a wind generating facility. We received your December 18, 2012 request for formal consultation on December 19, 2012.

The proposed action is not located within and will not affect critical habitat of the California condor or desert tortoise; we have not designated critical habitat for the Bakersfield cactus. Consequently, we will not address critical habitat in this biological opinion.

We based this biological opinion primarily on information that accompanied your initial request for consultation, additional information that you provided during the course of consultation, and our files. This information includes the biological assessment (Bureau 2012b), the results of the study of the proposed detection system for the California condor (Normandeau Associates 2012), and the draft and final environmental impact statements (Bureau 2012c, 2013). A record of this consultation can be made available at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

The Bureau originally submitted a request for formal consultation on the project in July 2012. We declined to initiate formal consultation because the biological assessment (Bureau 2012a) that accompanied the request for formal consultation contained inadequate information to fully assess the effects of the proposed action on the listed species. We provided a copy of the biological assessment with track changes to the Bureau and Alta Windpower in which we described our concerns (Service 2012g); we also participated in a conference call with the Bureau and Alta Windpower on October 18, 2012, to further explain the information we required in a revised biological assessment.

The Bureau and Alta Windpower proposed, in the July request for formal consultation, a strategy that Alta Windpower would implement to further the conservation of the California condor. In our comments on the draft biological assessment (Service 2012g), we informed the Bureau and Alta Windpower that numerous aspects of the strategy would duplicate efforts by the Service's Condor Recovery Program, were unlikely to be effective, or were too speculative upon which to base an analysis. Terra-Gen, the parent company for Alta Windpower, had previously presented the same strategy to address the conservation of the California condor in relation to multiple projects it was considering in Kern County; we informed Terra-Gen at that time that the conservation strategy was inappropriate (Service 2011g). In tandem with discussions of how Alta Windpower could minimize impacts and avoid killing California condors during operation of the facility, Alta Windpower agreed to work with the Service to develop a conservation strategy that would complement the efforts being undertaken by the Condor Recovery Program. Alta Windpower (2013) has proposed to fund conservation programs for the California condor as a component of the proposed action.

In its December request for formal consultation, the Bureau and Alta Windpower proposed to reduce the potential for mortality of California condors by using a VHF-detection system to detect the presence of birds and curtail operations if one ventured near the proposed facility. We notified the Bureau and Alta Windpower that the Service intended to remove the VHF transmitters from California condors in the southern flock within the next few years because the birds were becoming more difficult to trap to replace transmitters, the process of trapping and replacing the transmitters is stressful for birds, and the Service's objective for the recovery of the species does not include most of the individuals wearing electronic devices. The Bureau, Alta Windpower, and the Service then engaged in a series of discussions that eventually led to the proposal to use the VHF-detection system for the first few years of operations and then replace it with a an alternative detection system, such as radar, that does not rely on the birds being equipped with VHF transmitters; we have described both systems in the Description of the Proposed Action section of this biological opinion.

We provided a draft biological opinion to the Bureau on April 23, 2013 (Service 2013d). The Bureau, in turn, provided the draft biological opinion to Alta Windpower. On April 26, 2013, the Bureau returned the document to us in a manner that included both its and Alta Windpower's comments (Fesnock 2013b). We evaluated the comments and included them in this final biological opinion, as appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Introduction

The Bureau proposes to issue a right-of-way grant to Alta Windpower to construct, operate, maintain, and decommission a wind energy generating facility. The project is situated on the south side of State Route 58 approximately 3 miles northwest of the town of Mojave and approximately 11 miles east of the city of Tehachapi. Figure 2-12 of the final environmental impact statement (Bureau 2013) shows the location of the wind turbine generating facility and the general boundaries of the project. This figure depicts the layout for a 97-turbine project; the current proposal is for a 51-turbine project (Childers 2013).

The project is proposed on approximately 2,272 acres, of which approximately 1,705 acres are public lands and approximately 568 acres are private. The project description is the same for private lands and Bureau-administered land.

Project Components

Construction

We summarized the following information from the biological assessment (Bureau 2012b) and supporting information that the Bureau and Alta Windpower provided during consultation. Facilities would consist of up to 51 wind turbines, above- and below-ground electrical transmission/collection systems for collecting the power generated by each turbine, an approximately 6-acre electrical substation and interconnection switchyard, a 3-acre operations and maintenance building, 25 miles of access roads, an observation building to monitor California condors, and two 279-foot meteorological (met) towers. Construction would also require a temporary concrete batch plant and temporary laydown yard.

All of these components would involve the following general construction activities: land surveying, clearing, grubbing, and grading, and restoring and revegetating (as described in the project's proposed restoration plan [Appendix B; Bureau 2012b]). According to the supporting information to the biological assessment (Childers 2013), the proposed project would result in approximately 81 acres of permanent disturbance and approximately 517 acres of temporary disturbance. Alta Windpower estimates that construction timing would last for 7 months. The following table provides details of the acreages that would be disturbed during construction for each component.

Item	Total	Unit	Typical Temporary Disturbance		Temporary Total (acres)	Typical Permanent Impervious		Permanent Total (acres)
Wind Turbine	51	EA	2.5	acres	127.50	5,000	square feet	5.85
Access Road	97,900	FT	100	feet wide	224.75	25	feet wide	56.19
Underground Electric	150,000	FT	20	feet wide	68.87	none	-	-
Laydown Area	1	EA	5	acres	5.00	none	-	-
Substation	1	EA	6	acres	6.00	6	acres	6.00
O & M Facility	1	EA	3	acres	3.00	3	acres	3.00
Interconnect	0	EA	8	acres	0.00	6	acres	0.00
230 kV T-Line Pole	45	EA	1	acre	45.00	200	square feet	0.21
34.5 kV T-Line Pole *(Alt)*	0	EA	0.5	acre	0.00	100	square feet	0.00
Met Tower	2	EA	1.3	acre	2.60	1100	square feet	0.05
Concrete Batch Plant	1	EA	4	acre	4.00	none	-	-
Other	0	LF	30	acre	30.00	10	acre	10.00
Total					516.72			81.30
Contingency Factor	0%				0.00			0.00
Inflated Total					516.72			81.30

Major activities at each turbine location include construction of the foundation and crane pad, unloading and laydown of the components of the turbine, and erection of the turbine. Alta Windpower proposes to install and operate up to 51 utility-scale turbines with a horizontal axis design. Of these, 42 would be located on Federal land. The turbines would be capable of generating up to 3 megawatts of electricity each for a project maximum output of 153 megawatts. The total height of the turbine at the highest point of the rotor blade rotation would be 465 feet. The ground clearance for the rotor blades at their lowest point of rotation would be 98 feet. The tower portion of the turbine would consist of a tubular steel monopole that extends from the top of its 10-foot diameter base at ground level to its connection with the nacelle. The tower would support the nacelle, hub, and three-bladed rotor and has internal access ladders for turbine maintenance. The total height of the tower to the hub of the rotor blades would be 279 feet. Each turbine would be supported by an excavated, 18-foot diameter, concrete pad.

Alta Windpower proposes to use existing state highways and county roads to access the site. However, in areas without existing access, Alta Windpower would install approximately 19 miles of temporary and permanent access roads. Access roads would be cleared of vegetation and graded. Temporary roads would be used during construction and restored once construction is completed. Permanent roads would be maintained for the life of the project to allow access for maintenance activities. Permanent road width would be 25 feet and would have 3 to 6 inches of gravel installed and compacted.

The proposed power collection system would consist of underground cables connecting individual turbines together and conducting the electrical power to the collector substation. Alta Windpower proposes to place the cables in the access roads. However, where the distance to the substation is excessive or where terrain and/or obstacles dictate such, Alta Windpower proposes to connect underground cables to an overhead collection system on wood or steel poles. In addition, Alta Windpower proposes to install a fiber optic cable with the electrical cables, to the extent practical, for its Supervisory Control and Data Acquisition (SCADA) system that would be used to remotely control the turbines. Installation of underground power and communication cables would involve excavating 2- to 3-foot wide and 3- to 5-foot deep trenches using a backhoe or a trenching machine and installing cables, backfilling trenches with clean fill and excavated material, and grading backfilled trenches to preconstruction conditions.

The project substation would cover an area of approximately 300 feet by 300 feet and would include pole structures to support electrical conductors entering the substation and exiting to the proposed 230-kilovolt transmission line. In addition, Alta Windpower proposes one switchyard for the project to collect power coming from the substation and consolidate the power onto high voltage overhead transmission lines. The substation site would be graded, graveled, and enclosed within a security fence, and the substation and switchyard sites would also involve pouring foundations and erecting structures.

The proposed transmission line would be approximately 5.5 miles long and would consist of up to 45 pole structures (Childers 2013). The average height of the pole structures would be 120 feet and minimum ground clearance beneath conductors would be 30 feet. The proposed transmission line would exit the project area traveling southward through privately owned land parallel to Pipeline Road, follow existing roads heading west and south, and connect into existing Substation 6D as shown in figure 4 of the biological assessment (Bureau 2012b). At Substation 6D, the transmission line would then tie into the existing Alta Infill II transmission line to connect into the existing Sun Creek Switchyard. Transmission line construction would involve clearing and grubbing an approximately 60- to 100-foot wide right-of-way, embedding of poles into a concrete foundation, and pulling cables from the ground using standard methods for installing cables.

The operation and maintenance facility would be approximately 3 acres in size and would have a building footprint of approximately 100 by 150 feet. Alta Windpower proposes to staff the facility with approximately 15 workers who will be responsible for implementing the project's standard operating procedures, operating the SCADA system, performing inspections and maintenance, and ensuring that all permit conditions are implemented.

Alta Windpower proposes to install security perimeter fencing consisting of posts installed at 10- to 15-foot intervals, 4 strands of barbed wire, with the bottom strand a minimum of 18 inches above ground to allow small animal passage and the top strand at a height to allow larger wildlife to jump over. Alta Windpower proposed to install fence posts manually or with specialized equipment and to install wire manually.

Alta Windpower also proposes to locate an approximately 4-acre temporary concrete batch plant onsite to support the construction activities associated with the ancillary facilities, turbine foundations and pads, and possibly for pole foundations. In addition, Alta Windpower proposes to temporarily locate an approximately 5-acre laydown yard along the western access road for the staging of construction and project equipment and materials. As an alternative, Alta Windpower may use the Alta Infill II project laydown area. These temporary areas would be restored after construction is completed.

Alta Windpower installed nine temporary met towers with guy wires in the past on the project site. Eight of these have marked guy wires. Once the project has been constructed, Alta Windpower proposes to remove eight of the installed met towers. The ninth temporary met tower will be removed in the year following construction. Alta Windpower proposes to install 2 permanent 279-foot met towers. These will be free-standing lattice design. The exact location of the permanent met towers will be determined based on site terrain and contractual obligations under a master development agreement with Southern California Edison.

Alta Windpower proposes to install two 50-foot free-standing, lattice design towers designed to support the antennas for the proposed VHF-detection system. The concrete tower foundation size would be approximately 3 feet wide by 3 feet long. The primary tower would be located on an existing wind facility to the west of the project site on private lands. The secondary tower will be located on Bureau land to the northeast of the project site. Alta Windpower selected these sites to maximize coverage of the project site and its 16-mile detection perimeter and to minimize blind spots of the VHF-detection system. Alta Windpower would install other components of the system, including VHF receivers, communication equipment, cables, solar panel, and battery box, at the base of the towers.

Alta Windpower proposes to install an observation building on the project site as part of the effort to monitor California condors. The building will not be taller than 20 feet nor larger than 16 feet by 16 feet at the base; to protect the structure from fires, Alta Windpower would clear or reduce the amount of vegetation from a 30-foot-wide area at its base. The building would have an all-window exterior that would provide for viewing in 360 degrees. There will be a portable toilet downhill from the observation building, placed such that it does not block the view from the building.

Operations and Maintenance

Operation and maintenance would occur throughout the life of the project. Routine maintenance activities would consist of visual inspections of turbine components and may include, but would not be limited to, replacing lubricating fluids, checking parts for wear and replacing, as required, and recording data from data recording chips in all pertinent equipment including anemometers. The turbines would also be monitored continuously by the project SCADA system. On average, each turbine would require 40 to 50 hours of scheduled mechanical and electrical maintenance per year. Roads, power collection and communications systems, transmission lines, VHF-detection system, antenna and observation towers, fencing, and buildings would all be routinely inspected and maintained. Operation and maintenance would result in regular truck traffic on access roads throughout the year and access roads would be regraded as necessary to facilitate these activities.

Decommissioning and Repowering

The biological assessment (Bureau 2012b) did not provide any information on decommissioning or repowering of the Alta East development. In the final environmental impact statement (Bureau 2013), the Bureau assumed the project to have a lifespan of at least 30 years, based on landowner lease arrangements and permit approval timeframes. Prior to the termination of the right-of-way authorization, Alta Windpower would develop and the Bureau would approve a decommissioning plan. The decommissioning plan will include a plan to reclaim the site and a monitoring program, which would include all appropriate management plans, best management practices, and stipulations developed for the construction phase. All turbines and ancillary structures will be removed from the site. All areas of disturbed soil will be reclaimed using weed-free native shrubs, grasses, and annuals. Finally, the vegetation cover, composition, and diversity will be restored to values commensurate with the ecological setting.

New technology may become available for repowering the turbines to foster more efficient operation. If Alta Windpower decides to repower the turbines, it would be required to apply for all required environmental and permit/entitlement reviews and new landowner agreements to extend the operational period. In this situation, the Bureau would consider whether additional consultation, pursuant to section 7(a)(2) of the Act, would be required. For this reason, we have not discussed repowering further in this biological opinion.

Avoidance and Minimization Measures

The proposed action includes measures that would be implemented by Alta Windpower to avoid, reduce, and offset potential adverse effects to the California condor, desert tortoise, and Bakersfield cactus. The Service, Bureau, and Alta Windpower worked closely on developing these measures. These avoidance and minimization measures and best management practices were proposed in the biological assessment (Bureau 2012b) and final environmental impact statement (Bureau 2013). Alta Windpower will implement the following species-specific protective measures during construction, operation, and maintenance activities to minimize adverse effects to the California condor, desert tortoise, and Bakersfield cactus. The wording of some of the measures has changed as a result of our discussions with the Bureau and Alta Windpower; we have also changed some wording to improve clarity. For the sections for each species, 'qualified biologist' refers to an individual or individuals who are specifically qualified to work with the species under discussion in that section.

California Condor

As part of its operations, Alta Windpower plans to implement a Condor Monitoring and Avoidance Plan (Appendix D; Bureau 2012b) to monitor California condor in the vicinity and curtail turbines if one enters the project area to decrease the risk of it being struck. This plan requires a full-time qualified biologist employed or retained by Alta Windpower be on site during daylight hours to look for California condors and direct the curtailment of turbines if one is seen and is in danger of striking a turbine and/or one approaches within a 2-mile buffer around the project boundary. This plan also incorporates the use of a Condor Monitoring System that will rely on a VHF-detection system that will scan through all VHF frequencies for California condors within a 16-mile perimeter of the project and will send alerts to a qualified biologist and other project staff. These staff will look for California condors and listen for alerts and initiate response procedures, including curtailment of some or all of the turbines, if appropriate. Given the 30-year proposed life of the project, the Bureau and Alta Windpower also proposed an adaptive management strategy.

Alta Windpower will implement the following measures to minimize impacts of the proposed wind facility on the California condor:

General Protective Measures

1. Alta Windpower will not site turbines on or immediately adjacent to the upwind sides of ridge crests.

2. Prior to ground-disturbing activities, Alta Windpower will employ several qualified biologists approved by the Service and the Bureau, with demonstrated knowledge of the California condor's ecology, natural history, and identification, and who will be onsite to monitor all construction and operations activities within the project area. These biologists will have excellent birding and observation skills, be able to identify California condors and other large birds at long distances (i.e., greater than 1 mile), and will be skilled in the use of VHF telemetry equipment. These biologists will also be able to take detailed field notes and be able to report on project activities.

3. Prior to project initiation, Alta Windpower will develop a worker environmental awareness program. This program will be approved by the Service and Bureau and will be presented to all workers on the project site throughout the life of the project. It will include the following information specific to the California condor: A summary of the minimization measures described in this biological opinion; training on the issue of microtrash, its potential effects on California condors, and the necessity of avoiding the generation and deposition of microtrash; a protocol to be followed when road kill is encountered in the work area or along access roads to minimize potential for these carcasses to serve as attractants to scavengers, including the California condor, as well as an attraction of common ravens (*Corvus corax*); and the contact information of the qualified biologists and project compliance manager. Each trainee will sign an acknowledgement of training, to be kept in an accessible place throughout the life of the project and furnished to agencies upon request, that they have participated in the training.

4. In addition to implementing the worker environmental awareness program, Alta Windpower will develop a pamphlet or similar document that will be distributed to all construction and

maintenance workers on the project providing information on the California condor including: species description with photos and/or drawings indicating how to identify the California condor and how to distinguish them from turkey vultures (*Cathartes aura*) and golden eagles (*Aquila chrysaetos*); protective status and penalties for violation of the Act; minimization measures being implemented on the project; and contact information for reporting California condor sightings.

Management of Hazardous Waste, Microtrash, and Carcasses

1. A non-toxic dust palliative will be used when watering roads to prevent creation of fugitive dust.

2. Alta Windpower will develop a Spill Prevention and Response Plan that identifies where hazardous materials and wastes are stored on site, spill prevention measures to be implemented, training requirements, appropriate spill response actions for each material or waste, the locations of spill response kits on site, a procedure for ensuring that the spill response kits are adequately stocked at all times, and procedures for making timely notifications to authorities. All spills of hazardous substances will be cleaned up immediately and a report documenting the actions taken to remediate the spill will be provided to the Service and Kern County within 2 days of the incident. In the event of an inadvertent spill of a hazardous substance, the Bureau would enter into emergency consultation with the Service to address potential effects on listed species.

3. Fuel or hazardous waste leaks will be repaired immediately and spills/leaks will be cleaned up at the time of occurrence. The storage of hazardous materials will be excluded from the construction zone. Unused or leftover hazardous products will be properly disposed of at a licensed facility.

4. To avoid and/or minimize the potential for microtrash to collect in areas used or potentially used by California condors within the action area, Alta Windpower will implement the following measures: trash receptacles will be fitted with animal- and weatherproof lids; work areas will be cleaned daily and all trash will be collected; waste will be properly contained and removed regularly for disposal at appropriate offsite permitted disposal facilities; and signage will be posted indicating sanctions for microtrash violations.

5. To minimize the availability of any carcasses, including those of small mammals and reptiles that may serve as an attractant to California condors and other scavengers, Alta Windpower will minimize cutting into hill slopes for turbine construction, will discourage small mammals and reptiles from burrowing under or near turbines, will not participate in rodent control programs on the project site, and will discourage adjacent landowners from using poisoning for rodent control in the vicinity of the project.

6. Alta Windpower will also implement a carcass removal protocol to be followed when a carcass is encountered in the work area or along access roads to minimize potential for attracting scavengers including the California condor.

7. The Bureau will notify Alta Windpower within 24 hours when any Bureau-authorized livestock grazing in a given year will begin.

8. Alta Windpower will work with the area grazing permittees to develop best management practices to minimize attraction of California condors to the project area, such as removing livestock carcasses to an off-site location far enough from wind developments so as not to present a risk to California condors foraging on the carcasses as well as making all watering troughs inaccessible to wildlife (covered, empty, etc.) during periods when grazing is not occurring.

Measures to Minimize Collisions with Wind Turbine Generators, Met Towers, and Power Lines

1. Alta Windpower will implement its proposed Condor Monitoring and Avoidance Plan. The purpose of this plan is to outline the procedures and compliance steps Alta Windpower will undertake when a California condor is within 2 miles of the Alta East turbines.

2. The Condor Monitoring and Avoidance Plan will be active prior to initiation of turbine testing and operations and will remain active during daytime hours, which includes 30 minutes prior to sunrise and 30 minutes after sunset, until such time as a Service-approved alternative detection system is activated on the site.

3. A qualified biologist will staff a biological observation building full time during daylight hours for the duration of the project or until such time as a Service- and Bureau-approved alternative detection system for California condors is in operation on the project site, which replaces the need for the observer. This biologist will implement full-time observation, during daylight hours, for California condor activities on the project site and a 2-mile buffer outside the project boundary to ensure that if an individual is sighted or detected with the VHF-antenna system, turbines can be safely curtailed prior to it being in danger of being struck by a turbine. The location of the observation building will be reviewed and approved by the Bureau and the Service. The observation building will provide 100 percent coverage of the project area plus the 2-mile buffer to ensure that a California condor could not visually be missed should it be flying in the area. Observations will be conducted year-round during all daylight hours of operations, including 30 minutes prior to sunrise and 30 minutes after sunset. The qualified biologist will have direct communication with the project SCADA operator controlling the project turbines and the authority to curtail all project turbine operations if a California condor enters the project site or buffer area.

4. The Condor Monitoring System is described in the biological assessment (Appendix D; Bureau 2012b) and will include, at a minimum, the following components:

a) VHF-detection stations that will consist of antenna towers, VHF receivers, a datalogger, an antenna switchbox with amplifier, unidirectional antennas, and PC with Internet and SCADA connections.

b) The appropriate number of VHF-detection receiver station components that will allow for scanning through all California condor (California population) VHF frequencies within 2 minutes.

c) Two VHF-detection stations that will maximize coverage of the project site and avoid blind spots that would allow California condors equipped with VHF transmitters to enter the 16-mile detection perimeter around the project undetected.

d) VHF transmitters for qualification testing, response procedure testing, and for use as a sentinel signal.

e) Equipment that will automatically send electronic mail and text notification messages to a Condor Initial Response Team that will initiate response procedures upon detecting a VHF frequency from a California condor within the 16-mile detection area.

5. The Condor Initial Response Team and notification response procedures will include, but not be limited to, the following:

a) The qualified biologist, one Alta Windpower environmental staff, two Alta Windpower operations staff, and the SCADA operator. To provide full-time coverage from 30 minutes before sunrise to 30 minutes after sunset, multiple qualified biologists, environmental staff, operations staff, and SCADA operators will staff these teams in shifts. These Condor Initial Response Team members will be trained in the operation of the Condor Monitoring System and will be available to respond to any detection of California condors. The qualified biologist will coordinate the response and the SCADA operator will maintain a response form detailing the detection and response actions taken.

b) Curtailment of turbines will commence at the time a California condor comes within 2 miles of any project turbine. Curtailment commands may be given for specific sectors or for all sectors of the wind facility at the discretion of the qualified biologist.

c) Identified turbines will be curtailed to a tip speed equal to or less than 15 miles per hour within 2 minutes of any curtailment command. Tip speed will be further reduced to 3 mph by yawing the turbine. This procedure takes longer than 2 minutes.

d) If a VHF signal from a California condor is detected and then subsequently lost, Alta Windpower will treat the bird as if it is moving towards the project site. Condor Initial Response Team members will respond to get visual confirmation or until the qualified biologist determines no condor is within the detection area.

e) If the Condor Initial Response Team members have been dismissed by the qualified biologist because no further signals have been detected and no visual observations have been made, the qualified biologist will spend the remainder of the day on high alert (i.e., continuously scanning the project site and 2-mile buffer area, monitoring the VHF-detection system, and using hand held VHF scanning equipment to scan through condor frequencies) until 30 minutes after sunset. The qualified biologist will continually use a combination of hand-held VHF detection equipment and visual scanning to attempt to detect the California condor and initiate response procedures if the California condor is detected again.

f) If a California condor has triggered the detection system and subsequently the signal is lost and the qualified biologist cannot locate the bird either visually or with a VHF receiver, one of the following procedures will be implemented:

- Under good visibility weather conditions (i.e., no fog or sand storm), the qualified biologist should be able to visually detect an approaching California condor, but the terrain or distance to the bird prevents such visual detection. Unless the biologist believes a threat exists, curtailment will not be required as the biologist should be able to see the California condor as it moves closer into visible range. The curtailment command will not be issued until the California condor is seen or detected by the VHF system and is within the 2-mile buffer around the project site.

- Under poor visibility weather conditions (i.e., heavy fog or sand storm), visual detection will be precluded, regardless of terrain or distance to the California condor. This scenario will result in curtailment because the biologist may not be able to see the California condor as it approaches the project.

g) If California condors are consistently detected entering the 16-mile detection area, but the birds are believed to remain far from the turbines based on VHF signal strength, the following procedures will be implemented:

- The qualified biologist will continually scan the project site and buffer area. Once the biologist communicates that no California condor is within 2 miles of the project boundary, the Condor Initial Response Team members will access vantage points and search until they can visually locate the individual that triggered the alert. After a full search for the California condor that triggered an alert, team members may be directed by the qualified biologist to discontinue monitoring if it is not visually detected. The qualified biologist can direct the other team members to discontinue the attempt to visually locate a California condor if the signal strength detected by the detection system is too low or the project site has sufficient detection ability should the bird come within 2 miles of the project site. However, the qualified biologist will spend the remainder of the day on high alert until 30 minutes after sunset.

- The SCADA operator and Condor Initial Response Team members will continually monitor visual and VHF information (i.e., VHF frequency, signal direction and strength) specific to any California condor locations. If a team member has visually detected a California condor, he or she will relay location relative to the project site, landmarks, direction of flight, and flight behavior to the other members of the team. If the SCADA operator has a VHF detection of a California condor, he or she will relay transmitter frequency, relative direction from the antenna, and signal strength to the team. Additionally, every 2 minutes all team members will receive the information by text and electronic mail on their digital devices if a California condor is within the 16-mile detection perimeter.

- If a California condor is visually located and reported as moved out of the 16-mile detection perimeter by one of the Condor Initial Response Team members, the qualified biologist will continue to visually scan the area around the project site. This procedure will occur each time the California condor enters the 16-mile detection perimeter.

- The Condor Initial Response Team, in responding to reoccurring alerts for any period of time for a specific California condor, will take information from previous responses such as transmitter frequency, relative direction from antenna, and signal strength into account to determine if a particular individual is entering the detection area more regularly than previously reported. The frequency, location, and duration of reoccurring alerts will be used by the qualified biologist to determine the relative level of risk that exists and how the future response by the team will be carried out to avoid mortality of California condors at the project site. Alta Windpower will never ignore an alert regardless of the number of times an individual California condor may trigger the detection system.

h) If a California condor roost is identified within the 16-mile detection perimeter of the VHF-detection system, Alta Windpower will discuss the behavior of the birds and tracking information with the Service and Bureau. Refinement in the detection of specific California condors that establish or use a new roost may be necessary. Alta Windpower will refine the monitoring and detection of changed occurrence patterns of California condors on specific behavior observed as changes occur. The Condor Initial Response Team will continue to implement the existing protocol in relation to repeated detections at a roost within the 16-mile detection perimeter.

i) If, for any reason, the qualified biologist does not respond to a detection alert within 90 seconds, the SCADA operator will curtail all project turbines.

6. Alta Windpower will provide training to its Condor Initial Response Team members in the operation, programming, and maintenance of the Condor Monitoring System equipment and will provide regular updates on the system's operations through monthly meetings with Condor Initial Response Team members.

7. Alta Windpower will practice response procedures for the Condor Monitoring System to facilitate refinement of the observer's search image. Alta Windpower may operate small remote aircraft (manned and/or unmanned) within 4 miles of the turbines to perform drills and reduce the response time of Condor Initial Response Team observers.

8. Alta Windpower will communicate with other wind energy facility operators in the area to expand the effective range of the Condor Monitoring System.

9. The above observer and VHF-detection system protocols could be adapted, with approval from the Service, if future data collection and analyses demonstrate any newly proposed technologies and protocols would meet a higher avoidance criterion for California condors.

10. Un-guyed permanent met towers will be constructed for the wind project. If guy wires are necessary (e.g., on the one temporary met tower that will be removed in the year following construction), bird flight diverters will be installed on all guy wires.

11. Alta Windpower will conform to the latest practices to protect California condors from electrocution and collision with power lines. Alta Windpower will construct all power lines as outlined in the most recent Avian Power Line Interaction Committee guidance (2012).

Adaptive Management Strategy for the California Condor

Due to the 30-year operational life of this project and the anticipation that the recovery program for the California condor will continue to be successful, the risk of California condor mortality associated with the wind facility could increase. An increase in the number of California condors in the area, a change in their flight patterns that brings them into the 16-mile detection perimeter, and fewer birds equipped with VHF transmitters would challenge the functionality of the Condor Monitoring and Avoidance Plan. Each of these scenarios would result in an increase in risk of mortality of California condors. To offset this potential increase in risk, Alta Windpower will implement the following adaptive management strategy:

Change in Use of the 8- to 16-Mile Detection Perimeter Area by California Condors:

If a California condor is detected within the 16-mile detection perimeter, but is more than 8 miles from the project boundary, the Service, Bureau, and Alta Windpower will discuss the details of this detection. The Service and Bureau acknowledge that California condors regularly use gathering areas (including but not limited to Double Mountain) within 12 miles of the project boundary; continued use of these areas does not place California condors at risk of being struck by turbines. Continuation of this use pattern by California condors in the future will not require additional discussion.

Change in Use of the 8-Mile Detection Perimeter Area by California Condors:

If a California condor is detected within the 8-mile detection perimeter more than once during a 30-day period or 2 or more times during a 60-day period or if an individual has been detected near the project boundary (within 2 miles) more than once during a one year period, the Service, Bureau, and Alta Windpower will discuss the circumstances of these detections to determine the appropriate action.

Potential circumstances include, but are not limited to: use of the 8-mile detection perimeter area by California condors is increasing and a greater number of birds are flying within the area of risk; California condors are flying in the 8-mile detection perimeter area more frequently, but at an altitude that does not place them at risk for collision with turbines; use by California condors shifted in proximity of the project site, but has already shifted away again; or one individual is responsible for all of the detections. Potential actions in response to the circumstances listed above would include the following:

The Service and Bureau would initiate discussions. During discussions, the Service and Bureau would determine whether re-initiation of formal consultation is needed based on the new information on movement of California condors. Should re-initiation be determined the appropriate action, the Bureau would complete a section 7(d) analysis to determine what actions could occur during re-initiation. While the Bureau is completing the section 7(d) analysis, Alta Windpower will also implement one of the following measures:

1. Alta Windpower will continue full-time observation and reliance on the Condor Monitoring System using VHF and qualified biologists (status quo option) until the Section 7(d) analysis is complete, or should the 7(d) analysis propose this measure, until the re-initiation of consultation is complete; or

2. Within 24 hours of notice from the Bureau, Alta Windpower will deploy a proven alternative detection system (e.g., a radar detection system proven, to the satisfaction of the Service, to be effective at detecting California condors); or

3. If Alta Windpower can no longer rely on the qualified biologist and Condor Monitoring System measure (measure 1 above) and an alternative detection system approved by the Service is not available (measure 2 above), and if the Service or Bureau has reasonably determined that the risk for mortality of California condors is high and provided written notice of this determination to Alta Windpower, the Bureau will direct Alta Windpower to implement the failsafe approach of nighttime-only operations. Nighttime-only operations will remain in place until Alta Windpower can implement additional protection measures to reduce the risk of mortality to a level that is acceptable to the Service and the Bureau. The Service and Bureau will deem these actions to work sufficiently if Alta Windpower can demonstrate that the measures would provide for the real-time curtailment of turbines within 2 minutes of the detection of a California condor within 2 miles of a project turbine.

4. In the event that a group of California condors moves to within 2 miles of the project boundary (e.g., feeding event or establishing new roost), then Alta Windpower will implement immediate measures, such as real time curtailment to ensure California condors are not killed while the Service, the Bureau, and Alta Windpower convene an immediate meeting to determine what actions are necessary.

Change in Percentage of Population Wearing VHF Units (short term):

In the short term, the percentage of birds that are invisible to the detection system could exceed 30 percent of the southern California flock due to unanticipated events (e.g., extreme weather prevents the replacement of dying batteries, manufacturer fails to ship units etc.). (As we discussed elsewhere in this biological opinion, California condors from the central California flock occasionally fly into the area occupied by the southern California flock; when this happens, we consider these birds to be part of the southern California flock.) If more than 30 percent of the flock is not equipped with VHF transmitters, Alta Windpower will implement one of the following measures until the Service reaches this transmitter threshold again:

1. If Alta Windpower has already deployed a Service-approved alternative detection system that does not rely on California condors being equipped with VHF transmitters for detection, no further action is needed; or

2. If Alta Windpower has not deployed a Service-approved alternative detection system that does not rely on California condors being equipped with VHF transmitters for detection, but has one available, it will be deployed within 24 hours of notice from the Service or the Bureau that the number of individuals carrying VHF transmitters has fallen below the pre-determined trigger level; or

3. In the event that no Service-approved alternative detection system is available, Alta Windpower will implement the failsafe approach of nighttime-only operations to avoid mortality until it can implement additional protection measures to reduce the risk of mortality or until the Service captures and equips California condors with VHF transmitters to a level exceeding 70 percent of the southern California population.

Change in Percentage of Population Wearing VHF Units (long term):

In the long term, the potential exists that the Service may not be able or wish to maintain VHF transmitters on at least 70 percent of the southern California flock. The Service intends to transition to sampling a smaller percentage of the population with VHF transmitters over the long term. A long-term change in the percentage of the population equipped with VHF transmitters would result in the Service providing Alta Windpower with a 60-day written notice. Alta Windpower will implement one of the following measures at the time such notice is provided:

1. Alta Windpower will develop and deploy a Service-approved alternative detection system, such as radar, that does not rely on any California condors being equipped with VHF transmitters. This system will be incorporated into Alta Windpower's "detect and curtail" strategy at the time such notice is provided; or

2. If Alta Windpower has not successfully identified another means to detect and curtail, the Bureau will require Alta Windpower to implement nighttime-only operations to reduce the potential for mortality until Alta Windpower has identified and implemented an alternative system to detect California condors that is approved by the Bureau and Service.

Procedure to Follow if a California Condor is Struck by a Turbine Blade

If a California condor were struck by a turbine blade, the project will immediately be confined to nighttime-only operations. The Service and Bureau would then re-initiate formal consultation.

Condor Monitoring and Avoidance Plan Reporting

Alta Windpower will implement the following protocol for recording and reporting detections of California condors and responses to detections:

1. The full-time qualified biologists will be responsible for coordination with Service staff regarding reporting of data collected by the VHF-detection system. The points of contact for such coordination will be the project biologist in the Ventura Fish and Wildlife Office and a designated biologist at the Hopper Mountain National Wildlife Refuge.

2. Twice per year, upon Service acquisition of new VHF transmitters prior to a trapping season, a list of all new VHF frequencies will be transmitted via electronic mail to the project's qualified biologists, Alta Windpower Project Manager, and Alta Windpower environmental compliance manager. Alta Windpower's biologists or other qualified project staff will be responsible for entering these frequencies into all project VHF receivers upon receipt. Alta Windpower will be responsible for ensuring the appropriate number of VHF receivers is in place to accommodate these additional frequencies and still be able to scan through all frequencies within 2 minutes.

3. Throughout the year, no less than on a weekly basis, Service staff will transmit via electronic mail any updates to the VHF frequencies list. Alta Windpower will be responsible for updating its project receivers weekly to reflect any changes.

4. On a daily basis, Service staff will transmit condor GPS data downloads via electronic mail to Alta Windpower for informational and planning purposes and for assisting in the development of any alternative detection technology.

5. Alta Windpower will establish a reimbursable agreement and account with the Service to offset the costs associated with Service staff handling of project-related data and information needs.

6. Alta Windpower will develop a central data collection and reporting system to organize and manage information regarding the Condor Monitoring System and will share these data and reports with the Service immediately upon their collection or development, respectively.

7. Alta Windpower will report to Service staff within 24 hours all alerts with regard to California condors that result in curtailment of the project.

8. A copy of any notification response form will be provided to the Service within 48 hours of completion. This form will include information on any curtailments, including the duration of curtailments and the number of turbines affected.

Annual Reporting on California Condor

1. No later than January 31 of each of the years the project remains in operation, the qualified biologist will provide the Bureau and Service with a California condor status report that will include at a minimum:

   a) A general description of the status of California condor in the project site;

   b) Information from the annual compliance report documenting compliance/noncompliance with each conservation measure;

   c) An assessment of the effectiveness of each minimization measure;

   d) A summary and map of California condor sightings and VHF system detections within and adjacent to the project site;

   e) Recommendations on how the minimization measures might be changed to more effectively avoid or minimize future adverse effects to the California condor.

2. Alta Windpower will report all California condor sightings in the project area during construction, operation, and maintenance directly to the Service within 24 hours. These reports will include, but will not be limited to, information on the behavior of the birds (e.g., location, flight height, etc.), meteorological conditions at the time the California condors were within the project area (e.g., time, duration, temperature, wind speed, and direction), and any subsequent curtailment.

Funding for Conservation Programs for the California Condor

To contribute to the recovery of the California condor, Alta Windpower will provide a financial contribution as described in the draft California Condor Recovery Contribution (Alta Windpower 2013). This draft strategy will be expected to include an implementation plan for the framework concepts and approved by the Service and Bureau within 6 months of signing of the Record of Decision. The California Condor Recovery Contribution will include, but not be limited to, funding for lead outreach and education programs, and funding for scientific research to guide future wind development in the Tehachapi Region. This contribution is expected to be approximately $100,000 per year for the 30-year life of the project.

Desert Tortoise

Alta Windpower will implement the following measures to minimize impacts of the proposed wind facility on the desert tortoise:

1. Alta Windpower will develop a worker environmental awareness program that is specific to the desert tortoise. In addition to the general provisions we described for the California condor that are applicable to all the listed species, the program will include: A summary of the minimization measures to be implemented; maps showing the locations of desert tortoises and exclusion areas; and a description of other limitations on construction.

2. Alta Windpower will employ at least one authorized biologist for the project that meets or exceeds minimum qualifications set forth by the Service who has gone through an official approval process with the Bureau and Service; the approval will be completed at least 45 days prior to beginning of ground-disturbing activities.

3. Alta Windpower will ensure that the authorized biologist performs the duties that comprise compliance with the conservation measures outlined in this biological opinion. The authorized biologist will be responsible for all aspects of clearance surveys, monitoring, developing and implementing the worker environmental awareness program, contacts with agency personnel, reporting, and long-term monitoring and reporting and be present, along with approved biological monitors during construction, operation, and maintenance that could affect desert tortoises.

4. Biological monitors will be approved and supervised by the authorized biologist. The biological assessment states that these monitors will "meet or exceed minimum qualifications as set forth by the (Service);" however, we do not have qualifications for biological monitors. The Service's practice with regard to biological monitors is that the authorized biologist is responsible for determining the tasks that each biological monitor is qualified to perform; with additional training, the authorized biologist may determine that the biological monitor is capable of assuming additional responsibility. In the following measures, 'qualified biological monitor' refers to a biological monitor that the authorized biologist has determined is qualified to perform that specific task.

5. The authorized biologist and qualified biological monitors will have the authority to halt any project activity that is not in compliance with conservation measures outlined in this biological opinion or other project approvals or permits. Alta Windpower will coordinate with the Bureau to ensure that an appropriate number of authorized biologists and biological monitors are onsite during construction, operation, and maintenance to monitor project activities in desert tortoise habitat. Authorized biologists or biological monitors will be assigned to monitor each area of activity where conditions exist that may result in mortality of desert tortoises (for example, clearing, grading, trenching, recontouring, and restoration activities). Authorized biologists will maintain a detailed record of all desert tortoises encountered during project surveys and monitoring and will be responsible for determining compliance with measures as put forth in the biological opinion and other project agreements and for reporting desert tortoise activity or noncompliance to the project's compliance lead and to the Bureau and Service.

6. During preconstruction land surveying, all survey crews working in vegetated areas to delineate routes of travel, turbines, and other facility locations before clearing and grubbing will be escorted by an authorized biologist or qualified biological monitor to ensure the path immediately in front of the survey crew is clear of desert tortoises. Use of vehicles and equipment outside the delineated work areas will be prohibited.

7. Temporary fencing to exclude desert tortoises will be erected and maintained between the interface of project construction areas and any remaining habitat before initiating clearance surveys and construction on the project site. Installation of this fencing will be monitored by a qualified biological monitor.

8. After this fence is erected, an authorized biologist or biological monitor will check it daily to ensure it remains intact and that no desert tortoises were missed in the clearance survey. A biological monitor will remain onsite throughout the construction period to continue daily fence inspections.

9. Clearance surveys will be conducted within the impact areas immediately after constructing the fence to exclude desert tortoises. The surveys will cover 100 percent of the exclusion area and consist of at least 2 consecutive surveys of the area. Alta Windpower will require two negative surveys (no individuals or new sign found) before declaring the fenced construction sites free of desert tortoises. Desert tortoises are generally active from March 15 to May 31 or September 1 to October 15; in some years, rain and suitable temperatures prompt widespread activity outside of these dates.

10. Desert tortoises that are found aboveground and need to be moved from harm's way will be placed at unoccupied shelter sites including unoccupied soil burrows, spaces within rock outcrops, caliche caves, and the shade of shrubs from 150 to 300 feet from the point of encounter. During periods of the year when desert tortoises are generally active, a biological monitor will monitor these individuals to ensure that they do not move back into harm's way or exhibit signs of physiological stress (e.g., gaping, foaming at the mouth, etc.). If a desert

tortoise exhibits any signs of physiological stress, the authorized biologist will immediately undertake actions to stabilize it (e.g., place it in a climate-controlled facility, shade it and lightly mist it with water, etc.); the desert tortoise will be released only after it is exhibiting normal behavior and temperatures are appropriate.

11. If an individual is found in a burrow during a construction clearance survey in a season when desert tortoise are generally inactive, the first choice is to construct a pen around the occupied burrow (of at least 66.5 by 66.5 feet) with permanent desert tortoise exclusion fencing or other materials that will prevent individuals from digging out of the pen. The pen will contain at least two natural or artificially constructed burrows of appropriate size for the desert tortoise, natural shrub cover, and shade structures up against the fence every 20 feet; the pen will not enclose other desert tortoises. This area would be avoided until the next active period and the desert tortoise leaves its burrow on its own volition.

12. If, for some reason, Alta Windpower cannot bypass a desert tortoise in a burrow during the inactive season, the desert tortoise would be removed from its burrow and placed in a pen that has been constructed in the same vicinity, but outside of the construction zone. The pen would contain all of the features listed in the preceding measure. Alta Windpower will monitor any desert tortoise moved in this manner until the desert tortoise settles into its new environment. Alta Windpower will consider a desert tortoise settled when it exhibits appropriate behavior for the season (e.g., remaining in its burrow most of the day) and does not constantly walk the fence line in an effort to escape. If the desert tortoise remains active, Alta Windpower will provide it with food and water.

13. Alta Windpower will report any instances of desert tortoises experiencing stress or being transferred to a holding pen within one business day of the incident.

14. Alta Windpower will avoid desert tortoise burrows, whether occupied or not, by realignment of the construction path. If realignment is not feasible, an authorized biologist will excavate the burrow to allow removal of desert tortoises or their eggs. An authorized biologist will relocate desert tortoises and nests found within the construction area in accordance with the Service's field manual (2009b) and collapse or block unoccupied burrows to prevent re-entry by desert tortoises. Alta Windpower will flag desert tortoise burrows and pallets that are outside but within 50 feet of the construction work area for avoidance. The authorized biologist will conduct all handling of desert tortoises and their eggs and excavation of burrows in accordance with the recommended protocol (Service 2009b). Alta Windpower will not place stakes or flagging on the berm or in the mouth of a burrow or mark them in a manner that facilitates poaching. It will design avoidance flagging to be easily distinguished from access route or other flagging and remove the flagging following construction.

15. An authorized biologist or biological monitor will survey for desert tortoises immediately in front of vegetation clearance activities within the marked boundaries of all construction sites, staging areas, and access routes in the event an individual was inadvertently missed during clearance surveys.

16. Trash receptacles at the work site will have self-locking lids to prevent entry by opportunistic predators such as common ravens and coyotes (*Canis latrans*). Alta Windpower will empty these receptacles daily.

17. Whenever a vehicle or construction equipment is parked longer than 2 minutes within desert tortoise habitat, workers will inspect the ground around and underneath the vehicle for desert tortoises prior to moving the vehicle. If the worker observes a desert tortoise, he or she will contact an authorized biologist or qualified biological monitor. If possible, the desert tortoise will be left to move out of harm's way on its own. If the desert tortoise does not move out of harm's way within 15 minutes, an authorized biologist will move it out of harm's way in accordance with the handling procedures (Service 2009b).

18. The authorized biologist will follow the procedures for handling tortoises in the Service's field manual (2009b). Only the authorized biologist or qualified biological monitor will move desert tortoises and then solely for the purpose of moving them from harm's way. The authorized biologist will document each desert tortoise encounter/handling with the following information, at a minimum: a narrative describing circumstances; vegetation type; date; conditions and health; any apparent injuries and state of healing; if moved, the location from which it was captured and the location in which it was released; maps; whether animals voided their bladders; and diagnostic markings (that is, identification numbers marked on lateral scutes).

    If a worker observes a desert tortoise that is at risk and an authorized biologist or biological monitor cannot reach the area in a timely manner, the worker will move the desert tortoise to a safe area a short distance away and remain near the animal until either an authorized biologist or biological monitor arrives or the authorized biologist advises the worker that the threat is no longer present. The worker will report the details of this activity and the circumstances to the authorized biologist as soon as possible. Alta Windpower will evaluate the circumstances of the interaction to determine whether additional protective measures may be required and discuss the issue with the Service and Bureau as soon as possible.

19. Alta Windpower will maintain vehicles and equipment in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Alta Windpower will inform the authorized biologist, Service, and Bureau of any hazardous spills immediately and immediately clean them up; it will properly dispose of contaminated soil at a licensed facility.

20. Alta Windpower will immediately repair fuel or hazardous waste leaks and clean them up at the time of occurrence. Alta Windpower will exclude the storage of hazardous materials from the construction zone and properly dispose unused or leftover hazardous products at a licensed facility.

21. Alta Windpower will inspect construction pipe, culvert, or similar structures with a diameter greater than 3 inches and stored less than 8 inches aboveground on the construction site for

one or more nights for desert tortoises and other wildlife before the material is moved, buried, or capped. As an alternative, Alta Windpower may cap these materials before they are stored on the construction site.

22. Alta Windpower will apply water to the construction right-of-way for dust control and to the topsoil piles as necessary to prevent the loss of topsoil because of wind erosion. During the active season (generally March 15 to May 31 and September 1 to October 15 or at any other time of the year when weather conditions may lead to desert tortoise activity), an authorized biologist or biological monitor will patrol watered areas to ensure water is not ponding onsite.

23. Alta Windpower will surround trenches with temporary fencing to exclude desert tortoises; an authorized biologist or biological monitor will inspect these areas periodically throughout and at the end of each day, and immediately before backfilling. An authorized biologist or qualified biological monitor will promptly remove any desert tortoise found in a trench or excavation in accordance with Service-approved protocol (Service 2009b). Alta Windpower will provide escape ramps at 100-foot intervals along the trench and backfill or cover them at the end of the construction day to prevent animals from becoming entrapped overnight.

24. Alta Windpower will manage common ravens by annually removing their nests, removing carrion at the base of turbines, and storing garbage in containers that these birds cannot access.

25. Upon completion of construction, the authorized biologist will conduct a thorough inspection of the site to determine the extent of compliance with the conditions of Service's biological opinion. Within 45 days of completion of project activities, the authorized biologist will submit a report to the Bureau and Service. The report will document the numbers and locations of desert tortoises encountered, their disposition, effectiveness of protective measures, practicality of protective measures, and recommendations for future measures that allow for better protection or more workable implementation. The authorized biologist will also submit annual reports to the Service by January 31 that summarize occurrences of desert tortoises within the project area throughout the year, the effectiveness of avoidance and protection measures, and other relevant information.

26. The authorized biologist will notify the Bureau and Service within 24 hours upon locating a dead or injured desert tortoise during construction, operation, and maintenance of the project. The notification will be made by telephone and in writing or by electronic mail to the Bureau and the Service. The report will include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Alta Windpower will submit desert tortoises that are fatally injured during project-related activities for necropsy, at its expense, as outlined in Berry (2001 in Bureau 2012b). Alta Windpower will transport desert tortoises with minor injuries to a nearby veterinarian qualified in treatment of reptiles, for treatment at its expense. If an injured

animal recovers, Alta Windpower will contact the Bureau and Service for final disposition of the animal.

27. The authorized biologist and biological monitors will be present during maintenance outside the established exclusion areas (i.e., transmission line maintenance) to assist in the implementation of protection measures for the desert tortoise and to monitor compliance with the biological opinion and other project permits. The appropriate number of authorized biologists and biological monitors will be dependent upon the nature and extent of the work. All transmission line maintenance will be conducted using existing roads.

28. Project personnel encounters with desert tortoise will be immediately reported to the authorized biologist. If the desert tortoise is in harm's way, only an authorized biologist or qualified biological monitor will remove it from harm's way, except for situations as described in measure 15. The authorized biologist will maintain records of all desert tortoises encountered during the operation phase. This information will include for each individual: the locations (narrative, vegetation type, and maps) and dates of observations; general conditions and health; any apparent injuries and state of healing; if moved, the location from which it was captured and the location where it was released, whether animals voided their bladders, and diagnostic markings (i.e., identification numbers).

29. Alta Windpower will strictly enforce a speed limit of 15 miles per hour in desert tortoise habitat at all times during construction, operations, and maintenance.

30. The Bureau's biological assessment includes a measure related to the acquisition of off-site habitat to compensate for the loss of habitat as a result of the proposed action. Such acquisitions provide some benefit to desert tortoises because they remove lands from the threat of private development. We will not discuss this issue further in this biological opinion; we included this paragraph merely to avoid confusion in the numbering of measures between the biological opinion and the biological assessment.

31. Alta Windpower will manage noxious weeds (section 2.3.2.1, measure 6 in Bureau 2012b) to control the spread and introduction of invasive plants that are present in the project area and immediate vicinity. The management measures address vehicle washing, transport of materials, minimizing ground disturbance/vegetation removal, identification of noxious weed infestations, and treatment of noxious weed infestations with Bureau-approved herbicides.

32. Alta Windpower will monitor the project area regularly for the establishment of invasive species for the life of the project and will initiate weed control measures immediately upon evidence of such an introduction.

33. Alta Windpower will limit herbicide use to those that are approved by the Bureau and confirmed to have no effect on the desert tortoise and to non-persistent, immobile pesticides and will only apply these herbicides in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.

34. Alta Windpower will maintain all vehicles used for construction, operation, and maintenance at all times to minimize leaks of motor oils, hydraulic fluids, and fuels. During construction, refueling and maintaining vehicles that are authorized for highway travel will be performed offsite at an appropriate facility. For vehicles that are not highway-authorized, Alta Windpower will provide service on the project site by a maintenance crew using a specially designed vehicle maintenance truck. During operation and maintenance, Alta Windpower will service and fuel vehicles at the operation and maintenance building or at an offsite location. Alta Windpower will prepare a Spill Prevention Control and Countermeasure plan for the facility that will contain information regarding training, equipment inspection and maintenance, and refueling for construction vehicles, with an emphasis on preventing spills.

Bakersfield Cactus

We will explain the difference between 'Federal' and 'State' Bakersfield cactus later in this biological opinion.

1. Alta Windpower will develop a worker environmental awareness program that is specific to the Bakersfield cactus. In addition to the general provisions we described for the California condor that are applicable to all the listed species, the program will include: A summary of the minimization measures to be implemented; maps showing the locations of Bakersfield cactus and exclusion areas; and a description of other limitations on construction.

2. To avoid individuals of the Federal Bakersfield cactus, Alta Windpower will clearly mark individual plants with orange construction fencing or stakes and flagging in the field including a 25-foot buffer around each individual plant. Alta Windpower will instruct project personnel to avoid impacts to these plants during all project activities including construction, operation, and maintenance. The fencing measure also applies to the State Bakersfield cactus (Martin 2013).

3. Alta Windpower will implement best management practices, including placement of silt fencing and erosion and sediment controls upslope of Federal Bakersfield cactus locations to minimize risks of localized erosion and deposition of sediment near plants.

4. Alta Windpower will avoid individuals of the State Bakersfield cactus by a minimum of 25 feet (Martin 2013). Alta Windpower may request concurrence from the California Department of Fish and Wildlife to reduce this distance in specific instances.

5. State Bakersfield cactus plants that cannot be avoided will be translocated according to guidelines provided by the California Department of Fish and Wildlife (Martin 2013).

6. At the end of construction in the vicinity of the Bakersfield cactus, the biological monitor will determine if the amount of dust on Bakersfield cactus within 100 feet of construction is above normal amounts of dust. If the plant is heavily coated with dust, the biological

monitor will gentle rinse the plant with fresh water. If the dust is within typical amounts, no further action would be needed.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

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

The jeopardy analysis in this biological opinion relies on four components in relation to the California condor, desert tortoise, and Bakersfield cactus: (1) the *Status of the Species*, which describes the range-wide conditions of these species, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of these species in the action area, the factors responsible for those conditions, and the relationship of the action area to their survival and recovery; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on these species.

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

STATUS OF THE SPECIES

California Condor

The Service listed the California condor as federally endangered on March 11, 1967 (32 Federal Register 4001). We designated a population of California condors that was introduced in northern Arizona in 1996 as experimental, 'non-essential,' under section 10(j) of the Act (61 Federal Register 54044; October 24, 1996).

California condors are among the largest flying birds in the world. Adults weigh approximately 17 to 22 pounds and have a wing span up to 9.5 feet. Plumage is black, with prominent white under-wings and naked skin on the head and neck that ranges from gray to shades of yellow, red, and orange. Males and females cannot be distinguished by size or plumage.

In 1982, biologists captured and brought a wild chick into captivity for the first time to institute a captive breeding program because the number of California condors continued to decline.

Between 1982 and 1987, we removed other chicks and eggs from the wild and, in 1987, brought the last free-flying California condor into the captive breeding program.

Following several years of increasingly successful captive breeding, we released captive-bred California condors back to the wild in southern California in early 1992. The Service began releases of California condors in northern Arizona in 1996; these birds have since expanded their range into Utah. Biologists working on recovery of the species also released birds in the Ventana Wilderness, along California's central coast, Pinnacles National Park in central California, and in the Sierra San Pedro de Martir, Baja California, Mexico.

As of February 28, 2013, 399 California condors comprised the total world population. In California, the central coast flock included 31 birds, the Pinnacles National Park flock included 34, and the southern California included 67. The Baja California flock included 28 California condors and the Arizona/Utah group had 73 birds. The remaining birds were in several captive breeding programs.

In 2013, the Service issued a biological opinion on the Service's proposed issuance of an incidental take permit to Tejon Ranchcorp for implementation of the Tehachapi Uplands Multiple Species Habitat Conservation Plan that considered the effects of commercial and residential development on 141,866 acres of land in Kern county on 25 covered species, including the California condor (Service 2013c). We concluded that the proposed action, the issuance of an incidental take permit, was not likely to jeopardize the continued existence of the California condor, nor was it likely to destroy or adversely modify California condor critical habitat. The primary mitigation measure proposed by Tejon Ranchcorp under the Tehachapi Uplands Multiple Species Habitat Conservation Plan is the permanent preservation of approximately 129,318 acres of the covered lands, including approximately 66,000 acres of suitable foraging habitat for California condors. Tejon Ranchcorp also proposes specific measures to avoid and minimize the adverse effects of the covered activities. Over the 50-year life of the permit, we anticipated that up to four nonbreeding California condors would be habituated to humans or human structures.

Nesting

California condors nest in various types of rock formations including caves, crevices, overhung ledges, and potholes, and, more rarely, in cavities in giant sequoia trees (*Sequoiadendron giganteum giganteus*) (Snyder et al. 1986) and in cavities or on the broken out tops of giant coast redwoods (*Sequoia sempervirens*) (Ventana Wildlife Society 2011). All but one of the nest sites used between 1979 to 1986 were in a narrow belt of chaparral and coniferous forested mountains from central Santa Barbara County across northern and central Ventura County to northwestern Los Angeles County. The nest sites were located within a total area approximately 56 miles from west to east and only about 15 miles from north to south. During this period, the only nest outside this area was located in Tulare County.

The first nesting attempt in the wild by reintroduced condors occurred in Southern California in 2001 in the southern Los Padres National Forest. Nesting now occurs in all wild California condor populations.

Foraging

California condors are opportunistic scavengers, feeding only on the carcasses of dead animals. Typical foraging behavior occurs during the daylight hours and includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and occasionally hours of waiting at a roost or on the ground near a carcass. Shifts in seasonal foraging behavior may result from climatic cycles or changes in food availability. California condors maintain wide-ranging foraging patterns throughout the year, an important adaptation for a species that may be subjected to unpredictable food supplies (Meretsky and Snyder 1992).

California condors frequently feed in a communal manner. If a single bird finds and begins to descend to a carcass, other individuals flying nearby are attracted to the area. If the carcass is sufficiently large, numerous California condors will gather to feed. Common ravens and golden eagles will also lead California condors to carcasses.

Prior to the arrival of Europeans, California condor food items within interior California probably included mule deer (*Odocoileus hemionus*), tule elk (*Cervus elaphus nannoides*), pronghorn antelope (*Antilocapra americana*), and smaller mammals (Koford 1953, Emslie 1987, Service 1996). Koford (1953) estimated that 95 percent of the species' diet after the arrival of European settlers consisted of cattle (*Bos primigenius*), domestic sheep (*Ovis aries*), ground squirrels (*Spermophilus beecheyi*), mule deer, and horses. More recently, as introduced wild pigs (*Sus scrofa*) have expanded their range in California, they have provided an additional food source for California condors.

Most foraging occurs in open terrain of foothill grassland and oak savannah habitats that allow unrestricted access to food (Snyder and Snyder 2000; Service 1974, 1996; Wilbur 1978; Koford 1953). California condors commonly feed in large open spaces; however, they will also feed under the tree canopy, including in canyon bottoms, where open areas for taking off and landing are accessible.

Movements

California condors are highly dependent on topography, which dictates prevailing wind patterns (Service 1996). Their large body size and broad wings require California condors to soar rather than constantly flap their wings to cover long distances. Most flights by California condors follow mountains and foothills where they use topography and associated thermal updrafts to generate lift. Only one California condor has been documented actually crossing over the Central Valley from the coast range to the southern Sierra Nevada (Snyder and Snyder 2000). California condors are able to freely cross flat agricultural regions that are much less extensive, such as the Cuyama and Salinas valleys.

Roosting

California condors often use traditional roosting sites near important foraging grounds (Service 1996); that is, they repeatedly use the same sites to roost. Although California condors usually remain at roosts until mid-morning and generally return in mid- to late afternoon, birds routinely remain perched throughout the day, particularly if they have fed recently. While at a roost, California condors devote considerable time to preening and other maintenance activities. Cliffs and tall conifers, including snags, are generally used as roost sites in nesting areas. Although most roost sites are near nesting or foraging areas, scattered roost sites are located throughout the range.

Reasons for Decline

During the Pleistocene Epoch (10,000 to 100,000 years ago), the California condor ranged from British Columbia, Canada, to Baja California, Mexico, and through the southwest to Florida and north to New York State (one record). By 1940, the California condor's range was reduced to a horseshoe-shaped area in southern California that generally included the coastal mountain ranges and foothills of Monterey, San Benito, San Luis Obispo, Santa Barbara, Ventura and northern Los Angeles counties; a portion of the Transverse Ranges in Kern and Los Angeles counties; and the southern Sierra Nevada in Tulare County. By the 1980s, the range was generally restricted to the area from San Luis Obispo south and east through the Tehachapi Mountains and north to Tulare County. In the 1980s, recovery efforts included a captive breeding program; by 1987, we removed all individuals from the wild.

Causes of the decline in the California condor population have probably been numerous and variable through time. With the extinction of the large Pleistocene Epoch mammals, California condors declined in range and numbers, possibly because of decreased food resources. Another large decline occurred when European settlers arrived on the west coast and accelerated during the gold rush of 1849; settlers wantonly shot and poisoned California condors and collected eggs and adults.

Since their reintroduction into the wild, threats have included lead poisoning, other contaminants, power line collision, microtrash ingestion, West Nile virus, and shooting. Because we cannot account for all released birds, the potential exists that other individuals have been killed in other manners. Lead poisoning likely caused many deaths of California condors historically and continues to be a serious source of mortality and a substantial obstacle to recovery. Habituation and habitat loss are additional threats. We will discuss continuing threats to wild California condors in the next section of this biological opinion.

Threats and Conservation Efforts to Address Threats

Lead Poisoning

Threat:

California condors ingest fragments of lead bullets in shot mammal carcasses. These fragments of bullets cause elevated lead levels in their blood. Finkelstein et al. (2012) found that California condors in California remain chronically exposed to harmful levels of lead that cause significant subclinical health effects; each year, the levels of lead in their blood are high enough (≥450 ng/mL) that approximately 20 percent of wild birds need clinical intervention to avert morbidity and mortality.

Janssen et al. (1986) first documented lead poisoning in California condors in the 1980s and Wiemeyer et al. (1988) concluded that lead exposure was the major adverse impact on California condors from 1982 to 1986. California condors fed on hunter-killed carcasses and gut piles, prior to their removal from the wild; they have continued this behavior following their reintroduction. Condors congregate in the Tehachapi Mountains during the fall deer hunting season to feed on the remains of deer carcasses (Wilbur 1978, Snyder and Snyder 2000).

Finkelstein et al. (2012) and Cade (2007) concluded that widespread exposure to lead from spent ammunition in all populations of wild California condor is inhibiting the species' recovery. Finkelstein et al. consider lead poisoning to be the most serious source of human-related mortality of California condors. Rideout et al. (2012) found that lead toxicosis was the most important mortality factor for the combined free-ranging populations from 1992 through 2009.

The State of California has enacted a ban on the use of lead ammunition for hunting (see next section), but does not restrict its use for other purposes (e.g., for depredation of nuisance animals). Comparisons of lead levels in the blood of California condors prior to and following the passage of the 2007 lead ban in California suggest that so far, these regulations have not reduced lead exposure (Finkelstein et al. 2012). In the Arizona/Utah experimental population, lead poisoning is the principal cause of mortality in the wild (Cade 2007). Lead ammunition is not regulated within the range of this population.

Researchers have used stable lead isotope tracer methods to assess lead poisoning sources and have demonstrated that lead ammunition is the primary source in California condors (Finkelstein et al. 2012, Church et al. 2006). Finkelstein et al. (2012) also found isotopes in the blood of several California condors that matched the lead in paint from an inactive fire lookout tower where birds perched.

Conservation Effort:

The agencies managing the groups of California condors treat birds whose blood lead level exceeds safe limits. These chelation treatments can prevent mortality but are stressful to the birds.

Population models based on demographic data show that ongoing intensive management is the sole reason for the increases in the number of California condors. Finkelstein et al. (2012) concludes that recovery is dependent upon the elimination or substantial reduction of lead poisoning rates.

Various agencies and landowners have also enacted measures to attempt to reduce the amount of lead in the environment. Tejon Ranch banned the use of lead shot and bullets for hunting on the ranch; this measure took effect on January 1, 2008. Fort Hunter Liggett and Camp Roberts have also banned the use of lead for on-base hunting. The Ridley-Tree Condor Preservation Act, which became effective on January 1, 2008, regulates lead ammunition with regard to hunting within the present and recent historical range of the California condor in California.

The recovery plan for the California condor (Service 1996) advocates a supplemental feeding program as an integral component of the release program to reduce exposure to lead and other poisoning from contaminated carcasses. However, older, more experienced birds are foraging across larger portions of their range and, despite the ongoing presence of supplemental food, California condors continue to find their own sources of carrion, including carcasses that contain lead ammunition fragments. Supplemental feeding has not proven to be an effective management tool to eliminate exposure to lead. The recovery field programs continue to use supplemental food to assist in trapping California condors, but it is generally no longer the primary food source for wild birds. Supplemental feeding is also used as a food source for recently released juvenile, captive-bred birds that would naturally be fed by their parents prior to learning how to find food. To some extent, supplemental food continues to provide lead-free feeding opportunities for California condors.

<u>Collisions</u>

Threat:

Condors have not evolved to look directly ahead while flying, making them susceptible to collisions. The visual fields of *Gyps* vultures contain a small binocular region and large blind areas above, below and behind the head, and the head positions typically adopted by foraging vultures suggest that these visual fields provide comprehensive visual coverage of the ground below. However, vultures will often be blind in the direction of travel (Martin et al. 2012).

We have historical information that at least two California condors died from collisions with man-made objects, including power lines (Koford 1953). Eleven of the California condors released since 1992 died as a result of collisions with or, electrocution by, power lines (Service unpublished data, Rideout et al. 2012, Meretsky et al. 2000, Grantham 2007, Mee and Snyder 2007).

Collisions with the moving blades of wind turbines are a potential threat as California condors move into areas where wind energy development is expanding. Several proposed and existing wind energy projects overlap with or are in close proximity to the occupied and historical range of the California condor, including but not limited to, the Tehachapi Mountains, the Sierra Nevada mountain range, and the Salinas River Valley. Because of their communal feeding strategy, a single feeding event within a facility could kill many individuals.

To date, there have been no documented condor collisions with wind turbines. However, several California condors have been documented flying over and near areas where wind energy facilities have been proposed, are operating, or are under construction (Service 2009a). We anticipate that, as California condors continue to reoccupy their known prior range and wind energy facilities continue to expand, the risk to California condors from wind facilities will increase.

The environmental impact statements (Service 2012d, e) for the Tejon Uplands Multiple Species Habitat Conservation Plan broadly considered the effects of 15 reasonably foreseeable wind projects in the Tehachapi Wind Resource Area of Kern County. It also considered additional wind projects east of this area, but within the range of the California condor. Several of these projects have been approved by the County of Kern. Some of these projects and their associated transmission facilities would be located on or cross land managed by the Bureau; others are located on private land. To date, the Service has not completed any section 7 consultations or issued any section 10(a)(1)(B) permits on wind energy projects that address or cover California condor.

Conservation Effort:

Utility companies have removed or buried some electrical lines to reduce the likelihood of collisions. Many companies also design transmission lines according to the latest standards established by the Avian Power Line Interaction Committee.

Prior to release, biologists use aversion training on California condors to deter them from using power poles. If birds do not approach power lines to perch, they will spend less time in the vicinity of power lines; consequently, this behavior may reduce the likelihood of collisions and electrocutions.

<u>Habituation</u>

Threat:

The Service has defined habituation in California condors as the point at which individuals that are attracted to human activity and/or structures no longer respond effectively to hazing (i.e., Service-approved methods for deterring such behavior, including but not limited to yelling, hand clapping, use of leashed dogs, and automated water sprinklers) and must be removed from the wild to avoid physical injury or death to the habituated bird or, potentially, other nearby birds likely to mimic the habituated behavior.

Each California condor release site has experienced unanticipated problems with condors landing on radio towers, telephone poles, houses and other structures; being fed by humans; and approaching or allowing humans to approach them (Service 2012c). These undesirable habituation behaviors were exhibited at a much higher frequency during early years following the establishment of a release site, and persist to a lesser degree in each of the wild populations. Habituation increases the risk of injury to condors (or the people they approach) and the likelihood of condors associating food with humans, which may result in reduced reliance on natural foraging behavior.

The habituation of California condors to human presence affects individuals because it substantially disrupts their essential behavioral patterns and impairs their ability to survive in the wild. For instance, a habituated bird may seek out and become dependent on humans for proffered food rather than forage in the wild for carrion. The ability to successfully forage is an essential feeding behavior that is necessary for the survival of a California condor in the wild. In many cases, human structures are inherently hazardous to condors which can become entangled or entrapped on or in structures, or ingest poisonous household or industrial items associated with human structures, leading to injury or death.

Conservation Effort:

The aversion training provided to California condors is also intended to deter them from contact with humans and human structures. As we discussed previously, if birds experience negative reinforcement around humans or their structures, they are less likely to frequent areas where the source of the negative experience occurs.

<u>Microtrash</u>

Threat:

Breeding California condors sometimes ingest small man-made materials (e.g., nuts, bolts, washers, copper wire, plastic, bottle caps, glass, spent ammunition cartridges; hereafter, microtrash) and feed these items to their nestlings (Grantham 2007, Mee et al. 2007b, Rideout et al. 2012). Nestlings are able to tolerate these items in small amounts; however, large quantities can result in impaction of the digestive track, evisceration, internal lesions, and death (Grantham 2007, Snyder 2007, and Rideout et al. 2012). The ingestion of microtrash has predominantly affected nestlings in California, where it is the leading cause of death; it has been the major cause of nest failure in the breeding population (Mee et al. 2007a, Rideout et al. 2012).

Mee et al. (2007b) compared the number and mass of foreign trash items collected from historical nests to those from nests of reintroduced California condors and found that trash was significantly more prevalent and numerous in the latter. The occurrence of trash items also tends to be more common in California nests, with the greatest amounts in the southern California region.

Conservation Effort:

Biologists involved with recovery efforts for the California condor attempt to reduce the amount of microtrash and its threat through two methods. The first, known as nest guarding, involves periodically climbing into each active nest, cleaning the nest floor of any microtrash, and assessing the nestling for consumption-related distress, including stunted growth. Cleaning trash from nests has been effective in preventing impactions from forming in the birds' gastrointestinal tracts. Occasionally, biologists temporarily remove chicks with impactions from their nests, surgically remove the impaction, and return the chicks within 24 hours (Service 2012c).

The second method for reducing microtrash is by identifying and cleaning up the locations where microtrash is collected by the parent birds. Many of the actively breeding California condors carry GPS transmitters that broadcast hourly locations and speed during daylight hours. Biologists can then determine potential sources of microtrash by investigating the locations where birds spend time on the ground. Microtrash sites tend to be roadside pullouts or overlooks where people discard bottles or other refuse that eventually breaks into coin-sized pieces. We have anecdotal evidence that cleanups have reduced the amount of microtrash collected by pairs with a propensity to use a particular site (Service 2012c).

West Nile Virus

Threat:

West Nile virus has killed both captive and wild California condors (Rideout et al. 2012).

Conservation Effort:

The recovery program currently uses RECOMBITEK® Equine West Nile Virus Vaccine. To date, all captive and wild California condors are vaccinated for West Nile virus and provided with a booster annually. The efficacy of the vaccine is thought to be high; the low rate of infection in the population demonstrates this belief. One vaccinated wild bird died; another seemed to be infected but recovered from the disease.

Chicks are also susceptible to West Nile virus infection. They may be protected by maternal immunity; however, one wild chick died of West Nile virus prior to being vaccinated. Any chick that is handled in the nest prior to fledging receives a vaccination. Chicks that are not handled in the nest are vaccinated the first time they are trapped.

Shooting

Threat:

Illegal shooting of wild California condors remains a potentially substantial threat. Since the reintroduction, two deaths of California condor have been attributed to shooting in California (Rideout et al. 2012). Additionally, an adult female required capture and permanent detention after being shot; radiography detected shotgun pellets embedded in the soft wing tissue and other areas of the bodies of two other birds. One condor was shot and killed with an arrow (Rideout et al. 2012).

Conservation Effort:

We are not aware of any organized effort to reduce this activity, other than routine hunter awareness training.

Organochlorines

Threat:

Kiff et al. (1979) identified DDT, an organochlorine pesticide, as a potential contributor to the species' decline in the 1950s and 1960s. Snyder and Meretsky (2003) found little or no correlation between eggshell thinning and the decline of the California condor. In 2006, biologists recovered a thin-shelled California condor egg from the first nest in Monterey County in nearly 100 years; the nesting attempt failed.

Despite being banned in the 1970s, DDT continues to persist in California sea lions (*Zalophus californianus*) along the California coast at very high levels (LeBoeuf et al. 2002, Debier et al. 2005, Ylitalo et al. 2005). Because birds nesting in central California feed on marine mammals, they are susceptible to organochlorine exposure. Burnett et al. (2013 in press) found a correlation between eggshell thinning and weight loss rates, an absence of the outer crystalline layer (a characteristic of DDE contamination), and a significantly different eggshell thickness in eggs between southern California birds (which generally do not feed on marine mammals) and birds that feed on marine mammals along the central California coast. DDE is a metabolite of DDT.

Conservation Effort:

We are not aware of any organized effort to reduce this threat.

Habitat Loss

Threat:

The threat of habitat loss is a concern. Habitat used historically by California condors for foraging has been lost to development in Kern, Los Angeles, and Ventura counties over the years. Habitat loss may become an active threat if additional important foraging grounds are converted to land uses that do not provide foraging habitat.

Conservation Effort:

Substantial areas of foraging habitat remain in protected open space to support the expanding number of California condors. Large areas of land, managed by the Bureau, Forest Service, The Wildlands Conservancy, and other conservation organizations, maintain habitat for wildlife and grazing and provide foraging opportunities for California condors. Tejon Ranch, which is located in the western Tehachapi Mountains, has also conserved land that California condors use for foraging; California condors also use other private rangelands for foraging. We have no evidence to suggest that habitat loss is currently preventing or limiting the condor's expansion into its historical range in California.

Summary

In summary, the captive breeding program established in the early 1980s has effectively prevented the extinction of the California condor. Reintroductions into the wild begun in the early 1990s have created wild populations, as contemplated in the recovery plan (Service 1996). California condors are breeding successfully in the wild and are continuing to expand their use of the species' historical range each year.

Despite past habitat loss, at present, we have no evidence to suggest that the expanding population of wild California condors lacks sufficient foraging habitat or food. California condors are currently finding their own sources of food, foraging across large areas of their historical range.

California condor populations in the wild are not self-sustaining because the mortality rate of condors continues to be greater than the growth rate from wild fledged chicks. The primary cause of mortality affecting the recovery of the California condor is lead poisoning (Finkelstein et al. 2012). Other threats still exist for condors including collisions, microtrash, habituation, habitat loss, other contaminants, West Nile virus, and shooting. The threat of collision with the turbines of new commercial wind farms is increasing within the species' historical range. Until the threat of lead poisoning is eliminated or at least substantially reduced, continued release of captive-bred birds is likely to be necessary to supplement the wild population and the recovery goals identified in the recovery plan will likely not be achieved.

Recovery Plan for the California Condor

The primary objective of the California condor recovery plan (Service 1996) is the reclassification of the species from endangered to threatened status. The recovery plan states that this reclassification may be considered when, at a minimum, at least two non-captive populations of California condors do not require maintenance with one additional population remaining in captivity. All three populations must each number at least 150 individuals, must each contain at least 15 breeding pairs, and be reproductively self-sustaining and have a positive rate of population growth. In addition, the non-captive populations must be spatially disjunct and non-interacting and contain individuals descended from each of the 14 founders (i.e., the first birds in the captive breeding program).

The recovery plan describes a strategy for reclassification, which includes the following actions: establish a captive breeding program to preserve the gene pool; reintroduce California condors to the wild; minimize mortality factors in the natural environment; maintain habitat for recovery; and implement information and education programs. All of these actions continue to be necessary to facilitate recovery. The captive breeding program is successful and is effective in producing juvenile birds for release. However, because the wild populations are currently not self-sustaining, captive breeding and the release of captive reared birds into the wild remain a necessity. The minimization of mortality factors also remains essential as the species continues to experience lead poisoning and other threats, such as the threat of collision with the turbines of new commercial wind farms, increase within the species' historical range. Maintaining suitable habitat also remains important as increasing numbers of wild birds continue to re-occupy more of their historical range. Additionally, information and education programs, particularly related to the threat of lead poisoning and, possibly to a lesser degree, shooting, continue to be necessary because of mortalities from lead poisoning and shooting.

Status of the Desert Tortoise

Section 4(c)(2) of the Act requires the Service to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review); these reviews, at the time of their completion, provide the most up-to-date information on the range-wide status of the species. For this reason, we are appending the 5-year review of the status of the desert tortoise (Appendix 1; Service 2010e) to this biological opinion and are incorporating it by reference to provide most of the information needed for this section of the biological opinion. The following paragraphs provide a summary of the relevant information in the 5-year review.

In the 5-year review, the Service discusses the status of the desert tortoise as a single distinct population segment and provides information on the Federal Register notices that resulted in its listing and the designation of critical habitat. The Service also describes the desert tortoise's ecology, life history, spatial distribution, abundance, habitats, and the threats that led to its listing (i.e., the 5-factor analysis required by section 4(a)(1) of the Act). In the 5-year review, the

Service concluded by recommending that the status of the desert tortoise as a threatened species be maintained.

With regard to the status of the desert tortoise as a distinct population segment, the Service concluded in the 5-year review that the recovery units recognized in the original and revised recovery plans (Service 1994 and 2011i, respectively) do not qualify as distinct population segments under the Service's distinct population segment policy (61 Federal Register 4722; February 7, 1996). We reached this conclusion because individuals of the listed taxon occupy habitat that is relatively continuously distributed, exhibit genetic differentiation that is consistent with isolation-by-distance in a continuous-distribution model of gene flow, and likely vary in behavioral and physiological characteristics across the area they occupy as a result of the transitional nature of, or environmental gradations between, the described subdivisions of the Mojave and Colorado deserts.

In the 5-year review, the Service summarizes information with regard to the desert tortoise's ecology and life history. Of key importance to assessing threats to the species and to developing and implementing a strategy for recovery is that desert tortoises are long-lived, require up to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential. The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition. Predation seems to play an important role in clutch failure. Predation and environmental factors also affect the survival of hatchlings.

In the 5-year review, the Service also discusses various means by which researchers have attempted to determine the abundance of desert tortoises and the strengths and weaknesses of those methods. The Service provides a summary table of the results of range-wide monitoring, initiated in 2001, in the 5-year review. This ongoing sampling effort is the first comprehensive attempt to determine the densities of desert tortoises across their range. Table 1 of the 5-year review provides a summary of data collected from 2001 through 2007; we summarize data from the 2008 through 2010 sampling efforts in subsequent reports (Service 2010g, 2010h). As the Service notes in the 5-year review, much of the difference in densities between years is due to variability in sampling; determining actual changes in densities will require many years of monitoring. Additionally, due to differences in area covered and especially to the non-representative nature of earlier sample sites, data gathered by the range-wide monitoring program cannot be reliably compared to information gathered through other means at this time.

In the 5-year review, the Service provides a brief summary of habitat use by desert tortoises; more detailed information is available in the revised recovery plan (Service 2011i). In the absence of specific and recent information on the location of habitable areas of the Mojave Desert, especially at the outer edges of this area, the 5-year review also describes and relies heavily on a quantitative, spatial habitat model for the desert tortoise north and west of the Colorado River that incorporates environmental variables such as precipitation, geology, vegetation, and slope and is based on occurrence data of desert tortoises from sources spanning more than 80 years, including data from the 2001 to 2005 range-wide monitoring surveys

(Nussear et al. 2009). The model predicts the probability that desert tortoises will be present in any given location; calculations of the amount of desert tortoise habitat in the 5-year review and in this biological opinion use a threshold of 0.5 or greater predicted value for potential desert tortoise habitat. The model does not account for anthropogenic effects to habitat and represents the potential for occupancy by desert tortoises absent these effects.

To begin integrating anthropogenic activities and the variable risk levels they bring to different parts of the Mojave and Colorado deserts, the Service completed an extensive review of the threats known to affect desert tortoises at the time of their listing and updated that information with more current findings in the 5-year review. The review follows the format of the five-factor analysis required by section 4(a)(1) of the Act. The Service described these threats as part of the process of its listing (55 Federal Register 12178; April 2, 1990), further discussed them in the original recovery plan (Service 1994), and reviewed them again in the revised recovery plan (Service 2011i).

To understand better the relationship of threats to populations of desert tortoises and the most effective manner to implement recovery actions, the Desert Tortoise Recovery Office is developing a spatial decision support system that models the interrelationships of threats to desert tortoises and how those threats affect population change. The spatial decision support system describes the numerous threats that desert tortoises face, explains how these threats interact to affect individual animals and habitat, and how these effects in turn bring about changes in populations. For example, we have long known that the construction of a transmission line can result in the death of desert tortoises and loss of habitat. We have also known that common ravens, known predators of desert tortoises, use the transmission line's pylons for nesting, roosting, and perching and that the access routes associated with transmission lines provide a vector for the introduction and spread of invasive weeds and facilitate increased human access into an area. Increased human access can accelerate illegal collection and release of desert tortoises and their deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive plants (Service 2011i). Changes in the abundance of native plants because of invasive weeds can compromise the physiological health of desert tortoises, making them more vulnerable to drought, disease, and predation. The spatial decision support system allows us to map threats across the range of the desert tortoise and model the intensity of stresses that these multiple and combined threats place on desert tortoise populations.

The threats described in the listing rule and both recovery plans continue to affect the species. Indirect impacts to desert tortoise populations and habitat occur in accessible areas that interface with human activity. Most threats to the desert tortoise or its habitat are associated with human land uses; research since 1994 has clarified many mechanisms by which these threats act on desert tortoises. As stated earlier, increases in human access can accelerate illegal collection and release of desert tortoises and deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive weeds.

Some of the most apparent threats to the desert tortoise are those that result in mortality and permanent habitat loss across large areas, such as urbanization and large-scale renewable energy projects, and those that fragment and degrade habitats, such as proliferation of roads and highways, OHV activity, and habitat invasion by non-native invasive plant species. However, we remain unable to quantify how threats affect desert tortoise populations. The assessment of the original recovery plan emphasized the need for a better understanding of the implications of multiple, simultaneous threats facing desert tortoise populations and of the relative contribution of multiple threats on demographic factors (i.e., birth rate, survivorship, fecundity, and death rate; Tracy et al. 2004).

We have enclosed a map that depicts the 12 critical habitat units of the desert tortoise and the aggregate stress that multiple, synergistic threats place on desert tortoise populations (Appendix 2). The map also depicts linkages between conservation areas for the desert tortoise (which include designated critical habitat) recommended in the revised recovery plan (Service 2011i) that are based on an analysis of least-cost pathways (i.e., areas with the highest potential to support desert tortoises) between conservation areas for the desert tortoise. This map illustrates that areas under the highest level of conservation management for desert tortoises remain subjected to numerous threats and stresses. This indicates that current conservation actions for the desert tortoise are not substantially reducing mortality sources for the desert tortoise across its range.

Since the completion of the 5-year review, the Service has issued several biological opinions that affect large areas of desert tortoise habitat because of numerous proposals to develop renewable energy within its range. These biological opinions concluded that proposed solar plants were not likely to jeopardize the continued existence of the desert tortoise primarily because they were located outside of critical habitat and desert wildlife management areas that contain most of the land base required for the recovery of the species. The proposed actions also included numerous measures intended to protect desert tortoises during the construction of the projects, such as translocation of affected individuals. Additionally, the Bureau and California Energy Commission, the agencies permitting these facilities, have required the project proponents to fund numerous measures, such as land acquisition and the implementation of recovery actions intended to offset the adverse effects of the proposed actions. In aggregate, these projects resulted in an overall loss of approximately 41,385 acres of habitat of the desert tortoise; three of the projects (BrightSource Ivanpah, Stateline Nevada, and Desert Sunlight) constricted linkages between conservation areas that are important for the recovery of the desert tortoise. We also predicted that these projects would translocate, injure, or kill up to 1,715 desert tortoises (see table below); we concluded that most of the individuals in these totals would be juveniles. The mitigation required by the Bureau and California Energy Commission will result in the acquisition of private land within critical habitat and desert wildlife management areas and funding for the implementation of various actions that are intended to promote the recovery of the desert tortoise; at this time, we cannot assess how successful these measures will be.

The following table summarizes information regarding the proposed solar projects that have undergone formal consultation with regard to the desert tortoise. Data are from Service (2010a [Blythe], b [Genesis], c [Chevron Lucerne Valley], d [Calico]; 2011b [BrightSource Ivanpah], c [Desert Sunlight], d [Abengoa Harper Lake], e [Palen], 2011f[Rice]; 2013a [Desert Harvest], 2013b [McCoy]; and Burroughs (2012; Nevada projects). Projects are in California, unless noted.

Project	**Acres of Desert Tortoise Habitat**	**Estimated Number of Desert Tortoises Onsite[1]**	**Recovery Unit**
BrightSource Ivanpah	3,582	1,136	Eastern Mojave
Stateline Nevada - NV	2,966	123	Eastern Mojave
Amargosa Farm Road - NV	4,350	4	Eastern Mojave
Calico[2]			Western Mojave
Abengoa Harper Lake	Primarily in abandoned agricultural fields	4	Western Mojave
Chevron Lucerne Valley	516	10	Western Mojave
Nevada Solar One - NV	400	**	Northeastern Mojave
Copper Mountain North - NV	1,400	30 **	Northeastern Mojave
Copper Mountain - NV	380	**	Northeastern Mojave
Moapa K Road Solar - NV	2,152	202	Northeastern Mojave
Genesis	1,774	8	Colorado
Blythe	6,958	30	Colorado
Palen	1,698	18	Colorado
Desert Sunlight	4,004	56	Colorado
McCoy	4,533	15	Colorado
Desert Harvest	1,300	5	Colorado
Rice	1,368	18	Colorado
Total	41,385	1,715	

1. The numbers in this column are not necessarily comparable because the methodologies for estimating the numbers of desert tortoises occasionally varies between projects.
2 The applicant has proposed changes to the proposed action; the Bureau has re-initiated formal consultation with the Service, pursuant to section 7(a)(2) of the Act, as part of its re-evaluation of the project (Bureau 2012d, Service 2012f).
** These projects occurred under the Clark County Multi-species habitat conservation plan; we estimate that all three projects combined will affect fewer than 30 desert tortoises.

In addition to the biological opinions issued for solar development within the range of the desert tortoise, the Service (2012a) also issued a biological opinion to the Department of the Army for the use of additional training lands at Fort Irwin. As part of this proposed action, the Army removed approximately 650 desert tortoises from 18,197 acres of the southern area of Fort Irwin, which had been off-limits to training. The Army would also use an additional 48,629 acres that lie east of the former boundaries of Fort Irwin; much of this parcel is either too mountainous or too rocky and low in elevation to support numerous desert tortoises.

The Service also issued a biological opinion to the Marine Corps that considered the effects of the expansion of the Marine Corps Air Ground Combat Center at Twentynine Palms (Service 2012a). We concluded that the Marine Corps' proposed action, the use of approximately 167,971 acres for training, was not likely to jeopardize the continued existence of the desert tortoise. Most of the expansion area lies within the Johnson Valley Off-high Vehicle Management Area.

The incremental effect of the larger actions (i.e., solar development, the expansions of Fort Irwin and the Marine Corps Air Ground Combat Center) on the desert tortoise is unlikely to be positive, despite the numerous conservation measures that have been (or will be) implemented as part of the actions. The acquisition of private lands as mitigation for most of these actions increases the level of protection afforded these lands; however, these acquisitions do not create new habitat and Federal, State, and privately managed lands remain subject to most of the threats and stresses we discussed previously in this section. Although land managers have been implementing measures to manage these threats, we have been unable, to date, to determine whether the measures have been successful, at least in part because of the low reproductive capacity of the desert tortoise. Therefore, the conversion of habitat into areas that are unsuitable for this species continues the trend of constricting desert tortoise.

As the Service notes in the 5-year review (Service 2010e), "(t)he threats identified in the original listing rule continue to affect the (desert tortoise) today, with invasive species, wildfire, and renewable energy development coming to the forefront as important factors in habitat loss and conversion. The vast majority of threats to the desert tortoise or its habitat are associated with human land uses." Oftedal's work (2002 in Service 2010e) suggests that invasive weeds may adversely affect the physiological health of desert tortoises. Modeling with the spatial decision support system indicates that invasive species likely affect a large portion of the desert tortoise's range; see Appendix 3. Furthermore, high densities of weedy species increase the likelihood of wildfires; wildfires, in turn, destroy native species and further the spread of invasive weeds.

Global climate change is likely to affect the prospects for the long-term conservation of the desert tortoise. For example, predictions for climate change within the range of the desert tortoise suggest more frequent and/or prolonged droughts with an increase of the annual mean temperature by 3.5 to 4.0 degrees Celsius. The greatest increases will likely occur in summer (June-July-August mean increase of as much as 5 degrees Celsius [Christensen et al. 2007 in Service 2010e]). Precipitation will likely decrease by 5 to 15 percent annually in the region, with winter precipitation decreasing by up to 20 percent and summer precipitation increasing by 5 percent. Because germination of the desert tortoise's food plants is highly dependent on cool-season rains, the forage base could be reduced due to increasing temperatures and decreasing precipitation in winter. Although drought occurs routinely in the Mojave Desert, extended periods of drought have the potential to affect desert tortoises and their habitats through physiological effects to individuals (i.e., stress) and limited forage availability. To place the consequences of long-term drought in perspective, Longshore et al. (2003) demonstrated that even short-term drought could result in elevated levels of mortality of desert tortoises. Therefore, long-term drought is likely to have even greater effects, particularly given that the current fragmented nature of desert tortoise habitat (e.g., urban and agricultural development, highways, freeways, military training areas, etc.) will make recolonization of extirpated areas difficult, if not impossible.

The Service notes in the 5-year review that the combination of the desert tortoise's late breeding age and a low reproductive rate challenges our ability to achieve recovery. When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would "reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 Code of Federal Regulations 402.02). Although the Service does not explicitly address these metrics in the 5-year review, we have used the information in that document to summarize the status of the desert tortoise with respect to its reproduction, numbers, and distribution.

In the 5-year review, the Service notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease (Oftedal 2002 in Service 2010e), and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native forbs) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Oftedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number that reaches adulthood. Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to negatively affect the reproduction of desert tortoises and recruitment into the adult population.

Data from long-term study plots, which were first established in 1976, cannot be extrapolated to provide an estimate of the number of desert tortoises on a range-wide basis; however, these data indicate, "appreciable declines at the local level in many areas, which coupled with other survey results, suggest that declines may have occurred more broadly" (Service 2010e). Other sources indicate that local declines are continuing to occur. For example, surveyors found "lots of dead [desert tortoises]" in the western expansion area of Fort Irwin (Western Mojave Recovery Unit) in 2008 (Fort Irwin Research Coordination Meeting 2008). After the onset of translocation, coyotes killed 105 desert tortoises in Fort Irwin's southern translocation area (Western Mojave Recovery Unit); other canids may have been responsible for some of these deaths. Other incidences of predation were recorded throughout the range of the desert tortoise during this time (Esque et al. 2010). Esque et al. (2010) hypothesized that this high rate of predation on desert tortoises was influenced by low population levels of typical prey for coyotes due to drought conditions in previous years. Recent surveys in the Ivanpah Valley (Northeastern Mojave Recovery Unit) for a proposed solar facility detected 31 live desert tortoises and the carcasses of 25 individuals that had been dead less than 4 years (Ironwood 2011); this ratio of carcasses to live individuals over such a short period of time may indicate an abnormally high rate of mortality for a long-lived animal. In summary, the number of desert tortoises range-wide likely decreased substantially from 1976 through 1990 (i.e., when long-term study plots were initiated through the time the desert tortoise was listed as threatened), although we cannot quantify the amount of this decrease. Additionally, more recent data collected from various sources throughout the range of the desert tortoise suggest that local declines continue to occur (e.g., Bureau et al. 2005, Esque et al. 2010).

The distribution of the desert tortoise has not changed substantially since the publication of the original recovery plan in 1994 (Service 2010e) in terms of the overall extent of its range. Prior to 1994, desert tortoises were extirpated from large areas within their distributional limits by urban and agricultural development (e.g., the cities of Barstow, Lancaster, Las Vegas, St. George, etc.; agricultural areas south of Edwards Air Force Base and east of Barstow), military training (e.g., Fort Irwin, Leach Lake Gunnery Range), and off-road vehicle use (e.g., portions of off-road management areas managed by the Bureau and unauthorized use in areas such as east of California City). Since 1994, urban development around Las Vegas has likely been the largest contributor to habitat loss throughout the range. Desert tortoises have been essentially removed from the 18,197-acre southern expansion area at Fort Irwin (Service 2012b).

The following table depicts acreages of habitat (as modeled by Nussear et al. 2009) within various regions of the desert tortoise's range and of impervious surfaces as of 2006 (Xian et al. 2009). Impervious surfaces include paved and developed areas and other disturbed areas that have zero probability of supporting desert tortoises.

Regions[1]	Modeled Habitat (acres)	Impervious Surfaces within Modeled Habitat	Percent of Modeled Habitat that is now Impervious
Western Mojave	7,582,092	1,864,214	25
Colorado Desert	4,948,900	494,981	10
Northeast Mojave	7,776,934	1,173,025	15
Upper Virgin River	232,320	80,853	35
Total	20,540,246	3,613,052	18

[1]The regions do not correspond to recovery unit boundaries; we used a more general separation of the range for this illustration.

On an annual basis, the Service produces a report that provides an up-to-date summary of the factors that were responsible for the listing of the species, describes other threats of which we are aware, describes the current population trend of the species, and includes comments of the year's findings. The Service's (2011h) recovery data call report describes the desert tortoise's status as 'declining,' and notes that "(a)nnual range-wide monitoring continues, but the life history of the desert tortoise makes it impossible to detect annual population increases (continued monitoring will provide estimates of moderate- to long-term population trends). Data from the monitoring program do not indicate that numbers of desert tortoises have increased since 2001. The fact that most threats appear to be continuing at generally the same levels suggests that populations are still in decline. Information remains unavailable on whether mitigation of particular threats has been successful."

In conclusion, we have used the 5-year review (Service 2010e), revised recovery plan (Service 2011i), and additional information that has become available since these publications to review the reproduction, numbers, and distribution of the desert tortoise. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species. Prior to its listing, the number of desert tortoises likely declined range-wide, although we cannot quantify the extent of the decline; since the time of listing, data suggest that declines have occurred in local areas throughout the range. The continued increase in human access across the desert continues to expose more desert tortoises to the potential of being killed by human activities. The distributional limits of the desert tortoise's range have not changed substantially since the issuance of the original recovery plan in 1994; however, desert tortoises have been extirpated from large areas within their range (e.g., Las Vegas, other desert cities). The species' low reproductive rate, the extended time required for young animals to reach breeding age, and the multitude of threats that continue to confront desert tortoises combine to render its recovery a substantial challenge.

Status of the Bakersfield Cactus

We are appending the 5-year review of the status of the Bakersfield cactus (Appendix 4; Service 2011a) to this biological opinion and are incorporating it by reference to provide most of the information needed for this section of the biological opinion. Unless otherwise noted, the information in the following paragraphs is from the 5-year review.

In the 5-year review, the Service provides information on the Federal Register notices that resulted in its listing. The Service also describes the Bakersfield cactus's ecology, life history, spatial distribution, abundance, habitats, and the threats that led to its listing (i.e., the 5-factor analysis required by section 4(a)(1) of the Act). Because the distinct population segment component of the definition of species under the Act applies only to vertebrate wildlife, the Service's policy regarding distinct population segments does not apply to the Bakersfield cactus. In the 5-year review, the Service concluded by recommending that the status of the Bakersfield cactus as an endangered species be maintained.

In the 5-year review, the Service summarizes information with regard to the ecology and life history of the Bakersfield cactus. We do not have extensive information on the reproductive ecology of the species. We know that its seeds require warm, wet conditions to germinate, which is a combination of weather conditions that is rare in the Bakersfield area. We do not know the pollination ecology of the species; however, we have observed low levels and infrequency of seed set in the wild, which may be related to impacts to pollinators. Bakersfield cactus can also reproduce vegetatively through the disarticulation of pads from the parent plant, which then form roots. Flood waters may disperse pads; the potential exists that wood rats (*Neotoma* spp.) may disperse fruits.

In the 5-year review, the Service also discusses the abundance of the Bakersfield cactus. We do not have an historical estimate of its numbers. Cypher et al. (2011) conducted a survey of locations of the Bakersfield cactus based on occurrence records from the California Natural Diversity Database, which contained records of 39 occurrences. Cypher et al. visited 33 of the sites and examined aerial photography or conducted aerial surveys of the remaining sites. They determined that 25 occurrences were extant and 11 may be extirpated; they could not determine the status of 3 occurrences. They also documented 2 previously unreported occurrences and 6 identified undocumented translocated occurrences. Habitat conditions "ranged from relatively undisturbed to highly disturbed." The number of individuals within at least nine occurrences was considerably smaller compared to previous estimates and almost 60 percent of the occurrences have fewer than 100 individuals.

In the 5-year review, the Service describes the range of the Bakersfield cactus, as we knew it at the time, and provides a brief summary of habitat types that the Bakersfield cactus occupies. Generally, it occurs on sandy soils within floodplains, ridges, bluffs, and rolling hills. The Bakersfield cactus occurs in Sierra-Tehachapi saltbush scrub, blue oak woodland, and, in at least one location, in riparian woodland. Until recently, we considered the Bakersfield cactus to be restricted to the Central Valley, generally occurring from the southern end of the valley to just north of Bakersfield and to the east. Recently, surveyors have found plants that may be the Bakersfield cactus along the southern flank of the Tehachapi Mountains in different plant communities, such as juniper woodlands.

The Service completed a review of the threats known to affect the Bakersfield cactus at the time of its listing and updated that information with more current findings in the 5-year review. The review follows the format of the five-factor analysis required by section 4(a)(1) of the Act. The Service described these threats as part of the process of its listing of the Bakersfield cactus (55 Federal Register 29361; July 19, 1990) and further discussed them in the recovery plan (Service 1998).

The final listing rule for the Bakersfield cactus described agriculture and oil development, sand mining, urbanization, off-road vehicle use, proposed flood control basins, and the construction of telecommunication facilities and electrical lines as threats; the final rule also discussed wildfire as a potential threat to habitat of the Bakersfield cactus. Residential development and conversion of habitat to agriculture remain the most prominent threats. The Service issued an incidental take permit for covered wildlife species, pursuant to section 10(a)(1)(B) of the Act, to the City of Bakersfield and the County of Kern; the habitat conservation plan that was developed in support of the incidental take permit includes the Bakersfield cactus as a covered species and allowed for the loss of up to 1,440 acres of lands supporting Bakersfield cactus. As of the issue of the 5-year review, the loss of approximately 355 acres of habitat of the Bakersfield cactus had occurred in the planning area; the permittees acquired approximately 657 acres of Bakersfield cactus habitat to offset that loss. The Service has not issued any biological opinions or incidental take permits since the date of the 5-year review that would alter its status (Leeman 2013).

In the 5-year review, we discuss new threats to the Bakersfield cactus identified since its listing. The loss of pollinators may adversely affect reproduction. Elevated levels of nitrogen deposition from industrial pollution promote the growth of weeds in the naturally nutrient-poor soils that the Bakersfield cactus favors. Climate change and dust may also affect the taxon. Non-native grasses may be responsible for the decreased vigor of clumps of the Bakersfield cactus. At one study site, non-native annual grasses caused a reduction in soil moisture storage during years with below-normal precipitation; the number of Bakersfield cactus declined during this period. In plots where non-native grasses were controlled, the number of pads of the Bakersfield cactus increased. Dense non-native grasses carry wildfires well and may threaten the Bakersfield cactus by making it more vulnerable to wildland fires. Cypher et al. (2011) also identified a potential new threat, the opuntia-killing cactus moth (*Cactoblastis cactorum*), which is spreading westward from Florida.

In the 5-year review, the Service notes that the reproductive output of the Bakersfield cactus is generally low and posits that air pollution, declines in the abundance of pollinators, and climate change may be responsible. The 5-year review does not provide numbers of individuals or clumps of plants or current data on the number of occurrences. We do not know the full extent of the range of the Bakersfield cactus prior to the arrival of European settlers; however, we are aware that it is much more patchily distributed now than previously because of loss of habitat to human activities.

The Service's (2011h) recovery data call report describes the threats associated with the Bakersfield cactus as 'continuing at the same level.' The recovery data call generally describes the same threats that we have discussed in this section. Cypher et al. (2011) concluded that, "(b)ased on the reduced number of extant populations and the reduced number of plants within many populations, Bakersfield cactus appears to be declining on multiple landscape scales."

As we mentioned previously in this section, in the final listing rule for the Bakersfield cactus, we considered this taxon to be restricted to the Central Valley, generally occurring from the southern end of the valley to just north of Bakersfield and to the east; we considered that area to be the range of the taxon. The Bakersfield cactus resembles other forms of *Opuntia basilaris.* Kentner (2011) states that "(t)he populations of beavertail cactus (*O. basilaris* var. *basilaris*) that occur in the vicinity of the Alta East Wind Energy Project are morphologically variable and contain a small proportion of individuals displaying some characters that may be characteristic of the Federal and State Endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*)."

In the final listing rule, the Service described the Bakersfield cactus as having areoles (the points from which spines emerge) that are flush with the surface of the pad or somewhat raised; we also stated that all areoles have spines and that the surface of the pads is not covered with numerous small protuberances. The spines of beavertail cactus (of which the Bakersfield cactus is one variety) are relatively easily removed; consequently, the presence of spines in all areoles is unlikely. Additionally, Kentner (2011) notes that the small protuberances of the Bakersfield cactus are difficult to distinguish from the minute hairs of the beavertail cactus.

Recent genetic work seems to indicate that the individuals of *Opuntia basilaris* located on the southern flank of the Tehachapi Mountains (where the Alta East project would be located) are intermediate between the Bakersfield cactus found in the Central Valley and *O. basilaris* found farther downslope in the desert, near the town of Mojave (Smith 2013). The Bakersfield cactus is also listed as endangered by the California Department of Fish and Wildlife, which considers the *O. basilaris* along the southern flanks of the Tehachapi Mountains as the protected Bakersfield cactus (Cypher personal communication in Kentner 2011).

ENVIRONMENTAL BASELINE

Description of the Action Area

The action area consists of all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). The action area for this biological opinion includes the approximately 2,272 acres depicted as alternative C in figure 2-12 of the final environmental impact statement (Bureau 2013). This includes the area within which the wind turbines, access roads, laydown area, power collection system, ancillary facilities, substation and switchyard, concrete batch plant, and meteorological towers would be constructed. The action area also includes the generation tie-in line that would extend approximately 6.8 miles to the south of the polygon, the state highways and county roads that would provide access to the project site, and a ¼-mile buffer around the polygon. The buffer would account for the potential for construction-related noise and dust to extend beyond the project boundary and affect the desert tortoise and Bakersfield cactus (Bureau 2012b).

Existing Conditions

We summarized the following description of the action area primarily from the biological assessment (Bureau 2012b). The site of the proposed wind facility gradually slopes from approximately 3,900 feet just south of State Highway 58 to 3,100 feet in the southeast. Human impacts include widespread, heavy sheep grazing, off-highway vehicle use, shooting, and illegal trash dumping. Existing wind facilities lie to the southwest and west of the proposed project. Transmission lines traverse the action area; the underground Los Angeles Aqueduct crosses the generation tie-in line. The town of Mojave lies immediately to the south of the site, State Highways 14 and 58 roughly bound the east and northern edges of the action area, and the relatively undisturbed junction of the Tehachapi Mountains and Sierra Nevada lies to the north. The action area supports several plant communities, with juniper woodland, Joshua tree woodland, and creosote bush scrub covering the largest areas.

Previous Consultations in the Action Area

We issued a biological opinion to the Bureau regarding the effects of a proposed amendment to the California Desert Conservation Area Plan for the western Mojave Desert (Bureau 2005) on the desert tortoise and its critical habitat (Service 2006). The Bureau's proposed action was a substantial revision of the California Desert Conservation Area Plan, with the fundamental goal of adopting numerous management prescriptions that were intended to promote the recovery of the desert tortoise. These prescriptions addressed grazing, land use classification, recreation, the route network, and numerous other elements of the Bureau's management of the western Mojave Desert. The Service concluded that the Bureau's amendment of the California Desert Conservation Area Plan for the western Mojave Desert was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat because the vast majority of changes addressed in the amendment reduced the intensity of use and were protective of the desert tortoise. We established thresholds regarding when the amount or extent of incidental take of desert tortoises would be exceeded, thereby requiring re-initiation of formal consultation related to livestock grazing and casual use (i.e., certain types of mining and recreation for which the Bureau would not conduct subsequent reviews under the National Environmental Policy Act) in an amendment to the incidental take statement for this biological opinion (Service 2007). (The 'take' of animals listed under the Act is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct and is prohibited. Taking that is incidental to, and not the purpose of, an 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 an incidental take statement.) To date, although some desert tortoises have been killed, the amount or extent of incidental take identified in the incidental take statement has not been exceeded; to the best of our knowledge, none of these mortalities occurred within the action area for this consultation. The entire action area for this project is within the action area for the California Desert Conservation Area Plan consultation.

Status of the California Condor in the Action Area

We summarized the following information from the biological assessment (Bureau 2012b), final environmental impact statement (Appendices D-1 – D-8 in Bureau 2013), information in our files, and the California Natural Diversity Data Base (CNDDB) data.

California condors were not observed in the project area during the avian point count and aerial raptor nest surveys conducted for the project in 2009, 2010, and 2011 (Bureau 2013). In addition, the CNDDB has no records of California condors within 10 miles of the project site (CNDDB 2013).

Historical data in our possession include a sighting 2.2 miles west of the project on September 9, 1975. GPS data on California condors collected by the Service through February 2013 indicate that the nearest documented individual was located in the Tehachapi Mountains, approximately 3.7 miles north of the project on Middle Knob Ridge, on June 1, 2009.

Habitat in the action area is mostly creosote bush scrub and juniper and Joshua tree woodland. This scrub and woodland habitat contains the appropriate structure for California condors to locate and access carrion. In addition, livestock grazing occurs within at least a portion of action area and wildlife populations (e.g., ungulates and small mammals) in the area could provide forage for California condors in the area over the lifetime of the project. Therefore, the entire action area comprises suitable foraging habitat for California condors.

Status of the Desert Tortoise in the Action Area

We summarized the following information from the biological assessment (Bureau 2012b). Alta Windpower surveyed the project site in 2009, 2010, and 2011; the surveys in these 3 years covered the entire project site. Surveyors found five desert tortoises and five active burrows, including one with fresh sign belonging to a juvenile or subadult. (We did not include the two active burrows found north of Highway 58, which is no longer within the project area; see figure 5b in the biological assessment.) Biologists surveying for other species incidentally observed four desert tortoises. Most of the observations of desert tortoises and their sign were located in a relatively small portion of the project area in the northwest corner of section 34; the potential exists that some of the individuals incidentally observed in this area were the same animals that were contacted during desert tortoise surveys. One desert tortoise was observed approximately 0.5 mile to the northwest of the main cluster of sightings and two approximately 0.5 mile to the south.

By using the equation contained in the Service (2010) protocol for estimating the number of desert tortoises within the area of the proposed project, the Bureau (2012b) estimated the lower and upper confidence intervals (at 95 percent) to be 2.18 and 12.29, respectively. The Bureau did not take into account the incidental sightings of desert tortoises within the action area; we agree with the methodology because at least some of these animals may have been repeated sightings of the desert tortoises observed during the surveys and the equation in our protocol accounts for individuals that are missed during surveys.

The Service's protocol is effective at detecting desert tortoises larger than 160 millimeters in length. (Because desert tortoises reach reproductive age [i.e., become adults] at different sizes in different parts of their range and the likelihood of being detected during surveys is a function of size and not reproductive capacity, we will use the terms 'larger' and 'smaller' with the difference occurring at 160 millimeters, rather than 'adult' and 'subadult,' throughout this biological opinion.) As a basis upon which to conduct the analysis of effects in this biological opinion, we will use the numbers in the following table. The table also contains the reason that we chose these numbers; details of our calculations are in Appendix 5.

Size Class of Desert Tortoises (millimeters)	Estimated Number of Desert Tortoises	Rationale for The Number
160 and above	12	We used the upper 95 percent confidence limit based on the number of desert tortoises found during protocol surveys.
Below 160	68	We used a life table to calculate the total number of animals based on the number of larger desert tortoises and then the number smaller than 160 millimeters.
Total	80	
Eggs	126	We estimated the number of eggs based an assumed number of females of reproductive age and an average production of eggs.

We emphasize that these numbers comprise estimates based on the best available information and provide a reasonable assessment of the status of the desert tortoise in the action area. However, the life table that we used to generate the number of smaller individuals was developed for a site in the eastern Mojave Desert and the demography of population of desert tortoises in that area could have been substantially different from that of the action area. (For example, the life table may have been based on a population that was stable or growing; the density of desert tortoises in the western Mojave Desert continues to decline.) The potential exists that these numbers overestimate the abundance of desert tortoises in the action area because eggs and the smallest size classes would not be present at the same time of the year. That is, after eggs hatch, the number of individuals in the smallest size class would increase and the number of eggs would decrease.

For the purposes of the analysis in this biological opinion, we consider desert tortoises 160 millimeters and greater in length to be large animals; we consider the remainder to be small. This distinction is important because we have determined, through work conducted during range-wide sampling, that field workers detect desert tortoises that are 160 millimeters in length or longer more readily than they do small individuals.

Status of the Bakersfield Cactus in the Action Area

As we discussed in the Status of the Bakersfield Cactus section of this biological opinion, the taxonomic status of the individuals within the action area is not clear. As a conservative approach to this issue, we will assess in the action area the status of both the *Opuntia* whose individuals more closely meet the description of the species from our final rule (i.e., those plants described by the Bureau and Alta Windpower in the biological assessment) and the *Opuntia* that meets the description provided by the California Department of Fish and Wildlife. We will refer to these two *Opuntia* as the Federal Bakersfield cactus and State Bakersfield cactus, respectively. The Status of the Species - Status of the Bakersfield Cactus section of this biological opinion describes the physical differences between the two forms; Kentner (2011) provides additional detail.

Federal Bakersfield Cactus

We summarized the following information from the biological assessment (Bureau 2012b). The biological assessment notes that the action area contains several habitat types not identified in the literature as typically suitable for Bakersfield cactus (e.g., scrub communities that do not support saltbush) and concludes that the entire action area "appears to be suitable for the species." Given that individuals identified as the Federal Bakersfield cactus occurred only in the southwestern-most section of the proposed wind facility (see figure 8 of the biological assessment), this characterization of habitat suitability seems to be an overstatement.

The surveyors found eight plants that met the characteristics of the Federal Bakersfield cactus within the project area. The surveyors did not find any seedlings during the surveys.

We do not have any information as to the suitability of the habitat in the action area with regard to the Federal Bakersfield cactus. We could not discern any pattern for the distribution of the Federal Bakersfield cactus, given that few individuals were located in a fairly small area. We do not know if its distribution is influenced by habitat characteristics or human disturbance. Given the amount of grazing and off-highway vehicle use on the site, these activities could have caused a decrease in the overall numbers of the Federal Bakersfield cactus.

State Bakersfield Cactus

We summarized the following information from the biota reports (Garcia and Associates 2010, 2011) that accompanied the biological assessment (Bureau 2012b). Garcia and Associates surveyed approximately 2,341 acres of the project site for the State Bakersfield cactus in 2010 and 2011; these surveys included the area north of Highway 58.

Garcia and Associates detected 29 individuals of the State Bakersfield cactus north of Highway 58 (4 in 2010; 25 in 2011). Because the area north of Highway 58 is no longer part of the proposed action, we will not include this area or these individuals further in this discussion.

Garcia and Associates detected 359 individuals of the State Bakersfield cactus in the project area in 2010 and 87 in 2011. Generally, most plants occurred in the westernmost part of the action area. Only two plants occurred in the easternmost part of the action area. Based on the aerial photographs in Garcia and Associates (2011), ground disturbance seems to increase to the east. The topography to the west is increasingly more rugged; the inaccessibility of this area may combine for some other aspect of the habitat to support more individuals of the State Bakersfield cactus. The State Bakersfield cactus was not found along the transmission line, based on information in the maps provided in Garcia and Associates (2011).

EFFECTS OF THE ACTION

California Condor

The action area does not contain any traditional roost or nest sites for the California condor. To the best of our knowledge, California condors have not foraged in this area in recent years. However, a few California condors have been documented within 12 miles of the project site recently and historically.

The Bureau determined that the proposed action was likely to adversely affect this species because of the 30-year life of the proposed action and the likelihood that, over that time, California condors would enter the action area. We concurred with the Bureau's determination because the number of California condors in the wild has been growing since they were re-introduced; we anticipate that the number of wild birds in the southern California flock will increase, both through continued releases of captive-bred birds and the nesting of released and wild birds. Additionally, since the initial releases of California condors at Hopper Mountain and Bitter Creek National Wildlife Refuges, the birds have expanded their areas of use, including to the east into the southern portions of the Tehachapi Mountains. Individual California condors make exploratory flights outside of the area that is heavily utilized currently, such as when a bird flew several miles to the east and north of the action area. In addition, the central California flock of California condors at Pinnacles National Park and Big Sur are increasing in numbers and expanding in range; we have documented that individuals from central and southern California have mixed and expect such mixing to continue.

Because we can reasonably expect the number of California condors in the wild to continue to increase and to continue to expand their areas of use, reoccupying areas previously used by California condors, this biological opinion considers the potential effects of the proposed project on the species to include collisions with turbines, met towers, or power lines; electrocution, exposure to microtrash; habituation to human structures and activities; and loss of foraging habitat.

Construction

Alta Windpower expects construction activities to last approximately 7 months; we recognize that Alta Windpower may require additional time for construction in the event of unforeseen circumstances. Construction would potentially have short-term effects on California condors, including collision with equipment (e.g., large cranes, met towers, pre-operational turbines) and attraction of birds to the site due to presence of trash, microtrash, and carcasses. California condors are attracted to microtrash and often ingest it or bring it back to their nests, where their chicks swallow the small pieces. Microtrash is not digestible; consequently, it clogs the bird's gastrointestinal system and can be fatal unless it is surgically removed.

Although California condors may be attracted to the site during construction due to their curious nature, they have not, to the best of our knowledge, visited the numerous other wind facilities that exist in the area. In addition, Alta Windpower will have a qualified biologist onsite during construction to monitor for California condor use of the area and will remove all trash, microtrash, and carcasses from the site that might serve as attractants. For these reasons, California condors are unlikely to be attracted to the site during construction.

Martin et al. (2012) suggest that vultures will often be blind in the direction of travel due to their visual fields. We have observed that California condors, in general flight, frequently move their heads to gain a fuller view of their surroundings. A California condor traveling through the area would likely be moving its head in this manner and would see large stationary objects. Conversely, a condor that has identified a carcass or is focused on another specific object may reduce the amount of its head movement and thus be blind in the direction of travel and therefore be at increased risk. Smallwood (2013) has documented avian fatalities at wind facilities with non-operating turbines.

Barrios and Rodriguez (2004) considered non-rotating turbines to be a "no-risk situation." Lucas et al. (2012) found that griffon vulture mortality at wind facilities in southern Spain was reduced by 50 percent after implementing a selective stopping program when vultures were observed near them. None of the mortalities were with non-operational turbines (Lucas 2013), which indicates these vultures were able to differentiate between rotating and stationary blades.

California condors could enter the action area and collide with large cranes, towers, and pre-operational turbines. The VHF system would not protect California condors from collisions with these objects because they are stationary; i.e., Alta Windpower would be unable to change their use or position in the event a California condor approached the structure. We expect the risk to California condors from cranes, towers, and inoperable turbines to be slight because they are large, stationary objects that would be fully visible to the birds. Rideout et al. (2012) examined the causes of mortality of 98 California condors that died from 1992 through 2010; they did not document any instances of California condors colliding with large, stationary objects such as cranes, towers, or non-operational turbines. Moreover, California condors routinely land and perch on radio towers, telephone poles, and other large structures (Service 2012c).

The temporary met towers that Alta Windpower has proposed would have guy wires; these wires likely pose a greater degree of threat to California condors because they are less visible despite their markings than cranes or turbines. We do not expect that California condors would collide with guy wires during construction because these wires would be in place for a short time (approximately 7 months). Additionally, the towers with guy wires are only anticipated to be in place in the near future (i.e., during construction and for up to one year following construction, if the Bureau issues a right-of-way grant to Alta Windpower) when California condors are less likely to be using the action area.

We anticipate that California condors are unlikely to collide with cranes, towers, or non-operational turbines during construction.

Operation

These activities would occur over a much longer period of time; the proposed life of the project is 30 years. We have taken this factor into consideration in the following analysis.

Collision with Turbines, Towers, and Power Lines

During operations of the Alta East wind facility, California condors would be at risk of being struck by a moving turbine blade. In the previous section on Construction, we discussed the potential for birds striking stationary objects. We cannot say that a California condor would never strike a stationary object; however, given that, to the best of our knowledge they have not collided with other large stationary objects to date, we expect that they would not collide with the non-operational turbines or other structures within the Alta East project.

To the best of our knowledge, California condors have not collided with wind turbines. We attribute this to the fact that relatively few California condors exist in the wild (i.e., compared to turkey vultures or several other species of large birds) and the areas where they have spent most of their time since their re-introduction into the wild do not overlap with wind energy facilities. (That is, California condors have been sighted flying near wind facilities and over and on the ground where wind facilities were proposed but they currently do not frequent areas that are occupied by turbines).

Other species of vulture with similar characteristics and behavior as California condor, such as griffon (*Gyps fulvus*; an Old World species that is almost as large as the California condor) and turkey vultures, have been documented to collide with commercial wind turbines. Griffon vultures were shown to be susceptible to colliding with turbines at some wind energy facilities in Europe (Barrios and Rodriguez 2004). Lucas et al. (2012) documented 221 dead griffon vultures within 13 wind farms that contained a total of 296 turbines in a 4-year period. In Wisconsin, Garvin et al. (2011) found that turkey vultures displayed high-risk flight behaviors, defined as flights directly toward a turbine without signs of avoidance, circling around a turbine and within the rotor plane, more often than all other raptor species.

Conversely, in one study in the Altamont Pass Wind Resource Area in California, the fatality rates of turkey vultures were considered low, which indicated that species-specific behaviors or visual acuity reduced their susceptibility to collision (Smallwood et al 2009). Although Garvin et al. (2011) found that turkey vultures displayed high-risk flight behaviors, they also found that turkey vultures showed signs of avoidance, defined as changes in flight height category or flight direction that deviated away from turbines or turbine blades, regardless of distance to turbines. Cooper et al. (2012) stated that most griffon vultures avoid wind facilities and suggested that "collision fatality estimates for griffon vultures may be best modeled using (greater than 99 percent) avoidance rates." (Cooper et al. (2012) also suggested that this estimate be used to model collision risk for the California condor). We could not ascertain the differences in results from the information in these sources and we do not know if all collisions documented were with rotating or stationary blades as that is often not reported.

Compared to more common species, relatively few California condors occupy the Tehachapi Mountains. Most of the time, these California condors are equipped with VHF transmitters. (The Service replaces failed or lost transmitters when we can capture the birds in a bi-annual effort; however, the number of VHF-equipped birds varies to some degree over time). With the warning provided by the Condor Monitoring System, Alta Windpower would curtail the turbines and substantially reduce the risk that a moving blade would strike a California condor. Success of the Condor Monitoring System is dependent on being able to determine when California condors are approaching the wind facility. Normandeau (2012) states that "[s]ignal strength provides an approximate indication of distance. The relationship is approximate because signal transmission is affected by atmospheric conditions, topography, and other variables that cannot be readily controlled or measured." Because we expect Alta Windpower will be routinely detecting birds at Double Mountain at a distance of approximately 12 miles and will be able to correlate this distance with VHF signal strength, it will be able to determine when birds are moving closer to the facility.

Curtailment of the turbines involves turning the blades to the point that they are almost perpendicular to the wind, thereby reducing the surface area of the blade exposed to the wind and subsequently reducing the speed of the blade. Because the blades cannot be positioned completely perpendicular to the prevailing wind, they would continue to rotate at approximately 3 miles per hour at the tip of the blade when the wind is approximately 55 miles per hour (Appendix D; Bureau 2012b). (In comparison, the speed at the blade tip can reach 150 miles per hour when the turbine is not curtailed.) Our professional judgment is that California condors would be able to see blades when they are moving at 3 miles per hour, perceive that a solid object is nearby, and avoid contact. Lucas et al. (2012) found that selective curtailment of specific turbines within wind farms resulted in an approximately 50 percent decrease in the mortality of griffon vultures and suggested "that trained observers can be effectively used to mitigate mortality rates in operating wind farms."

If California condors begin to use the project area more frequently than we anticipate within the next few years or the number of birds with VHF transmitters decreases below the trigger discussed in this biological opinion, the Bureau and Alta Windpower would implement an adaptive management program that relies on an advanced detection system or nighttime-only operations. These measures would be effective at minimizing risk of California condors colliding with operating turbines. Also, because the Bureau and Alta Windpower have agreed to implement nighttime-only operations if a California condor is killed, we do not expect that more than one California condor will be killed as a result of being struck by turbine blades.

If a California condor is struck by a turbine blade and the individual was a member of a pair that was caring for a nestling that was close to fledging, we expect that the nestling would likely survive. If the California condor was a member of a pair that was caring for an egg or young nestling, the egg or young nestling would also perish because single parents cannot incubate an egg or care for a young nestling on their own. In the short term, we consider the likelihood that a California condor with an egg or young nestling would be killed by an operating turbine to be discountable. We have reached this conclusion because we expect that few birds will use the project area in the short term and most birds entering the area will be fitted with VHF transmitters and be detectable by the monitoring system. Additionally, the action area does not contain any traditional roost or nest sites for the California condor, few mated pairs currently reside in the wild and because birds, when successful, typically nest every other year, the short-term likelihood that a breeding California condor would be struck by a turbine blade would be low. In the long term, this risk would increase because we expect more breeding birds to be present in the population.

We have previously discussed feeding events in this biological opinion; during such events, many individuals gather at a single, large carcass in a short period of time. We do not expect that such an event could occur at the project site without being detected because, with so many birds in one place, the VHF-detection system would detect multiple signals, which would lead to curtailment. Additionally, Alta Windpower's proposal to remove carcasses from the site would reduce the likelihood of a feeding event in the action area to some degree. (We acknowledge that California condors could be attracted to a carcass on an immediately adjacent property that Alta Windpower could not remove and be at risk from the project's turbines; in that case, we would expect that Alta Windpower would detect the VHF transmitters and curtail the turbines). The number of birds detectable by the Condor Monitoring System, when fully functional, will be at least 70 percent of the southern California flock. We consider the likelihood of a feeding event being composed of only individuals that did not have VHF transmitters, and therefore undetected by the Condor Monitoring System or the qualified condor observer, to be extremely low.

The Service, Bureau, and Alta Windpower have discussed, at length, whether turbines at the proposed project site pose any risk to California condors. One can argue that the proposed action poses no risk to California condors in the short term because the relatively few birds in the southern California flock are not currently using the area and the VHF-detection system would allow Alta Windpower to curtail operations before an individual would be at risk. We will discuss long-term issues later in this section. The Service contends that this argument ignores the facts that not all birds carry VHF transmitters and that California condors are highly mobile and curious; just because California condors have not visited an area previously does not allow us to conclude that they are unlikely to visit the area. In addition, the historical and recent detections of California condors within a few miles of the project indicate that birds will visit the area more frequently in the future.

GPS locations for three California condors are of particular note. In 2009, one California condor was detected 3.7 miles to the northeast of the project boundary. In 2011, 2 birds flew approximately 14 and 17 miles beyond the farthest area east of where California condors commonly occupied at that time to points approximately 6.5 and 12.5 miles to the northeast of the action area. The Service records GPS locations approximately once per hour. Therefore, we know where these birds were at the time the GPSs recorded their positions but not the routes they took to reach those points; the potential exists, especially for the 2009 California condor, that one or more of these birds may have crossed through the action area. Given that they are highly mobile and some birds will always be invisible to the Condor Monitoring System, we can reasonably anticipate that an individual could enter the project site undetected and could be killed by an operating turbine.

In the short term, if the proposed project's turbines kill a California condor, we do not anticipate population level impacts to the species for two reasons. First, the loss of a single bird would not affect the genetic diversity of the population because the genetic representation of the 14 founders in the wild populations has been managed by annually assessing each population's genetic makeup and selecting the most appropriate offspring from the captive flock for each release. Second, the Service and its partners in the recovery of the California condor will continue to augment the wild population through the release of captive-bred birds. Between 1992 and 2010, Rideout et al. (2012) noted that 135 of 352 released California condors died. Even with these mortalities, the number of California condors in the wild has increased because of the augmentation program. The loss of a single California condor to an operating turbine blade would not appreciably alter the mortality rate of wild birds.

In the long term (i.e., over the 30-year life of this project), we anticipate that the number of California condors in the wild will continue to increase and that these birds will expand the area that they use. As the central and southern California flocks mix, California condors are likely to explore areas surrounding the project even more regularly. Additionally, within the next few years, the Service anticipates that the percentage of California condors that carry VHF transmitters will decrease because it is not a long-term goal of the recovery program (Brandt 2013). Eventually, augmentation of the wild population will decrease because this also is not a long-term goal of the California Condor Recovery Program. Because the population is expected to increase over the long term, the loss of a single California condor to an operating turbine blade (and, if a breeding bird, its egg or young nestling also) occurring later in the life of the project would have even less of an effect on the overall population. In the event that a California condor caring for an egg or young nestling is struck by a turbine, the California Condor Recovery Program may recover the egg or young nestling and raise it in captivity for future release into the wild if they know where the nest is and know that a parent bird was lost.

In the absence of additional protective measures, we expect that the risk posed by the proposed action to California condors would increase. To address this issue, Alta Windpower and the Bureau have proposed the use of two triggers that would prompt the implementation of an adaptive management strategy. These triggers are California condors increasing their use of areas that would place them at risk of collisions with turbines and a decrease in the percentage of birds that are equipped with VHF transmitters.

If either of these triggers occurs, the first step would involve the Service and Bureau determining whether the circumstances warranted additional action on the part of Alta Windpower. A potential outcome of this analysis would be whether re-initiation of formal consultation was warranted; if the agencies determine that re-initiation is appropriate, the Bureau would conduct a separate analysis under section 7(d) of the Act to determine whether continued operation of the project could constitute the commitment of irreversible or irretrievable resources that would foreclose the formulation or implementation of reasonable and prudent alternatives.

We cannot assess the outcomes of future formal consultations or section 7(d) analyses in this biological opinion. Therefore, we will assess the efficacy of the additional protective measures Alta Windpower would implement as these analyses proceeded.

The first option would be the continued use of the Condor Monitoring System and associated observers. This option would only be implemented if the Service and Bureau determined that it offered the same high level of protection to California condors that was in place before the triggering event. Continued use of the Condor Monitoring System would be appropriate and protective if California condors began to fly over the facility at safe altitudes, routinely flew to a nearby point without actually entering a dangerous area, and/or the percentage of condors with VHF transmitters remains above 70 percent of the southern California population.

The second option would be the use of an alternative detection system (e.g., a radar detection system proven to be effective at detecting California condors) that could inform Alta Windpower when California condors are nearby; as with the VHF-detection system, Alta Windpower would then confirm the detection with observers and curtail the operation of turbines, if needed, or if the observers cannot find the birds but they are suspected to be at risk. We are aware that Alta Windpower is currently investigating radar as an alternative detection system; therefore, we will consider the efficacy of the system it currently owns, a Merlin DeTect radar.

Radar systems can detect both large flocks of birds and large individual birds (Voltura 2013). At this point in time, we are unaware that radar can consistently differentiate between a California condor and any other large bird. Until Alta Windpower can demonstrate conclusively to the Bureau and Service that it can differentiate a California condor from other birds, it would be expected to initiate its protective measures at any time the radar detected a bird that could be a California condor.

Once the radar(s) is situated in a manner that eliminates blind spots (i.e., areas where California condors could approach the turbines closely, such as behind a hill, without being detected) and Alta Windpower has demonstrated its overall effectiveness to the Service and Bureau, such a system, combined with the full-time observers that Alta Windpower would continue to use, should substantially reduce the likelihood that operating turbine blades would strike California condors. As we discussed previously, curtailed blades continue to move at low speeds but we consider the likelihood that curtailed blades would strike a California condor to be discountable. Use of the radar would not alter the likelihood of a California condor colliding with a non-operating turbine or other structure; however, we continue to expect that a California condor would not collide with the non-operational turbines or other structures within the Alta East project.

The third option is nighttime-only operation of the turbines. If continued use of the Condor Monitoring System and observers is no longer offering the same high level of protection to California condors that was in place before the triggering event or if no proven effective alternative system is available, the Bureau would require Alta Windpower to curtail turbines from 30 minutes before sunrise to 30 minutes after sunset. The Bureau used the pre-dawn and post-sunset guidelines because California condors occasionally fly prior to sunrise and after sunset (Brandt 2013). Operation of the turbines only at night, as defined herein, would not affect California condors because they would be at their roosts during this time.

As noted previously, California condors have died as a result of collisions with power lines. Several of these events involved immature birds repeatedly using a flight path that crossed power lines. In most cases, however, California condors are able to avoid collisions with power lines. The transmission line associated with the project will be built to APLIC standards; it would begin at the lowest elevation of the project site and travel away from mountainous terrain. For these reasons, we expect that California condors are unlikely to collide with the project's 230-kilovolt transmission line.

During operation, Alta Windpower would maintain two permanent met towers onsite. As we discussed in relation to the cranes and towers for the turbines, the permanent met towers are large, stationary objects that California condors would be able to avoid during flight. Consequently, we do not expect that California condors would collide with met towers during operation of the project. Some potential exists that they may use the towers for perching, as they frequently use microwave towers. California condors have become tangled in loose strapping on radio communication towers; consequently, loose wires would pose some risk to perching birds.

Electrocution

As noted previously, the transmission line associated with the project will be built to APLIC standards. Eliminating all potential for electrocution is not possible; however, the use of the APLIC standards and the aversion training provided to released California condors would substantially reduce this risk.

Microtrash and Maintenance

Activities associated with operations and maintenance within the action area could produce microtrash and hazardous wastes, such as spills of antifreeze. Alta Windpower will implement measures to control microtrash and hazardous waste and educate project workers about the threat they pose to California condors, and its environmental staff will regularly monitor and enforce these requirements. The implementation of these measures should effectively avoid the adverse effects of microtrash and hazardous waste to California condors.

Habitat Loss and Degradation

The biological assessment notes that the proposed action may degrade habitat quality for California condors if invasive weed species spread and the potential for fire increases. California condors often forage over large expanses of non-native grasslands; additionally, the Bureau and Alta Windpower have proposed measures to control non-native invasive plants. Consequently, we do not expect the proposed action to degrade habitat to the extent that its value for foraging is affected.

Although grasslands and oak savannah do not exist in the action area, the open structure of the vegetation in the area may allow for opportunistic scavenging. The Bureau's Warren Allotment provides for a limited amount of grazing by sheep when forage is available, which is generally in the spring; it was last grazed in 2003 (Fesnock 2013a). Cattle trespass onto public lands, other wildlife (such as mule deer) use the action area, and hunting is allowed. Consequently, the action area provides potential foraging habitat for California condors.

The proposed project would result in the permanent disturbance of approximately 81 acres of potential foraging habitat, which is a small portion of the action area and an even smaller portion of the habitat in the general vicinity. Because the amount of grazing may decrease and Alta Windpower would remove any carcasses that it finds, the entire action area would be essentially lost as California condor foraging habitat. However, because California condors currently do not use the action area for foraging, other foraging habitat exists, and large wild animals are generally scarce in the action area, we consider the effect of the loss of this habitat to be negligible. Substantial areas of foraging habitat remain within the range of the California condor outside of the action area. California condors within California are regularly finding carrion on their own. Consequently, we do not anticipate that the permanent loss of 81 acres of foraging habitat to ground disturbance and the Bureau and Alta Windpower's proposal to remove carcasses from the remainder of the 2,272-acre project area will affect the ability of the California condor to find adequate amounts of food.

Habituation

As part of their natural behavior, California condors investigate their environment, which increasingly includes humans and human structures. California condors in close proximity to humans and their structures will likely experience positive reinforcement (e.g., microtrash, garbage upon which they can feed, direct feeding by people) that can lead to a potentially dangerous situation (e.g., entanglement in wires and screens, ingestion of trash or harmful chemicals). California condors may teach undesirable behavior to other individuals, which further expose more birds to injury or mortality.

During operation, human activity on the project site would be relatively limited. The action area does not contain natural roosting sites and carcasses would be limited. Additionally, Alta Windpower will inform its workers regarding appropriate behavior if they encounter a California condor. Therefore, we do not anticipate that California condors would become habituated due to project activities.

Common Ravens

California condors often follow common ravens to carrion. If the increased human presence at the site attracts common ravens, they may lead California condors to the site and the threat of the turbines. Alta Windpower and the Bureau (Appendix C; 2012b) have developed a Raven Control Plan for the project to discourage common ravens from using the area; the plan includes best management practices regarding trash and the elimination of nest sites, where possible. The proposed removal of carcasses would also reduce the attractiveness of the area to common ravens. With implementation of this plan, we do not expect adverse effects to California condors from attraction of common ravens to the site.

Decommissioning

We anticipate that decommissioning would affect California condors in much the same manner as construction, with the primary difference being that the number of large structures would decrease during the decommissioning phase. As we have discussed previously, we do not expect California condors to collide with large stationary structures, such as cranes and non-operating turbines. The increased activity in the area may result in the potential for the generation of additional microtrash; because the Bureau and Alta Windpower would continue to implement controls on microtrash, we do not expect any additional effects to California condors from microtrash.

Climate Effects

Increases in atmospheric carbon are responsible for changes in climate. Plant communities in arid lands sequester carbon by incorporating it into their tissues. Plants also respire carbon into the substrate, where it combines with calcium to form calcium carbonate; calcium carbonate also sequesters carbon (Allen and McHughen 2011). The removal of plant life from approximately 107 acres within the action area is likely to reduce the amount of carbon that can be sequestered through natural processes within the action area.

The proposed action is unlikely to affect California condors in a measurable manner with regard to carbon sequestration for several reasons. First, the amount of carbon sequestration that would be lost as a result of the proposed action would be minor because the proposed action would affect an extremely small portion of the desert. Second, some researchers have questioned the amount of carbon sequestration that occurs in arid areas; Schlesinger et al. (2009) contend that previous high estimates of carbon sequestration in the Mojave Desert bear re-examination. Finally, the reduction in the use of fossil fuels as a result of the wind facility may prevent more carbon from entering the atmosphere than would occur by the vegetation that is currently present within the areas to be disturbed by construction. For example, Fernandes et al. (2010) report that thin film photovoltaic technology reduces overall atmospheric carbon by 4 million grams of carbon per acre per year and that, by contrast, the amount of annual carbon uptake by desert land is approximately 429,000 grams carbon per acre per year. We have not calculated these measurements for the proposed action but expect that the reduction in atmospheric carbon resulting from the wind generation would likely exceed that of the portion of the action area to be disturbed. An additional consideration is that the effects of any changes in carbon sequestration would be so dispersed that we could not link it to any specific impacts to California condors within or outside the action area.

Zhou et al. (2012) demonstrated that wind facilities covering a large area caused “a significant warming trend of up to 0.72^{o} Centigrade per decade, particularly at night-time, over wind farms relative to nearby non-wind-farm regions." Their study area included 2,358 wind turbines. Zhou et al. (2012) found that stronger winds in the summer months and at night cause the "strongest warming effect at night" because the atmospheric boundary layer is typically more stable and much thinner at night than during the day; therefore, the "turbine-enhanced vertical mixing produces a stronger night-time effect."

The Alta East project alone is unlikely to cause measurable warming because of its small size in relation to the study area in Texas (i.e., 48 turbines compared to 2,358). As a component of all the turbines in the region, the potential exists that warming could occur over a larger area that would include the Alta East site. Based on the available information, we cannot determine whether the regional temperature would increase as a result of the wind facilities; differences in topography and daily wind patterns between the study area and the project site may produce dissimilar results from those found by Zhou et al. (2012). If local warming did occur within and around the action area as a result of the generation of wind energy, we expect that the composition of the plant community may change to one more adapted to arid lands; non-native invasive grasses may become more prominent. Such a change would likely reduce the level of grazing and the abundance of larger animals within the action area; if the number of animals decreased, the opportunity for California condors to forage on their carcasses would also decrease. Given that we do not expect California condors to use the action area for foraging on a consistent basis under current climatic conditions, such a change would be unlikely to affect the species in a measurable manner.

Proposed Funding for Lead Abatement and Other Programs

Alta Windpower will provide a financial contribution to California condor conservation in the manner described in Alta Windpower's Condor Recovery Contribution (Alta Windpower 2013). This strategy will be completed and approved by the Service and Bureau prior to the initiation of operation of the facility. The Condor Recovery Contribution will include, but not be limited to, funding for lead outreach and education programs, and funding for scientific research to guide future wind development in the Tehachapi Region. Alta Windpower proposes to contribute funds to lead abatement programs, such as outreach to hunter groups, staffing a non-lead information booth at sporting expositions, and hosting shooting demonstration events. In addition, Alta Windpower proposes to contribute funds to additional scientific research on California condors to increase our understanding of threats and guide future management decisions.

As noted previously, lead poisoning is inhibiting the recovery of the California condor throughout its range; alleviating this threat would likely result in fewer deaths of California condors and facilitate achieving the recovery goal of a self-sustaining wild population (Finkelstein et al. 2012). Recent regulatory efforts in California, such as the Ridley-Tree Condor Preservation Act enacted in 2008, seek to mitigate this hazard to California condors by partial bans on the use of lead ammunition within the range of the California condor. Kelly et al. (2011) found that lead exposure in both golden eagles and turkey vultures declined significantly post-ban. However, Finkelstein et al. (2012) found no indication that lead levels in the blood of

California condors had declined in 2009 and 2010 compared with 2006 and 2007. We are unable to explain these conflicting results.

In addition to regulatory efforts, agencies and partners have focused on providing public education and outreach on the lead threat to California condors. Although not quantifiable, these efforts seem to be effective at getting information on the threat of lead in ammunition to hunters at sporting events and expositions (Garcelon 2013, Parish 2013).

Fragments of lead ammunition certainly remain in the environment since the ban on hunting with it in 2008. Poaching of wildlife occurs within the range of the California condor; we expect that participants in this illegal activity are unlikely to be concerned about the effects of lead on California condors. Ranchers can continue to use lead ammunition to put down livestock. Old buildings and structures likely continue to be a source of lead. California condors may continue to be exposed for some time to lead fragments in the carcasses of poached wildlife and downed livestock and in microtrash. Absent an effort to remove lead from the environment, however, the levels of lead in the blood of California condors would never decrease and we would never achieve a self-sustaining wild population. The Alta East project itself will not increase the threat of lead exposure; however, Alta Windpower's proposal to fund continuing efforts to reduce the amount of lead in the environment would assist in maintaining or expanding a key component of the recovery effort for the California condor.

Effects on Recovery

The number of California condors in the wild continues to increase, primarily through the release of captive-bred birds but also through a low level of natural recruitment. The death of one California condor during operation of the Alta East project would not hinder the growth of the wild population in California, which has expanded to 132 birds (as of February 28, 2013) since 1992, when they were reintroduced.

The proposed Condor Monitoring System relies on the majority of California condors being equipped with VHF transmitters for the system to detect them and for the qualified biologist to track any VHF-equipped birds that enter the area. The long-term goal for recovery of the California condor does not include attempting to maintain VHF transmitters on all or most of the birds in the future. The Bureau and Alta Windpower's proposal to eventually transition to a more advanced detection system should not interfere with achieving the goals of the recovery program because we intend to maintain VHF transmitters on California condors for the immediate future.

Finally, Alta Windpower has proposed to contribute funds toward California condor recovery through outreach and education aimed at reducing the prevalence of lead within its habitat and to conduct scientific research that would answer questions relevant to reducing future potential conflicts with wind energy development. The funding of the lead abatement program should further efforts to reduce the most widespread and ongoing impediment to the recovery of the

California condor. Collecting additional information to address other questions relevant to recovery should also further the conservation of the species.

Summary of Effects on the California Condor

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the reproduction, numbers, and distribution of the species. We also consider the effects of the action on the recovery of the species. In that context, the following paragraphs summarize the effects of the proposed project on the California condor.

Reproduction: We have no evidence that California condors nested in the action area either historically or currently. We do not anticipate that California condors would attempt to nest within the action area in the future because it does not contain suitable nesting habitat.

The Bureau and Alta Windpower's proposal to control microtrash within the action area would eliminate the potential for a breeding adult to ingest trash at the site and return it to a nestling. The Condor Monitoring and Avoidance Plan, with the component of adaptive management, would preclude the loss of more than a single California condor during operation of the project. Therefore, even under the worst-case scenario (i.e., the loss of a single nesting California condor), the proposed action is unlikely to appreciably affect reproduction of the California condor.

Numbers: The proposed action may kill a California condor if a turbine blade strikes a bird. The Bureau and Alta Windpower have proposed to use night-only operations if a single California condor is killed by a moving turbine blade. Consequently, we anticipate the proposed action is likely to kill a single California condor. Between 1992 and 2010, 135 of 352 wild California condors died. In the short term, the single California condor we anticipate would be killed as a result of the proposed action would be a minor fraction of the overall mortalities experienced by wild birds and would not appreciably diminish the number of birds in the wild because of the continued augmentation of the wild population.

Over the long term, the risk of turbine blades striking a California condor is likely to decrease, even though we expect the number of wild birds to increase, because of Alta Windpower's proposed use of an enhanced detection system. Additionally, Alta Windpower would use nighttime-only operations if a California condor is killed by a turbine blade until re-initiation of consultation is concluded. Should it occur, the loss of a single California condor over the long term is not likely to appreciably reduce the number of birds in the wild for several reasons. First, we anticipate that Alta Windpower's contributions to recovery actions (i.e., lead abatement) are likely to reduce this threat to the California condor, which the Service and numerous scientists consider to be the primary barrier to recovery of the species. Second, California condors will likely increase the amount of reproduction in the wild. Finally, the number of captive-bred, released California condors, combined with wild-bred birds, will increase and the low level of mortality associated with the proposed action would likely become an even smaller proportion of the overall mortality of wild birds.

Distribution: The proposed action will not appreciably affect the distribution of the California condor. California condors are not currently using the action area for nesting, roosting, or foraging. We expect that California condors would never use the site for nesting because of the lack of suitable habitat; it also does not seem to support any highly desirable areas for roosting. Because livestock and wildlife use the area, it may provide opportunities for foraging.

California condors are currently accessing nearly all of their recent historical range in California; we anticipate that they will continue to expand their range and reoccupy their broader historical range. Substantial areas of foraging habitat remain within the range of the California condor outside of the action area. California condors within California are regularly finding carrion on their own. Consequently, we do not anticipate that the permanent loss of 107 acres of foraging habitat to ground disturbance and the Bureau and Alta Windpower's proposal to remove carcasses from the remainder of the 2,272-acre project area will affect the distribution of the California condor.

Desert Tortoise

We conducted the analysis in the following sections based on the current conditions in the action area, which, as we described in the Environmental Baseline - Existing Conditions section of this biological opinion, is affected by sheep grazing, unauthorized off-road vehicle use, and trash dumping. We expect that these conditions lead, at least in part, to the low number of desert tortoises in the action area. The regular presence of Alta Windpower employees, fencing of portions of the project area, and the turbines themselves have the potential to render the site less attractive to people who engage in these uses over the 30-year life of the project. If that is the case, the number of desert tortoises within the action area may increase, which, to some degree may alter the degree of risk that they face during operation and maintenance of the facility relative to the construction phase.

Driving Off Roads

In general, the use of vehicles off of roads (paved or unpaved) can injure or kill desert tortoises and trap them in their collapsed burrows. In contrast to recreational use, where numerous vehicles travel off road at high speeds and with little or no regard to natural resources, Alta Windpower's use of vehicles off road would be limited to designated work areas and be monitored by the authorized biologists or biological monitors. Consequently, we expect that use of vehicles off paved or unpaved roads is likely to injure or kill few desert tortoises.

In general, the use of vehicles off of roads (paved or unpaved) can destroy plants needed for cover and food, erode and compact substrates, cause proliferation of non-native invasive plants, and increase the number and location of wildfires. We expect the low level of use of vehicles off roads, which will be appropriately monitored and occur in limited areas, would not affect the quality of desert tortoise habitat in a measurable manner.

We expect that most off-road travel would occur during construction. Therefore, this activity would pose the greatest threat to the desert tortoise for a short period relative to the life of the project.

Driving on Roads

Although they are generally more easily observed on roads, vehicles often travel at high speeds, reducing the likelihood of drivers detecting and avoiding desert tortoises. Rises and turns in roads also decrease the ability of drivers to detect desert tortoises. Along heavily used roads, the number of desert tortoises is depressed for some distance from the edge of the road as a result of road-associated mortality; this distance varies with the level of use of the road. Smaller desert tortoises are more vulnerable because they are more difficult to see; all desert tortoises are more vulnerable when they are active and frequently leaving their burrows.

In general, vehicle use is likely to result in at least some mortalities of and injuries to desert tortoises; the extent of the loss is related to the condition of the road, the time of the year, the abundance of desert tortoises, and the awareness of the driver. The potential exists for workers to be extremely vigilant of desert tortoises because of the worker environmental awareness program and their familiarity with where and when desert tortoises occur on site. Even the most careful drivers may occasionally strike a desert tortoise.

The Bureau and Alta Windpower's proposal to enforce a speed limit of 15 miles per hour on all roads within the project's boundaries throughout the life of the project is likely to be more protective of larger desert tortoises; because of their size, this measure may be less effective for smaller desert tortoises.

The primary threat that vehicle use of roads poses to the habitat of desert tortoise is the spread of non-native invasive plants. The threat of vehicles bringing new species of non-native invasive plants to the action area is likely to continue for the life of the project. During operation and maintenance, most of the vehicles entering the site would likely remain on roads, which would limit the initial introduction of new species of weeds to roadside areas and render them more likely to be detected and eliminated. We will address the control of non-native invasive plants later in this section of the biological opinion

Ground Disturbance

Ground disturbance includes any project activities that disrupt vegetation and substrate through the use of heavy equipment. Desert tortoises may be injured or killed or trapped in their burrows during these activities. Because Alta Windpower would use standard and successful methods and experienced authorized biologists to avoid injuring or killing desert tortoises during ground-disturbing activities, we expect that relatively few desert tortoises are likely to be injured or killed.

Construction of the project would result in the permanent loss of approximately 107 acres of habitat. We expect that most of the permanent loss of habitat would occur during construction. Temporarily disturbed areas may support habitat that provides some value to the desert tortoise within a few years; the nature of disturbance and the amount of rainfall would greatly affect the time to recovery.

We do not expect the loss of habitat for the pads for the wind turbines and for other ancillary facilities to be so extensive that desert tortoises would be prevented from moving across the landscape. Because of the lack of cover in the pad areas, desert tortoises may avoid these areas to some degree. Most fencing to be used during operation of the project would allow for the movement of animals underneath the lowest wire. If the pad areas support higher concentrations of annual plants, desert tortoises may occasionally forage in these locations.

Ground disturbance could also exacerbate the spread of non-native invasive plants. We address the control of non-native invasive plants in the following section.

Non-native Plant Species

Vehicles, ground disturbance, fire, grazing by livestock, and other human activities contribute to the dispersal of non-native plant species. These non-native plants include species that are already present in the California desert and newly introduced species. Non-native plants can alter the quality and quantity of plant foods available to desert tortoises and thereby affect their nutritional intake, as we discussed in the Status of the Species section of this biological opinion. If non-native plants become too widespread and dense, fires have the potential to spread quickly over large areas and alter habitat conditions on a large scale.

The Bureau and Alta Windpower's proposal to control non-native invasive plants incudes several components. Washing vehicles before entering the project site for the first time would greatly reduce the likelihood that they would introduce new species to the project site; the Bureau and Alta Windpower have proposed this measure as the minimum level of washing. Washing vehicles periodically during construction may be effective in preventing weeds from spreading internally on the site and would likely be most effective if implemented when weeds are producing seeds and vehicles are moving from one portion of the site to another. The biological assessment did not describe a schedule or parameters for periodic washing of vehicles; consequently, the potential exists that washing may not occur frequently enough or in the most appropriate time frames to control the spread of weeds that are already present on site.

The specific methods of cleaning vehicles and equipment prior to commencing work in off road areas (high pressure hoses outside, including on the undercarriage; sweeping of cabs; disposal of refuse in waste receptacles; washing at sites suitable for this activity) are likely to greatly reduce the potential for inadvertent spread of weeds. Ground disturbance can exacerbate the spread of weeds because many such species are early colonizers of such areas; minimizing ground disturbance would reduce the opportunities for such colonization. Avoiding the transportation of contaminated materials, such as soils, gravel, mulch, hay, straw and sand, should eliminate the potential for introducing new species of weeds to the project site.

Alta Windpower proposes to use appropriate herbicides to treat infestations of noxious weeds in limited areas according to the directions on the label and in any permits and to confirm with the Bureau that the use of the herbicides would have no effect on desert tortoises. Desert tortoises would be exposed to herbicides if they contacted the chemical directly or ingested plants or substrates that have been sprayed. We are unaware of any pesticides that have been tested to the extent that we can conclude they would not affect desert tortoises if contact occurred. Consequently, eliminating exposure of desert tortoises to herbicides would be necessary to achieve Alta Windpower’s goal; given the current low abundance of desert tortoises on site, the careful application of non-persistent herbicides may avoid contact with desert tortoises.

We expect that exposure to low levels of specific herbicides are unlikely to trigger an adverse effect in desert tortoises. Conversely, the spread of non-native invasive plants would likely compromise the habitat value of the project site to the degree that desert tortoises would no longer be capable of finding adequate nutrition from native annual plants. We also expect that the threat of non-native invasive plants entering the site would be greatest during and soon after construction, when habitat is disturbed; because the density of desert tortoises at this time is low, the chance that desert tortoises would be exposed to herbicides is correspondingly low. Consequently, the overall effect of herbicide use is likely to be beneficial to desert tortoises.

Common Ravens

The Bureau and Alta Windpower have proposed to manage trash and debris to reduce the attractiveness of the project site to common ravens. This protective measure would likely be effective in reducing some level of food subsidies to common ravens.

We expect that buildings and transmission lines associated with the proposed action would provide common ravens with more perching, roosting, and nesting sites than currently occur in the action area. The increase in human activity in the project area during construction and operation of the wind facility may lead to an increase in the number of common ravens. Lovich (personal observation in Lovich and Ennen 2013) notes that common ravens are attracted to wind energy facilities. Common ravens are highly intelligent and learn quickly of new food sources; if the wind turbines kill birds with any regularity, common ravens would soon learn of this new source of food and visit the site regularly. Given their intelligence and agility in flight, we expect that relatively few would collide with the turbines. Any increase in the number of common ravens would likely result in increased predation of desert tortoises. The Bureau and Alta Windpower’s proposal to remove carrion from the base of turbines may be effective in reducing this source of food. Neither the biological assessment nor its attached management plan for common ravens provides detail on how Alta Windpower will implement this measure; consequently, we cannot fully assess its likely effectiveness.

The Bureau and Alta Windpower have also proposed to remove raptor and common raven nests from the project site during the winter. The long-term removal of nests from the site would likely reduce overall use of the site by common ravens because birds feeding young would likely hunt in close proximity to the nest. Reducing hunting pressure from common ravens is likely to improve the potential for desert tortoises to survive within the project area and offset at least partially some of the attraction of the area to common ravens that is likely to result from its use by project workers.

The biological assessment notes that the site is currently used for grazing and off-road vehicle recreation. These activities can provide food for common ravens (carcasses of livestock, fecal matter from livestock attracts insects that common ravens consume, food and trash waste from recreationists, etc.). If operation of the project results in a decrease in the amount of grazing and recreation in the project area, the level of use by common ravens may decrease.

The proximity of other wind facilities in the area may also affect the Bureau and Alta Windpower's proposals to manage common ravens. Common ravens fly large distances daily in search of food and water. Because of the behavior patterns of the common raven and the numerous other variables we discussed in this section, we cannot fully assess how development of the proposed project is likely to change overall use of the site by common ravens. Given the species' overall reaction to the presence of human activity in the desert, we expect use of the action area by common ravens is likely to increase to some degree.

Moving Desert Tortoises from Harm's Way

Alta Windpower has proposed to move desert tortoises from harm's way during construction and in the course of operations and maintenance. During construction, Alta Windpower would permanently disturb approximately 107 acres and temporarily disturb 688 acres; this loss of habitat would occur in numerous smaller areas with the largest being 6 acres for the substation. Desert tortoises that are moved from harm's way during construction may experience the loss of a portion of their home range. With the possible exception of the substation, most disturbances would not result in the complete loss of an individual's home range because each disturbance would be relatively limited in area. Consequently, most animals would be moved relatively short distances if they were at risk during construction. Information from a translocation project at Fort Irwin indicates that desert tortoises moved less than 500 meters exhibited behavior similar to resident and control animals (Averill-Murray 2011). Resident animals were the desert tortoises residing in the same area as the translocated individuals; controls lived away from areas into which desert tortoises had been translocated. Because desert tortoises would be moved less than 500 meters at the Alta East site, the animals moved from harm's way are unlikely to exhibit abnormal behavior, such as excessive wandering; therefore, these animals are unlikely to be exposed to predators and extreme weather conditions as a result of being moved from harm's way.

Moving desert tortoises from one area to another has the potential to increase densities to the degree that desert tortoises are more likely to engage in hostile social interactions or contact other individuals and spread diseases. Because the action area contains so few desert tortoises, few animals are likely to be moved during construction; additionally, this movement would not affect local densities. Finally, because all of the movements of desert tortoises would be for short distances, the relocated desert tortoises are unlikely to meet individuals that they have not previously encountered. For these reasons, moving desert tortoises from harm's way would not expose them to increased risk of disease or negative interactions with their neighbors.

Alta Windpower would likely undertake at least some portion of construction during the summer, when desert tortoises are less active. Therefore, some potential exists that it would encounter inactive desert tortoises during clearance surveys. If Alta Windpower cannot avoid an inactive desert tortoise in its burrow, it would move the animal to a fenced area and maintain it there until it completes construction in the area; during the subsequent active season, Alta Windpower would remove the fence. Desert tortoises that are disturbed during the summer inactive period occasionally become active and spend more time outside of burrows; this seasonally inappropriate activity places these individuals at greater risk of dying as a result of overheating. Alta Windpower has proposed to monitor these animals, undertake measures to reduce the potential for overheating, and provide food and water, if the desert tortoises do not immediately retreat a burrow and become inactive. We acknowledge that moving desert tortoises from harm's way during the summer inactive period poses some risk to these individuals; however, given that only a portion of the area would be disturbed during construction, desert tortoises are not common onsite, and not all individuals would resist returning to an inactive state after being removed from a burrow, we expect that few animals would be placed at risk by this activity.

During operations and maintenance, we expect that ground-disturbing activities would be limited in scope. During these activities, moving desert tortoises from harm's way is unlikely to place them outside of their home range. Consequently, such short-distance movements are unlikely to adversely affect desert tortoises.

Some potential exists that handling desert tortoises to move them from harm's way may cause elevated levels of stress that may render these animals more susceptible to disease. Information from the Fort Irwin study indicates that translocation of desert tortoises in that study did not cause a measurable physiological stress response (Averill-Murray 2011). For that reason and because Alta Windpower will use experienced biologists approved by the Service and approved handling techniques, collected desert tortoises are unlikely to experience elevated stress levels.

Consequently, moving desert tortoises from harm's way may result in some increased movement of animals that are displaced from their home ranges during construction; however, we expect that these animals would resume normal behavioral patterns after a relatively brief period. We do not expect that the proposed action increases the risk of spreading disease or adverse interaction among neighboring desert tortoises. Handling of desert tortoises to move them from harm's way, during construction, operations, or maintenance, is unlikely to induce elevated levels of physiological stress. Therefore, the overall effect of moving desert tortoises from harm's way would, at worst, result in some increased exposure of animals to weather and predators; these adverse effects would be temporary and preferable to the desert tortoises being injured or killed by project activities.

Personnel on Foot

Because of their small size, hatchlings and slightly larger desert tortoises could be trampled by foot traffic. Nests are also vulnerable, but their typical location, near the mouth of a burrow, likely protects them to some degree.

We expect that few desert tortoises would be injured or killed in this manner because personnel working in desert tortoise habitat will receive specific training, which would increase their awareness of this potential threat. Additionally, the likelihood of stepping on desert tortoises is generally low because they are widely distributed and uncommon.

Decommissioning

We anticipate that decommissioning would affect desert tortoises in much the same manner as construction, with the primary difference being that areas disturbed during construction would be restored during the decommissioning phase. The increased presence of vehicles and workers would increase the risk to desert tortoises over what they would experience during operations. In general, because the decommissioning would result in the restoration of disturbed areas, we expect that the overall direct effect of decommissioning would be beneficial to the desert tortoise.

The degree to which decommissioning would affect desert tortoises is likely to vary greatly depending on how the number of individuals onsite changes over time. For example, if the operation of the Alta East facility discourages unauthorized grazing and recreational use, the number of desert tortoises in the area may increase. If the number of desert tortoises increases, more would be at risk during decommissioning, although Alta Windpower would implement protective measures (the same used during construction) to reduce this risk. If decommissioning would trigger any of the reasons for which re-initiation of consultation was necessary (50 Code of Federal Regulations 402.16), the Bureau would complete such consultation prior to the onset of activities.

Climate Effects

Increases in atmospheric carbon are responsible for changes in climate; as we discussed in the Status of the Desert Tortoise section of this biological opinion, climate change is likely to cause frequent and/or prolonged droughts with an increase of the annual mean temperature. Increased temperatures would likely adversely affect desert tortoises by decreasing the range of temperatures at which desert tortoises would be active; decreased rainfall would likely result in fewer annual plants on which desert tortoises feed.

Plant communities in arid lands sequester carbon by incorporating it into their tissues. Plants also respire carbon into the substrate, where it combines with calcium to form calcium carbonate; calcium carbonate also sequesters carbon (Allen and McHughen 2011). The removal of plant life from approximately 107 acres within the action area is likely to reduce the amount of carbon that can be sequestered through natural processes within the action area.

The proposed action is unlikely to affect desert tortoises in a measurable manner with regard to carbon sequestration for several reasons. First, the amount of carbon sequestration that would be lost as a result of the proposed action would be minor because the proposed action would affect an extremely small portion of the desert. Second, some researchers have questioned the amount of carbon sequestration that occurs in arid areas; Schlesinger et al. (2009) contend that previous high estimates of carbon sequestration in the Mojave Desert bear re-examination. Finally, the reduction in the use of fossil fuels as a result of the wind facility would prevent more carbon from entering the atmosphere than would occur by the vegetation that is currently present within the areas to be disturbed by construction. For example, Fernandes et al. (2010) report that thin film photovoltaic technology reduce overall atmospheric carbon by 4 million grams carbon per acre per year and that, by contrast, the amount of annual carbon uptake by desert land is approximately 429,000 grams carbon per acre per year. An additional consideration is that the effects of any changes in carbon sequestration would be so dispersed that we could not link it to any specific impacts to desert tortoises within or outside the action area.

Zhou et al. (2012) demonstrated that wind facilities covering a large area caused "a significant warming trend of up to 0.72^{o} Centigrade per decade, particularly at night-time, over wind farms relative to nearby non-wind-farm regions." Their study area included 2,358 wind turbines. Zhou et al. (2012) found that stronger winds in the summer months and at night cause the "strongest warming effect at night" because the atmospheric boundary layer is typically more stable and much thinner at night than during the day; therefore, the "turbine-enhanced vertical mixing produces a stronger night-time effect."

The Alta East project alone is unlikely to cause measurable warming because of its small size in relation to the study area in Texas (i.e., 48 turbines compared to 2,358). As a component of all the turbines in the region, the potential exists that warming could occur over a larger area that would include the Alta East site. We discussed the effects of warmer temperatures on desert tortoises previously in this section. Based on the available information, we cannot determine whether the regional temperature would increase as a result of the wind facilities; differences in topography and daily wind patterns between the study area and the project site may produce dissimilar results from those found by Zhou et al. (2012).

Miscellaneous Effects

Water can condense from fog and clouds on the towers and run down to the concrete bases of the wind turbines; we are aware that, in at least one location, desert tortoises routinely move to the bases of the turbines to drink (Lovich 2013). If this source of water is routinely available, it may increase the overall physiological condition of desert tortoises at the site; we do not know if condensation would occur to this degree at the project site. The attraction of desert tortoises to the turbine base could expose them to increased risk of injury or mortality from workers; conversely, if desert tortoises pursue this activity routinely, we expect that workers would be aware of their presence and avoid them.

Ennen et al. (2012) found no difference in annual nesting ecology between desert tortoises within and outside of a utility-scale wind facility. The authors note that they did not compare before-and-after nesting behavior. Based on this information, the operation of the wind facility is unlikely to alter the nesting ecology of desert tortoises onsite.

Lovich et al. (2011) found that adult female desert tortoises within the boundaries of a utility-scale wind facility exhibited lower mortality rates than the same cohort from other areas of the desert during the same time frame. The authors postulate that the productivity of food plants at the site may be greater than at other sites; the site is located at the western edge of the desert and receives rainfall more consistently on an annual basis. Additionally, the limited public access at the study site "may contribute to the overall stability of the population" (Lovich et al. 2011). Whether this effect will occur at the Alta East site will depend on the amount of public access that persists during operation.

The potential exists that noise during construction, operations (including that of spinning turbine blades), maintenance, and decommissioning may affect desert tortoises. Bowles et al. (1999) determined that simulated subsonic aircraft noise did not damage the ears of desert tortoises. Behaviorally, desert tortoises responded by freezing in place, withdrawing their heads, and being less active short periods of time; their reactions decreased with repeated exposure to the noise. Additionally, as noted previously in this section, Ennen et al. (2012) found no difference in annual nesting ecology between desert tortoises within and outside of a utility-scale wind facility. If the noise from the operation of the turbines was causing an adverse physiological response in desert tortoises, decreased reproductive rates as a result of the stress would be a reasonable response. Because Ennen et al. (2012) did not detect any differences in reproduction and Bowles (1999) did not detect any adverse effects of noise, we conclude that noise associated with the Alta East project will not affect desert tortoises. We acknowledge that different turbines would be used at Alta East than at Ennen's site and that the type and level of noise generated by these turbines may be different; however, we are basing our analysis on the best available information.

Transmission Line

Ground disturbance and other effects associated with construction of the transmission line would closely resemble those associated with construction of the wind facility; however, the areas to be disturbed would be much smaller. During operation and maintenance, vehicles would occasionally patrol the transmission line to ensure its proper functioning. During all activities, Alta Windpower would employ the same protective measures for the desert tortoise that would be used within the wind facility.

Surveyors did not detect any desert tortoises or their sign along the transmission line outside of the boundaries of the wind facility. We are aware of other projects in this vicinity (e.g., the Barren Ridge and Tehachapi renewable transmission projects) where surveys for desert tortoises detected few or no individuals.

The new transmission line is likely to provide additional perching and nesting substrate for common ravens in an area where an abundance of such sites already exists. Consequently, we do not expect the transmission line to have a measurable effect on the number of common ravens in the area. The construction and operation of the transmission lines is unlikely to kill or injure desert tortoises because few, if any, individuals occur along its route and because Alta Windpower will implement standard protective measures during these activities. We cannot confirm that desert tortoises are absent from this area; consequently, a minor potential exists that construction or operation of the proposed transmission line could kill or injure a desert tortoise.

Effects on Recovery

The Alta East project site is located in an area that the Service does not consider important to the long-term conservation of the desert tortoise, either as a key area to maintain a population of desert tortoises or as a linkage between such areas. Additionally, the site does not support many desert tortoises. Consequently, implementation of the proposed action will not measurably affect the recovery of the desert tortoise.

Summary of the Effects of the Proposed Action on the Desert Tortoise

The regulatory definition of "to jeopardize the continued existence of the species" focuses on how the proposed action would affect the reproduction, numbers, or distribution of the species being considered in the biological opinion. For that reason, we have used those aspects of the desert tortoise's status as the basis to assess the overall effect of the proposed action on the species.

Additionally, we determine whether a proposed action is likely "to jeopardize the continued existence of the species" through an analysis of how a proposed action affects the listed taxon within the action area based in relation to the range of the entire listed taxon. For the desert tortoise, this process involves considering the effects at the level of the action area, then at the level of the recovery unit (in this case, the Western Mojave Recovery Unit), and then finally for the range of the listed taxon. Logically, if an aspect of the proposed action is unlikely to cause a measurable effect within the action area, it cannot affect the recovery unit or the remainder of the range.

Reproduction: We have no reason to believe that the proposed action would affect the mortality rate of female desert tortoises differently than that of males; consequently, we consider the potential effects on reproduction in the context of individual animals, rather than the population within the action area as a whole. Construction of the project would not have a measurable long-term effect on reproduction of individual desert tortoises because intense construction activity would occur over a relatively brief period of time relative to the reproductive life of female desert tortoises. Based on work conducted by Ennen et al. (2012), we conclude that the operation of the project is unlikely to affect reproduction of desert tortoises within the action area. Consequently, the proposed action is not likely to appreciably diminish reproduction of the desert tortoise in the action area.

Numbers: We expect that construction and operation of the project are likely to result in the injury or mortality of few desert tortoises because the amount of ground disturbance caused by construction would be limited compared to the overall size of the action area; fewer desert tortoises are likely to be exposed to danger than if the entire site were to be disturbed. Additionally, the Bureau and Alta Windpower have proposed numerous measures to reduce the level of mortality during both construction and operation.

Relatively few desert tortoises occur within the action area compared to the overall numbers within the Western Mojave Recovery Unit. In its report on the results of range-wide sampling for 2010, the Service (2010h) estimated that 25,900 larger desert tortoises (i.e., those greater than 180 millimeters in length) occupied desert wildlife management areas within the Western Mojave Recovery Unit. The overall number of desert tortoises would increase if we included the individuals that reside in areas outside of the desert wildlife management areas and individuals smaller than 180 millimeters. Consequently, even the loss of all 12 larger desert tortoises estimated within the action area would comprise a barely measurable portion (approximately 0.05 percent) of the overall population within the Western Mojave Recovery Unit.

The potential exists that factors unrelated to the project may affect desert tortoises in the action area. If the overall number of desert tortoises in the recovery unit decreases, we expect that the number of desert tortoises that inhabit the action area would also decrease; in that case, the likelihood that individuals would be encountered and killed during any given action would also decrease. Some potential exists that the number of desert tortoises within the action area may increase relative to adjacent areas if the overall human disturbance decreases and the mortality rate of desert tortoises decreases concomitantly. Finally, if the number of desert tortoises onsite increases as a result of decreased human disturbance, the potential exists that operation of the project may pose an increase risk to animals. (We would not expect desert tortoise numbers to increase during construction because of their low reproductive capacity and the short time needed for construction.) Any increase in the number of desert tortoises within the action area is unlikely have a measurable effect on overall population trends in the Western Mojave Recovery Unit because of the small action area, relative to the size of the recovery unit. In spite of the uncertainties related to the overall future trend in the number of desert tortoises, the proposed action is not likely to appreciably diminish the number of desert tortoises in the action area.

Distribution: The permanent loss of 81 acres of desert tortoise habitat is not likely to appreciably reduce the distribution of the desert tortoise. Based on the Nussear et al. (2009) model and our calculations (Waln 2010), the Western Mojave Recovery Unit may support as much as 10,316 square miles of desert tortoise habitat. Consequently, the proposed action would result in the loss of approximately 0.0012 percent of the habitat in the Western Mojave Recovery Unit.

Additionally, the lost habitat would be scattered in numerous parcels across the action area, further reducing the overall impact to the distribution of the species.

Bakersfield Cactus

We conducted the analysis in the following sections based on the current conditions in the action area. As we described in the Environmental Baseline - Existing Conditions section of this biological opinion, the easternmost portion of the action area seems to be affected more by sheep grazing, unauthorized off-road vehicle use, and trash dumping than the western portion. The Federal Bakersfield cactus occurs only in the western portion of the action area. The State Bakersfield cactus is more common in the western portion of the action area than in the east; we do not know whether natural features, human activity, or a combination of both affect this distribution.

As we noted for the desert tortoise, the regular presence of Alta Windpower employees, fencing of portions of the project area, and the turbines themselves have the potential to render the site less attractive to people who use the site for recreation. If that is the case, the conditions within the eastern portion of the site may change in a manner that would allow for an increase in the abundance of the Bakersfield cactus. If they increase in abundance, the degree of risk to which they are exposed by some activities may increase during operation and maintenance of the facility relative to the construction phase.

In the following analysis, we use the term ‘Bakersfield cactus’ when referring to both the Federal and State forms. When we are discussing one specific form, we will refer to it as the ‘Federal Bakersfield cactus’ or the ‘State Bakersfield cactus.’

Driving Off Roads

In general, the use of vehicles off of roads (paved or unpaved) can destroy individuals of the Bakersfield cactus. Some potential also exists that pads may disarticulate from plants that are struck by a vehicle and subsequently root and develop into new plants. We do not know how frequently disarticulated pads may form new plants but expect that this outcome would generally occur infrequently because conditions for the pads to take root are likely not favorable for much of the year.

In contrast to recreational use, where numerous vehicles travel off road at high speeds and with little or no regard to natural resources, Alta Windpower’s use of vehicles off road would be limited to designated work areas and be monitored by the authorized biologists or biological monitors. Consequently, we expect that use of vehicles off paved or unpaved roads is likely to destroy few larger individuals of the Bakersfield cactus. Smaller individuals, such as seedlings or disarticulated pads, may be more difficult to see and avoid.

The use of vehicles off of roads (paved or unpaved) can cause proliferation of non-native invasive plants by disturbing substrates and making them more likely to be colonized. An increase in some species of non-native plants, such as grasses, can lead to an increase in the number of wildfires. We will address the control of non-native invasive plants later in this section of the biological opinion.

We expect that most off-road travel would occur during construction. Therefore, this activity would pose the greatest threat to the Bakersfield cactus for a short period relative to the life of the project.

Ground Disturbance

Ground disturbance includes any project activities that disrupt vegetation and substrate through the use of heavy equipment. Individuals of the Bakersfield cactus may be destroyed during these activities. Construction of the project would result in the permanent loss of approximately 81 acres of habitat. We expect that most of the permanent loss of habitat would occur during construction. Temporarily disturbed areas may support habitat that provides some value to the Bakersfield cactus within a few years; the nature of disturbance and the amount of rainfall would greatly affect the time to recovery.

With regard to the Federal Bakersfield cactus, the Bureau and Alta Windpower have proposed to implement measures to avoid all known clumps. We expect this measure to be effective in avoiding the loss of these individuals as a result of ground disturbance.

Alta Windpower has proposed to avoid individuals of the State Bakersfield cactus that are outside of areas of direct impact, such as for the placement of turbines, by a minimum of 25 feet, unless a shorter distance is approved by the California Department of Fish and Wildlife. We expect this measure to be effective in avoiding the loss of these individuals as a result of ground disturbance.

Alta Windpower has also proposed to transplant all individuals of the State Bakersfield cactus that cannot be avoided. After monitoring 10 clumps and 25 shed pads of transplanted Bakersfield cactus plants for 1.5 years, Cypher et al. (2011) concluded that translocating individuals of this species "may constitute an effective strategy for establishing new populations of Bakersfield cactus…." The transplanted plants "exhibited substantial growth in the form of new pads; all 10 of the clumps and 12 of the shed pads were alive and 4 of the clumps and 1 of the pads produced flowers during the monitoring period. Given these results, we expect that these measures are highly likely to prevent the mortality of most clumps of the State Bakersfield cactus.

Seedlings, fruits, and disarticulated pads would be more difficult to detect during surveys. These individuals are likely to be destroyed during ground-disturbing activities. The loss of these propagules would occur over only a brief portion of the life of the project; this short-term loss of propagules would not measurably affect the long-term survival of the Bakersfield cactus within the action area.

Ground disturbance could also exacerbate the spread of non-native invasive plants. We address the control of non-native invasive plants in the following section.

Non-native Plant Species

Vehicles, ground disturbance, fire, grazing by livestock, and other human activities contribute to the dispersal of non-native plant species. These non-native plants include species that are already present in the California desert and newly introduced species. During years of below-average rainfall, non-native plants may reduce soil moisture to the degree that the survival rate of individuals of the Bakersfield cactus is reduced (Service 2011a), as we discussed in the Status of the Species section of this biological opinion. If non-native plants become too widespread and dense, fires have the potential to spread quickly over large areas, alter habitat conditions on a large scale, and kill individuals of the Bakersfield cactus.

We have previously described the Bureau and Alta Windpower's proposal to control non-native invasive plants and analyzed the likelihood of success of these measures in the Effects of the Action - Desert Tortoise section of this biological opinion. In general, we concluded that the proposed measures to clean vehicles and avoid the transport of materials contaminated with non-native invasive species onto the site are likely to reduce the introduction and spread of these species.

Alta Windpower proposes to use appropriate herbicides to treat infestations of noxious weeds in limited areas according to the directions on the label and in any permits. The biological assessment does not address any effects of herbicide use on the Bakersfield cactus. If herbicides contacted individuals of the Bakersfield cactus, we expect that the plants would be damaged or die. However, because the larger individuals of the Bakersfield cactus will be readily visible and herbicides will only be applied in spot treatments by trained individuals, we expect that Alta Windpower would be able to avoid these plants during the use of herbicides. Seedlings, fruits, and disarticulated pads would be more difficult to detect during the use of herbicides; these individuals are more likely to be exposed to herbicides and die as a result. The treatment of weed infestations would occur over the 30-year life of the project; consequently, the ongoing loss of seedlings, fruits, and disarticulated pads could have ongoing effects on the reproductive capacity of the Bakersfield cactus within the action area. Because Alta Windpower would use herbicides on a localized basis, we expect that propagules over most of the action area would be unaffected.

Personnel on Foot

Because of their smaller size, seedlings and fruits could be trampled by foot traffic. We expect that few would be injured or killed in this manner because personnel working in habitat of the Bakersfield cactus will receive specific training, which would increase their awareness of this potential threat. Additionally, individuals of the Bakersfield cactus near work areas would be surrounded by protective fencing during construction.

Workers are less likely to be present within habitat of the Bakersfield cactus during operation of the project because most of their activity would occur adjacent to the turbines and other facilities that have been cleared of vegetation. Some workers would be present within occupied habitat during some routine activities, such as picking up trash. We do not expect individuals of the Bakersfield cactus to be affected in a measurable manner by workers on foot during operations.

Decommissioning

We anticipate that decommissioning would have minimal effect on the Bakersfield cactus primarily because most activities are likely to occur in existing disturbed areas from which the Bakersfield cactus would likely be absent. If Alta Windpower disturbed habitat during decommissioning, it would follow the avoidance (for the Federal Bakersfield cactus) and avoidance and transplantation (for the State Bakersfield cactus) protocols that it would use during construction.

Climate Effects

Increases in atmospheric carbon are responsible for changes in climate; as we discussed previously in this biological opinion, climate change is likely to cause frequent and/or prolonged droughts with an increase of the annual mean temperature. Increased temperatures may adversely affect the Bakersfield cactus by increasing the amount of water it needs to survive; it may also affect pollinators. Decreased rainfall could result in increased competition for soil moisture between the Bakersfield cactus and non-native annual grasses; however, some potential exists that decreased rainfall would prevent excessive amounts of non-native grasses from sprouting and growing to the point where they would compete with the Bakersfield cactus.

We also previously discussed the fact that the permanent disturbance of 81 acres of habitat would reduce the amount of carbon that the action area would be able to sequester. The proposed action is unlikely to affect the Bakersfield cactus in a measurable manner with regard to carbon sequestration for the same reasons we discussed for the desert tortoise. As we concluded in that discussion, the effects of any changes in carbon sequestration as a result of the proposed action would be so dispersed that we could not link it to any specific impacts to the Bakersfield cactus within or outside the action area.

We also discussed the potential for the project's wind turbines to contribute to warming of the area. We discussed the effects of warmer temperatures on the Bakersfield cactus previously in this section. As we concluded for the desert tortoise, we cannot determine whether the proposed project, in combination with adjacent wind facilities, would cause an increase in temperature; differences in topography and daily wind patterns between the study area and the project site may produce dissimilar results from those found by Zhou et al. (2012).

Dust

The 5-year review (Service 2011a) notes that dust may adversely affect the Bakersfield cactus. Dust generated by vehicles or using the roads (both paved and unpaved, although unpaved roads would likely generate more dust), can cover plants and interfere with their physiological functions. If the coating of dust is sufficiently thick and persists over a long enough period of time, the vigor, reproduction, and survival of the plant could be impaired.

Lewis (2013) studied the effects of dust from an unpaved road on the shrubby reed-mustard (*Hesperidanthus suffrutescens*) and concluded “that road dust reduces fruit set through both a disruption in pollination and reduced physiological processes.” Dust may affect pollination dissuading pollinators from entering the area or by coating flowers to the extent that pollination cannot occur. The Service (2011a) generally discusses the low rate of sexual reproduction in the Bakersfield cactus. At this time, we do not know if this rate is a normal condition for the taxon or a result of air pollution, dust, or other factors.

The impacts of dust would be greatest near roads, in areas traversed by numerous roads, and in construction areas. Ground disturbance during construction would likely generate more dust than routine use of the project area’s roads during operations.

Wind would carry dust into the habitat outside the project’s boundaries. We do not have any information on the number and distribution of the Bakersfield cactus outside of the project area.

The Bakersfield cactus may be more susceptible to dust because the plants are long lived; therefore, dust can, to some degree, accumulate on the pads. The Bureau and Alta Windpower have proposed to use non-toxic pallatives and water to reduce the amount of dust from roads and construction areas. The Bureau and Alta Windpower have also proposed to spray water on any individual Federal Bakersfield cactus that seems to have accumulated dust after construction. Given this measure and the relatively short time for construction (when most dust would be generated), we do not expect dust to have a measurable adverse effect on the Bakersfield cactus.

If Alta Windpower sprays water on individuals of the Federal Bakersfield cactus, the potential exists that the additional water may prompt the growth of annual pants in the immediately adjacent area. We do not expect such local growth of annual plants would have a measurable effect on the Bakersfield cactus; the watering may prove beneficial to the Bakersfield cactus, particularly in a year with below-average rainfall.

Effects on Recovery

The Alta East project site is not located in an area that the Service currently considers important to the long-term conservation of the Bakersfield cactus. Our view of the importance of this area may change once the taxonomic issues regarding this taxon are resolved. Regardless of how the taxonomic issues are resolved, the proposed measures to avoid all of the individuals of the Federal Bakersfield cactus and to avoid or transplant any individuals of the State Bakersfield cactus (and the success of at least one past transplanting effort) should ensure that implementation of the proposed action will not measurably affect the recovery of the species.

Summary of the Effects of the Proposed Action on the Bakersfield Cactus

The regulatory definition of "to jeopardize the continued existence of the species" focuses on how the proposed action would affect the reproduction, numbers, or distribution of the species being considered in the biological opinion. For that reason, we have used those aspects of the Bakersfield cactus' status as the basis to assess the overall effect of the proposed action on the species.

Additionally, we determine whether a proposed action is likely "to jeopardize the continued existence of the species" through an analysis of how a proposed action affects the listed taxon within the action area based in relation to the range of the entire listed taxon. For the Bakersfield cactus, this process involves considering the effects at the level of the action area and then for the range of the listed taxon. Logically, if an aspect of the proposed action is unlikely to cause a measurable effect within the action area, it cannot affect the remainder of the range.

Reproduction: Some potential exists for the proposed action to reduce the ability of the Bakersfield cactus to reproduce sexually because dust generated by ground-disturbing activities and vehicle use on roads could interfere with pollination. We expect the most severe effects of dust to occur for a short period of time while the project is under construction; during operation, the effects of dust on reproduction are likely to be substantially less. The Bakersfield cactus would continue to be able to reproduce through disarticulation of pads. Consequently, the proposed action is unlikely to appreciably affect the reproduction of the Bakersfield cactus.

Numbers: We expect that construction and operation of the project are unlikely to result in the mortality of any larger individuals of the Federal Bakersfield cactus. Smaller individuals, seedlings, and shed pads may be missed during surveys and destroyed, particularly during construction. The loss of these smaller plants during construction would not affect the overall number of individuals of the Federal Bakersfield cactus because we expect that relatively few would be destroyed given the small number of larger individuals, the relatively small area that would be disturbed, and the short period of time over which disturbance would occur. Consequently, the proposed action is unlikely to appreciably diminish the numbers of the Federal Bakersfield cactus.

Because they are more common in the action area, at least some individuals of the State Bakersfield cactus are likely to be transplanted during construction; based on the results of a transplantation study, we expect that most of the transplanted individuals are likely to survive. Alta Windpower would avoid most other large individuals of the State Bakersfield cactus during construction and operation. The proposed action would affect smaller individuals, seedlings, and shed pads in the same manner as we described for the Federal Bakersfield cactus, except that, given the greater number of larger individuals, we would expect a relatively greater number of these individuals to be destroyed. Even though a greater number of Bakersfield cactus of the

State form would be destroyed relative to the Federal form, we expect that the total number of individuals would be a small component of the number of plants onsite because most of the area would not be disturbed by construction, operations, or maintenance. Consequently, the proposed action is unlikely to appreciably diminish the numbers of the State Bakersfield cactus.

Distribution: The permanent loss of 81 acres of desert tortoise habitat would not appreciably reduce the distribution of the Bakersfield cactus. The loss of habitat would occur in small patches relative to the size of the action area and the range of the species as a whole.

CUMULATIVE EFFECTS

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

Any future action occurring on lands managed by the Bureau will require consultation with the Service, pursuant to section 7(a)(2) of the Act. Service staff reviewed the website for the County of Kern in March 2013 and found no non-federal projects in the action area that are reasonably certain to occur (Convery 2013). Consequently, we do not anticipate any cumulative effects with regard to the proposed action.

CONCLUSION

California Condor

After reviewing the current status of the California condor, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service’s biological opinion that the Bureau’s issuance of a right-of-way grant to Alta Windpower, for the Alta East Wind Project, as proposed, is not likely to jeopardize the continued existence of the species. We have reached this conclusion because:

1. Project activities are reasonably likely to result in the death of no more than one California condor as a result of being struck by a turbine blade over the life of the project because Alta Windpower will implement its proposed Condor Monitoring and Avoidance Plan. If this single bird has an egg or young nestling at the time of its death, this egg or young nestling may also die if the California Condor Recovery Program is not able to recover it.

2. Alta Windpower will implement an Adaptive Management Strategy if the number of California condors increases in the area, they change their flight patterns in a manner that brings them into the 16-mile detection perimeter, or the percentage of birds equipped with VHF transmitters drops below 70 percent of the southern California flock. We expect this strategy to include the use of radar or some other alternative to the Condor

Monitoring System that can detect California condors not equipped with VHF transmitters. If such a strategy cannot be developed, the Bureau will direct Alta Windpower to implement night-time only operations. Either option will prevent the deaths of additional California condors.

3. The loss of one California condor, and potentially the loss of an egg or young nestling in the unlikely event that a breeding bird was killed, is unlikely to affect substantially the trajectory of population trends range wide because the population of wild birds is continuing to increase through both captive breeding and reproduction in the wild. We anticipate the Service and other agencies and groups working on recovery will continue to release California condors until the primary threats to recovery (e.g., lead poisoning) have been reduced substantially or eliminated.

4. Alta Windpower has proposed to fund conservation measures that are likely to result in benefits to the California condor by addressing existing threats within its range.

Desert Tortoise

After reviewing the current status of the desert tortoise, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Bureau's issuance of a right-of-way grant to Alta Windpower, for the Alta East Wind Project, as proposed, is not likely to jeopardize the continued existence of the species. We have reached this conclusion because:

1. Project activities are likely to result in the deaths of relatively few desert tortoises over the life of the project because Alta Windpower will implement numerous measures to avoid and reduce mortalities.

2. The action area is located outside of any areas that the Service considers important to the long-term conservation of the species or linkages between such areas.

Bakersfield Cactus

After reviewing the current status of the Bakersfield cactus, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Bureau's issuance of a right-of-way grant to Alta Windpower, for the Alta East Wind Project, as proposed, is not likely to jeopardize the continued existence of the species. We have reached this conclusion because:

1. Project activities are unlikely to result in the loss of any larger individuals of the Federal Bakersfield cactus over the life of the project because Alta Windpower will avoid these plants during construction, operations, and maintenance.

2. Project activities are unlikely to result in the loss of many larger individuals of the State Bakersfield cactus over the life of the project because Alta Windpower will avoid most plants during construction, operations, and maintenance and transplant those that it cannot avoid. Past transplanting efforts have been successful.

3. The action area is located outside of areas that the Service considers important to the long-term conservation of the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife 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 and the avoidance and minimization measures proposed by the Bureau.

The measures described below are non-discretionary; the Bureau must include these measures as binding conditions of its right-of-way grant to Alta Windpower for the exemption in section 7(o)(2) to apply. The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau fails to require Alta Windpower to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the right-of-way grant, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Bureau must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 Code of Federal Regulations 402.14(i)(3)).

California Condor

The Service anticipates that over the 30-year life of the project, one California condor is likely to be killed as a result of the proposed action as a result of being struck by a turbine blade. If this single bird has an egg or young nestling at the time of its death, this egg or young nestling may also die if the California Condor Recovery Program is unable to recover it.

Desert Tortoise

Construction

We anticipate that all desert tortoises within the approximately 598 acres that would be permanently or temporarily disturbed during construction of the proposed wind facility are likely to be taken. We anticipate that most of the larger individuals within this area will be captured and moved from harm's way to immediately adjacent areas or, in some cases, collected and maintained in a holding pen until the weather is suitable for their release. Desert tortoises that are not detected during clearance surveys prior to construction may be killed or injured. Desert tortoises are also likely to be taken (either captured and moved from harm's way, killed, or injured) if they cross roads within the action area in locations where work is occurring.

We estimate that approximately 12 larger tortoises, 68 smaller desert tortoises, and 126 eggs may be present within the action area. These figures represent our estimate of the total number of desert tortoises within the action area. However, only 598 acres of 2,272-acre action area would be disturbed during construction; because desert tortoises are distributed unevenly across the action area, we cannot determine the number of individuals likely to be present in the areas to be disturbed or that may cross roads.

In addition to the uneven distribution of desert tortoises in the action area, additional constraints add to the difficulty of determining that number of desert tortoises that may be taken. Desert tortoises are cryptic (i.e., individuals spend much of their lives underground or concealed under shrubs), they are inactive in years of low rainfall, and their numbers and distribution within the action area may have changed since the surveys were completed because of hatchings, deaths, immigration and emigration. Hatchlings and eggs are even more difficult to detect because of their small size, the location of eggs underground, and the fact that their numbers vary depending on the season; that is, at one time of the year, eggs are present but they become hatchlings later in the year.

Determining the amount or extent of the form in which the take is likely to occur is also difficult. As we noted previously, most of the larger individuals within this area will be captured and moved from harm's way to immediately adjacent areas; in some circumstances, the desert tortoises will be collected and moved to holding pens until weather conditions are suitable for their release. Few larger desert tortoises are likely to be injured and killed because our prior experience is that the proposed avoidance and minimization measures will be effective. However, occasionally even larger animals remain undetected during clearance surveys or enter roads where they are likely to be crushed by vehicles.

Using the total number of desert tortoises within the action area as the anticipated level of take resulting from the proposed action would be inappropriate because a large portion of the action area would not be disturbed during construction and because it could not be exceeded under the circumstances we analyzed in this biological opinion. Therefore, we anticipate that the amount or extent of take resulting from the proposed action will be a subset of the number of desert tortoises and eggs estimated to be within the action area.

We expect that most of the eggs present in the 598 acres to be disturbed during construction will be destroyed. We cannot predict how many eggs desert tortoises will produce prior to the onset of construction. Biologists are unlikely to find many eggs because they are difficult to detect. For these reasons, predicting the number of eggs that may be taken is not possible.

Because we do not know the precise number of desert tortoises and eggs within the areas to be disturbed, cannot predict when desert tortoises would attempt to cross roads, and cannot predict how many animals and eggs the authorized biologists and biological monitors will find prior to and during construction, we cannot precisely quantify the anticipated amount or extent of take of desert tortoises and eggs resulting from construction of the proposed project. However, we anticipate that few larger desert tortoises will be injured or killed. Smaller desert tortoises are more likely to be injured or killed because they are more difficult to detect; we expect that most eggs are likely to be destroyed. Additionally, Alta Windpower is unlikely to find every desert tortoise that is injured or killed or egg that is destroyed during construction. For these reasons, we will consider the amount or extent of take to be exceeded if three desert tortoises are injured or killed during construction of the proposed project.

Because of the difficulty in estimating the number of desert tortoises that may be moved from harm's way and the fact that Alta Windpower will employ experienced biologists, approved by the Service and the Bureau, and sanctioned handling techniques, we do not expect that take, in the form of capture or collection, required to move desert tortoises out of harm's way during construction of the proposed project will result in mortality or injury of any individuals; in comparison to being injured or killed by construction work, moving individuals from harm's way will result in an overall benefit to the desert tortoise. Therefore, we are not establishing a reinitiation criterion for the number of individuals that would be moved out of harm's way during construction of the proposed project.

We anticipate that moving eggs from harm's way may result in the destruction of a portion of the eggs. Because some are likely to survive, we consider moving them from harm's way to be better for desert tortoises than leaving them in place in work areas, where they would most likely be destroyed. Therefore, we are not establishing a re-initiation criterion for the number of eggs that would be moved out of harm's way during construction of the proposed project.

Operation, Maintenance, and Decommissioning

A few desert tortoises may gain entry to fenced areas over the life of the project. More frequently, we expect that workers will encounter animals along the roads through the action area and at various project facilities during operation, maintenance, and decommissioning. Because of the numerous variables involved, we cannot predict how many desert tortoises operation, maintenance, and decommissioning may affect. Because Alta Windpower will implement measures to avoid injuring and killing these animals, most of these desert tortoises will be avoided or taken in the form of capture when they are moved from harm's way to nearby suitable habitat; however, the potential exists that a few are likely to be injured or killed over the life of the project.

We cannot reasonably estimate the numbers of desert tortoises that may breach exclusion fences or be encountered during operation, maintenance, and decommissioning of the wind facility because we do not know the number of animals in surrounding areas, how their numbers may change over time, how often they may be encountered by workers, or the fate of animals that encounter workers. However, we anticipate that few desert tortoises will be injured or killed, and will consider the amount or extent of take to be exceeded if two desert tortoises are injured or killed in any calendar year or if ten desert tortoises are injured or killed cumulatively during operation, maintenance, or decommissioning of the proposed project.

For the reasons discussed above in the Construction section, we are not establishing a re-initiation criterion for the number of individuals that would be moved out of harm's way during operation, maintenance, and decommissioning of the proposed project.

The exemption provided by this incidental take statement to the take prohibitions contained in section 9 of the Act extends only to the action area as described in the Environmental Baseline section of this biological opinion.

Bakersfield Cactus

Section 9 of the Act does not address the incidental take of listed plant species. Because the Act does not address the take of listed plant species, this biological opinion does not contain an incidental take statement, reasonable and prudent measures, or terms and conditions for this species.

Section 9(a)(2)(B)of the Act prohibits the removal and reduction to possession of endangered plants from areas under Federal jurisdiction; the malicious damaging, or destruction of endangered plants on any such area; or the removal, cutting, digging up, or damaging or destroying individuals of an endangered listed plant species on any other area in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

Our evaluation of the proposed action includes consideration of the avoidance and minimization measures proposed by the Bureau and Alta Windpower in the biological assessment (as modified through subsequent discussions with the Bureau and Alta Windpower) and reiterated in the Description of the Proposed Action section of this biological opinion. Any changes in these avoidance and minimization measures may constitute a modification of the proposed action that causes an effect to the California condor or desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of section 7(a)(2) of the Act (50 Code of Federal Regulations 402.16).

California Condor and Desert Tortoise

The Service believes that the avoidance and minimization measures proposed by the Bureau and Alta Windpower are sufficient to minimize the take of California condors and desert tortoises. Consequently, we have not identified any reasonable and prudent measures or terms and conditions that we consider necessary or appropriate to minimize take of the California condor or desert tortoise.

REPORTING REQUIREMENTS

Pursuant to 50 Code of Federal Regulations 402.14(i)(3), the Bureau must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement.

California Condor

The proposed reporting schedule and information contained in the "Annual Reporting on California Condor" measure for the California condor are sufficient. We request that the Bureau provide us with any recommendations that would facilitate the implementation of the avoidance and minimization measures while maintaining protection of the California condor.

Desert Tortoise

The proposed reporting schedule and information contained in measure 26 for the desert tortoise are sufficient.

Measure 19 includes the statement that "Alta Windpower will inform the authorized biologist, Service, and Bureau of any hazardous spills immediately and immediately clean them up;…." The Service does not need to be informed of every spill of hazardous waste. Rather, we recommend that the Bureau determine whether the effects of a spill and subsequent remediation are of sufficient magnitude such that they are likely to adversely affect listed species; if the Bureau determines that this circumstance has occurred, we recommend that it contact the Service at that time.

Bakersfield Cactus

We request that the Bureau or Alta Windpower provide information on the effectiveness of the proposed avoidance and minimization measures for this species.

DISPOSITION OF DEAD OR INJURED SPECIMENS

California Condor

The Bureau must condition the right-of-way grant as follows:

Alta Windpower must notify the Service and the Bureau within 24 hours of locating a dead or injured California condor during construction, operation, maintenance, or decommissioning of the project.

If an injured California condor is found, Alta Windpower must immediately contact the Service's California Condor Recovery Program staff at (805) 644-5185, the Ventura Fish and Wildlife Office at (805) 644-1766, and the Service's Office of Law Enforcement at the numbers below. The California Condor Recovery Program staff will respond, assess the injury, and determine the next course of action.

If a dead California condor is found or a mortality signal is detected, Alta Windpower must contact the Service's Office of Law Enforcement, Ventura Fish and Wildlife Office, and California Condor Recovery Program. The carcass must be left in place and secured, to the degree possible, to deter scavengers. The Service will provide further direction at the time of or soon after notification.

The Service's Office of Law Enforcement Contacts are:

Resident Agent in Charge Erin Dean, Torrance; Office: (310) 328-1516, Cell: (714) 493-3212; Electronic mail: erin_dean@fws.gov.

Resident Agent in Charge Rebecca Roca, Sacramento; Office: (916) 569-8488, Cell: (916) 616-3072; Electronic mail: rebecca_roca@fws.gov.

In the event Alta Windpower is unable to reach either of the above Law Enforcement contacts, the finding should be reported to Assistant Special Agent in Charge Dan Crum; Office: (916) 414-6660, Cell: (916) 396-9513.

Desert Tortoise

The proposed procedures for disposition of a dead or injured desert tortoise contained in measure 26 for the desert tortoise are generally sufficient. The appropriate contact is the Ventura Fish and Wildlife Office.

Measure 26 notes that Alta Windpower will transport desert tortoises with 'minor' injuries to a veterinarian but does not qualify the definition of minor. Desert tortoises can sustain major injuries and be capable of living in the wild, after appropriate treatment. In the event that any question exists over whether an injured desert tortoise should be taken to a veterinarian, the Bureau or Alta Windpower must contact the Service for guidance.

The Bureau or Alta Windpower must take care in handling dead specimens to preserve biological material in the best possible state for later analysis, if such analysis is needed. The Service will make this determination when the Bureau or Alta Windpower provides notice that a desert tortoise has been killed by project activities.

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.

We recommend that Alta Windpower participate in the regional program for the management of common ravens. The Desert Managers Group website or Service can provide more information on this program, the goal of which is to monitor and manage common raven use of the desert through a regional approach.

1. The Bureau and Alta Windpower have proposed to remove the carcasses of wildlife and livestock to reduce the attractiveness of the action area to California condors. The rationale behind this measure is sound but the biological assessment does not contain any information on how this measure would be implemented. We recommend that the Bureau include additional information on its methodology in its record of decision or right-of-way grant, as appropriate.

2. We recommend that the Bureau require Alta Windpower to ensure that all cables, wires, and strapping on all towers associated with the project (met towers, observation tower, VHF antenna towers) are secured and checked regularly to minimize the risk of entanglement of California condors.

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

REINITIATION NOTICE

This concludes formal consultation on the Bureau’s proposal to issue a right-of-way grant to develop and operate the Alta East wind energy project. As provided in 50 Code of Federal Regulations 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 9 of the Act. Consequently, we recommend that any operations causing such take cease pending re-initiation.

If you have any questions regarding this letter, please contact Jessica Rempel or Ray Bransfield or of my staff at (805) 644-1766, extension 370 and 317.

Appendices

1 - Mojave population of the desert tortoise (*Gopherus agassizii*). 5-year review: summary and evaluation. Available on disk or hard copy by request or at http://ecos.fws.gov/docs/five_year_review/doc3572.DT%205Year%20Review_FINAL.pdf.

2 - Map illustrating the 12 critical habitat units of the desert tortoise and the aggregate stress that multiple threats place on critical habitat.

3 - Map depicting the extent of the threat of invasive plants

4 - Bakersfield cactus (*Opuntia treleasei* = *Opuntia basilaris* var. *treleasei*) 5-year review: summary and evaluation. Available on disk or hard copy by request or at http://ecos.fws.gov/docs/five_year_review/doc3888.pdf.

5 - Methodology used to estimate the number of desert tortoises and eggs present in the action area.

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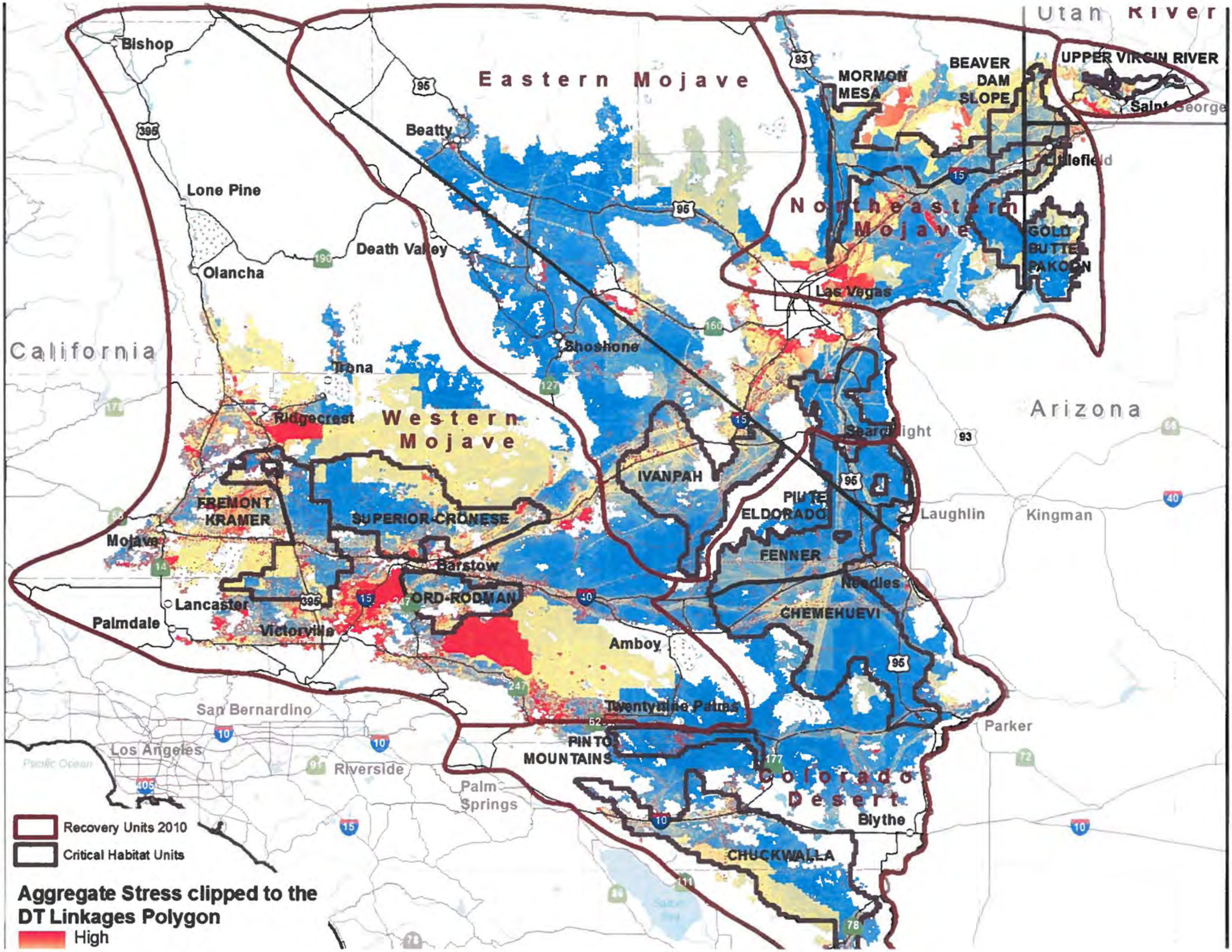
Eastern Mojave
Northeastern Mojave
Western Mojave
Colorado Desert
California
Arizona
Utah
Bishop
Lone Pine
Olancha
Death Valley
Beatty
Shoshone
Trona
Ridgecrest
Mojave
Lancaster
Palmdale
Victorville
Barstow
Amboy
Twentynine Palms
San Bernardino
Los Angeles
Riverside
Palm Springs
Blythe
Parker
Laughlin
Kingman
Searchlight
Needles
Las Vegas
Saint George
MORMON MESA
BEAVER DAM SLOPE
UPPER VIRGIN RIVER
GOLD BUTTE PAKOON
IVANPAH
PIUTE ELDORADO
FENNER
CHEMEHUEVI
FREMONT KRAMER
SUPERIOR-CRONESE
ORD-RODMAN
PINTO MOUNTAINS
CHUCKWALLA
Pacific Ocean
Recovery Units 2010
Critical Habitat Units
Aggregate Stress clipped to the DT Linkages Polygon
High

RIVER
UPPER VIRGIN RIVER
Saint George
BEAVERDAM SLOPE
NORTH-EAST MOJAVE
WESTERN MOJAVE
Bishop
Beatty
Littlefield
Lone Pine
MORMON MESA
GOLD BUTTE PAKOON
Death Valley
Olancha
Las Vegas
Shoshone
Trona
Ridgecrest
Searchlight
IVANPAH
PIUTE ELDORADO
Kingman
Laughlin
SUPERIOR-CRONESE
Mojave
FREMONT KRAMER
Barstow
FENNER
Needles
ORD-RODMAN
Lancaster
CHEMEHUEVI
Palmdale
Victorville
Amboy
Twentynine Palms
San Bernardino
Los Angeles
Parker
Riverside
PINTO MOUNTAINS
Palm Springs
COLORADO DESERT
Blythe
CHUCKWALLA
Salton Sea
Pacific Ocean
Critical Habitat Units
Recovery Units 2009
USGS Human Footprint Model
Exotic Plant Invasion Risk
High : 3

Appendix 5. Methodology Used to Estimate the Number of Smaller Desert Tortoises and Eggs Present in the Action Area.

We used the life table contained in Turner et al. (1987) to estimate the number of smaller desert tortoises that may be present in the action area based on the upper confidence limit of the number of desert tortoises predicted by the U.S. Fish and Wildlife Service's (Service 2010) protocol. We predicted the numbers of animals that would likely occur in each size class using the expected percentages in each size class and the total number of animals that were actually found. The following table depicts these values.

Mean Carapace Length (mm) [1]	**Life-table Distribution (percentage)** [2]	**Number of Desert Tortoises Likely to Be Present in the Action Area** [3]
<60	39.7	31.9
60 – 99	32.0	25.7
100 – 139	10.7	8.6
140 – 159	2.3	1.9
160+	15.3	12.29
Total		80.3

[1] Modified from Turner et al. (1987). The biological assessment (Bureau of Land Management 2012) does not provide the sizes of the live desert tortoises that were detected in the action area. Because we have found that surveyors often do not detect desert tortoises below 160 millimeters in size (Service 2010), we combined the size classes used by Turner et al. above this size.

[2] In this column, we used the life-table distribution percentage from Turner et al. (1987) but split their 140 to 179 class in the middle and then combined the percentages for the size classes above 160 millimeters. (The 140 to 179 class in Turner et al. comprises 4.5 percent of the individuals in the population; for our calculations, we used 2.3 percent.)

[3] We used the upper confidence limit as the number of desert tortoises in the greater-than-160-millimeter class. (The biological assessment does not provide the sizes of the desert tortoises that were detected nor define how the surveyors determined whether the observed desert tortoises were adults or juveniles. Because most surveyors detect desert tortoises that are greater than 160 millimeters in length, we have assumed that all 5 individuals were in the largest size class.) We then used the equation $12.29/15.3 = x/100$ to derive the total number of desert tortoises based on 12.29 animals being in the 160+ size class. Finally, we used the equation (% in size class)/100 = $x/80.3$ to derive the number of desert tortoises likely to occur in the remaining size classes.

Desert tortoises can produce from one to three clutches of eggs per year. On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. We established our estimate of the number of eggs that may be present in the action area, by assuming that 6 of the desert tortoises greater than 160 millimeters in length were females of reproductive age and then predicted that each of those females produced 21 eggs. That is, we assumed that each female laid three clutches of eggs with seven eggs in each clutch. Based on these assumptions, we predicted that the action area may contain up to 126 eggs.

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