Public Comment Card

Tylerhorse Wind Project DEIS/PA

Commentor Name: Antoinette Pappas Date: 11 Jul 14

Agency/Organization Affiliation: None

Address:

Comment: Sorry, I missed the presentation. I was curious how this would benefit Rosamond.

What's the point of this project? Is it just to spend excess $?

By submitting a scoping comment you will receive a copy of the FEIS/PA. Please indicate the format you would prefer:

☐ Compact Disk (CD) or ☒ Hardcopy No copy needed

Cristina Gispert

From:
Sent:
To:
Subject:

Another Tylerhouse comment which was sent to Sara Parsons aswell.

Cedric C. Perry

Project Manager

Bureau of Land Management (BLM)

22835 Calle San Juan De Los Lagos

Moreno Valley, Ca. 92553

Office # 951-697-5388

Cell Ph # 951-208-5794

---------- Forwarded message ----------
From: **Aubrey Novak** <beautynereid@msn.com>
Date: Tue, Jul 15, 2014 at 6:46 PM
Subject: Tyler Horse Wind Project Comments
To: "cperry@blm.gov" <cperry@blm.gov>
Cc: "sara.parsons@iberdrolaren.com" <sara.parsons@iberdrolaren.com>

Tyler Horse Wind Project

To whom it may concern:

I am writing to express my concerns about the proposed wind project as mentioned above. I am a property owner of property located very near the northern border of BLM land section 24. There is a residence on this property that has been there for the past 39 years. My parents are currently residing in the residence and the location of the windmills in the north Eastern section of “section 24” creates extreme concern. I am listing my concerns below:

1. There is no mention of the fact that there is a residence that will be directly impacted in the DRAFT PLAN AMENDMENT/ ENVIRONMENTAL IMPACT STATEMENT. There is an extreme concern regarding the noise impact and the flicker effect of the lights from the windmills. The Manzana project has already increased the noise levels at the residence and this project is significantly farther away then this proposed project.

2. There is no mention about safety concerns such as ice throw which has been documented to be an issue in cold climates. The elevation of section 24 does have cold weather during the winter that includes snow and ice. The following studies have discussed this safety issue. There have been instances in which ice has been thrown from the blade of a windmill up to several hundred yards. Here are the articles:

a. Wind Turbine Icing and Public Safety – a Quantifiable Risk?: Colin Morgan and Ervin Bossanyi of Garrad Hassan, 1996.
b. [2] Assessment of Safety Risks Arising From Wind Turbine Icing: Colin Morgan and Ervin Bossanyi of Garrad Hassan, and Henry Seifert of DEWI, 1998.
c. [3] Risk Analysis of Ice Throw From Wind Turbines: Henry Seifert, Annette Westerhellweg, and Jürgen Kröning of DEWI, 2003.
d. [4] State-of-the-Art of Wind Energy in Cold Climates: produced by the International Energy Agency, IEA, 2003.
e. [5] On-Site Cold Climate Problems: Michael Durstewitz, Institut fur Solare Energieversorgungstechnik e.V. (ISET), 2003.
f. [6] Wind Energy Production in Cold Climate: Tammelin, Cavaliere, Holttinen, Hannele, Morgan, Seifert, and Säntti, 1997.

3. The daily access to my property and the residence has been through a dirt road directly through section 24. This access has been in place for the past 39 years. There is mention in the impact statement that there will be fences used. This could cut off the access to my property which would not be acceptable as there is no other access to the property.

4. The view from my property will be significantly altered by these extremely large windmills.

5.I received no notice of this proposed project.

6.There will be significant traffic increase and dust during the construction phase of this project.

Thank you for your time and considerations regarding these concerns.

Naomi Novak

Public Comment Card

Tylerhorse Wind Project DEIS/PA

Commentor Name: Barbara Rose Hoffman Date: 7/13/2014

Agency/Organization Affiliation:

Address: PO BOX 84 Mojave CA 93502

Comment:

I spoke @ the 6/18/2014 Public meeting in Mojave. My concerns relative to the development of the Tylerhorse Wind Project and expressed @ the 6/18/2014 were as follows

1. Interuption of Migratory Bird patterns that would travel in areas of the Wind Turbines
2. Displacement of wildlife residing in the area of development disruption
3. Air disruption during construction possibly releasing Valley Fever spores
4. Water consumption to address mitigation issues during a severe drought season
5. Release of CO2 during construction vehicles and concrete patch plants
6. Possible disruption of Mustang occupation areas

By submitting a scoping comment you will receive a copy of the FEIS/PA. Please indicate the format you would prefer:

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Thank you

Barbara Hoffman

CENTER *for* BIOLOGICAL DIVERSITY *Because life is good.*

protecting and restoring natural ecosystems and imperiled species through science, education, policy, and environmental law

via email and USPS

7/17/2014

Cedric Perry,
BLM Project Manager,
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blm_ca_tylerhorse_wind_project@blm.gov
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Re: Comments on Draft Plan Amendment & Draft Environmental Impact Statement for the Tylerhorse Wind Project Publication Index Number: BLM/CA/PL-2014/014+1793; NEPA Tracking Number: DOI-BLM-CA-CAD000-2014-0001-EIS, April 2014

Dear Mr. Perry

These comments are submitted on behalf of the Center for Biological Diversity's ("Center') 775,000 online activists and members regarding the Draft Plan Amendment & Draft Environmental Impact Statement for the Tylerhorse Wind Project Publication Index Number: BLM/CA/PL-2014/014+1793; NEPA Tracking Number: DOI-BLM-CA-CAD000-2014-0001-EIS. April 2014.

Introduction

The development of renewable energy is a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist California in meeting emission reductions. The Center strongly supports the development of renewable energy production, and the generation of electricity from wind power. However, like all projects, proposed wind power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission corridors and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

The proposed project is described as an application for a Right-of-Way (ROW) authorization to construct, operate, maintain, and decommission, up to 60-Megwatts (MW) of wind energy on approximately 1,207-acres of BLM land in the Tehachapi Mountains in Kern County California. It would include up to 40 wind turbines and also access roads, a 34.5 kV energy collection system, supervisory control and data acquisition (SCADA) system, fiber optic communications, and fencing. It would share an existing operations and maintenance building with the adjacent and previously approved Manzana Wind Energy Project on private lands.

Unfortunately, the Draft Environmental Impact Statement for the proposed plan amendment and right-of-way application fails to provide adequate identification and analysis of the significant impacts to California condor, golden eagle, other avian species, bats, desert tortoise, rare plants and plant

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communities, ephemeral streams and washes other biological resources, cumulative and growth inducing impacts of the project, and lacks consideration of a reasonable range of alternatives. In addition, the agencies have failed to fully examine in impact of the proposed plan amendment (and other similar proposed plan amendments) that would result in industrial sites continuing to sprawl across the California Desert Conservation Area within habitat that should be protected to achieve the goals of the federal bioregional plans as a whole and specifically habitat that is essential to the recovery of the endangered California condor as well as protecting other threatened and fully protected species including but not limited to golden eagles and Swainson's hawks..

Purpose And Need and Project Description are Too Narrowly Construed and Unlawfully Segment the Analysis

Agencies cannot narrow the purpose and need statement to fit only the proposed project and then shape their findings to approve that project without a "hard look" at the environmental consequences. To do so would allow an agency to circumvent environmental laws by simply "going-through-the-motions." It is well established that NEPA review cannot be "used to rationalize or justify decisions already made." 40 C.F.R. § 1502.5; *Metcalf v. Daley*, 214 F.3d 1135, 1141-42 (9th Cir. 2000) ("the comprehensive 'hard look' mandated by Congress and required by the statute must be timely, and it must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made.") As Ninth Circuit noted an "agency cannot define its objectives in unreasonably narrow terms." *City of Carmel-by-the-Sea v. U.S. Dept. of Transportation*, 123 F.3d 1142, 1155 (9th Cir. 1997); *Muckleshot Indian Tribe v. U.S. Forest Service*, 177 F. 3d 900, 812 (9th Cir. 1999). The statement of purpose and alternatives are closely linked since "the stated goal of a project necessarily dictates the range of 'reasonable' alternatives." *City of Carmel*, 123 F.3d at 1155. The Ninth Circuit recently reaffirmed this point in *National Parks Conservation Assn v. BLM*, 586 F.3d 735, 746-48 (9th Cir. 2009) (holding that "[a]s a result of [an] unreasonably narrow purpose and need statement, the BLM necessarily considered an unreasonably narrow range of alternatives" in violation of NEPA).

The purpose behind the requirement that the purpose and need statement not be unreasonably narrow, and NEPA in general is, in large part, to "guarantee[ ] that the relevant information will be made available to the larger audience that may also play a role in both the decision-making process and the implementation of that decision." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). The agency cannot camouflage its analysis or avoid robust public input, because "the very purpose of a draft and the ensuing comment period is to elicit suggestions and criticisms to enhance the proposed project." *City of Carmel-by-the-Sea*, 123 F.3d at 1156. The agency cannot circumvent relevant public input by narrowing the purpose and need so that no alternatives can be meaningfully explored or by failing to review a reasonable range of alternatives.

The BLM's purpose and need for the proposed Tylerhorse wind project is "to respond to a FLPMA ROW application submitted by Heartland to construct, operate, maintain, and decommission a wind energy facility and associated infrastructure on public lands administered by the BLM in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws and policies" (DEIS at 1-2)

The DEIS notes that an amendment to the CDCA Plan is needed in order to approve the project and identifies the proposed Action as Alternative 1 and BLM's purpose and need is very narrowly construed to the proposed project itself, a reduced acres and megawatt project alternative, two no project alternatives and one no action alternative. The purpose and need provided in the DEIS is impermissibly narrow under NEPA for several reasons, most importantly because it forecloses meaningful alternatives review in the DEIS. The purpose and need must be broadened so that the BLM can review a reasonable

range of alternatives, including for example alternate sites and distributed renewable energy production. Because the purpose and need and the alternatives analysis are at the "heart" of NEPA review and affect nearly all other aspects of the EIS, on this basis and others, BLM must revise and re-circulate the DEIS.

In its discussion of the need for renewable energy production the DEIS fails to address risks associated with global climate change in context of including both the need for climate change mitigation strategies (e.g., reducing greenhouse gas emissions) and the need for climate change adaptation strategies (e.g., conserving intact wild lands and the corridors that connect them). All climate change adaptation strategies underline the importance of protecting intact wild lands and associated wildlife corridors as a priority adaptation strategy measure including the State of California[1], especially in areas that are key habitat for critically endangered species including the California condor, which is on the rebound from extinction and expanding its range.

The impacts to avian species, fragmentation of habitat, loss of connectivity for terrestrial wildlife, and introduction of predators and invasive weed species associated with the proposed project in the proposed location may run contrary to an effective climate change adaptation strategy. Siting the proposed project in the proposed location impacting ecologically functioning ecosystems, occupied habitat and important habitat linkage areas, desert washes and other fragile desert resources could undermine a meaningful climate change adaptation strategy with a poorly executed climate change mitigation strategy. Moreover, the project itself will emit greenhouse gases during construction and manufacturing in particular and the DEIS contains no discussion of ways to avoid, minimize or off-set these emissions although such mitigation is clearly necessary. The way to maintain healthy, vibrant ecosystems is not to fragment them and reduce their biodiversity.

Alternatives Analysis is Inadequate

The alternatives analysis is inadequate even with the inclusion a slightly smaller 55.5 MW project alternative. At least one alternative should include microsited turbines to avoid impacts to sensitive avian species.. Moreover, other alternatives should be considered for example, siting on previously degraded lands. In addition, the Notice and the DEIS should have considered distributed renewable energy alternatives, a no-build alternative that would focus on programs to increase efficiency and conservation efforts which could more than make up in energy savings the power that would be produced by this project, and other alternatives that could avoid impacts of the proposed project as well as impacts of the associated transmission lines.

The DEIS failed to adequately address any off-site alternative that would significantly reduce the impacts to biological resources including the California condor, golden eagle and their occupied habitat, and other special status species including Swainson's hawks and other raptors. The Center urges the BLM to revise the DEIS to adequately address these and other issues detailed below and then to re-circulate both a revised Notice and a supplemental DEIS for public comment.

The DEIS Does Not Adequately Describe Environmental Baseline

BLM is required to "describe the environment of the areas to be affected or created by the alternatives under consideration." 40 CFR § 1502.15. The establishment of the baseline conditions of the affected environment is a practical requirement of the NEPA process. In *Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988), the Ninth Circuit states that "without establishing . . . baseline conditions . . . there is simply no way to determine what effect [an action] will

1 http://www.climatechange.ca.gov/adaptation/strategy/index.html

have on the environment, and consequently, no way to comply with NEPA." Similarly, without a clear understanding of the current status of these public lands BLM cannot make a rational decision regarding proposed project. *See Center for Biological Diversity v. U.S. Bureau of Land Management, et al*., 422 F. Supp. 2d 1115, 1166-68 (N.D. Cal. 2006) (holding that it was arbitrary and capricious for BLM to approve a project based on outdated and inaccurate information regarding biological resources found on public lands).

The DEIS fails to provide adequate baseline information and description of the environmental setting in many areas including in particular the status of rare plants, animals and natural communities including California condors, golden eagles, desert tortoise, burrowing owls and other imperiled and common desert species.

The baseline descriptions in the DEIS are inadequate particularly for the areas where surveys were not performed in the appropriate season, were only two days long, or not performed at all. As discussed below, because of the deficiencies of the baseline data for the proposed project area, the DEIS fails to adequately describe the environmental baseline. Many of the rare and common species and habitats that may be significantly affected have incomplete and/or vague on-site descriptions that make determining the proposed project's impacts difficult at best. Some of the rare species/habitats baseline conditions are totally absent and as a result no impact assessment is provided either. A supplemental document is required to fully identify the baseline conditions of the site, and that baseline needs to be used to evaluate the impacts of the proposed project.

Failure to Identify and Analyze Direct and Indirect Impacts to Biological Resources

The DEIS fails to adequately analyze the direct, indirect, and cumulative impacts of the proposed project on the environment. The Ninth Circuit has made clear that NEPA requires agencies to take a "hard look" at the effects of proposed actions; a cursory review of environmental impacts will not stand. *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1150-52, 1154 (9th Cir. 1998). Where the BLM has incomplete or insufficient information, NEPA requires the agency to do the necessary work to obtain it where possible. 40 C.F.R. §1502.22; *see National Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 733 (9th Cir. 2001) ("lack of knowledge does not excuse the preparation of an EIS; rather it requires [the agency] to do the necessary work to obtain it.")

Moreover, BLM must look at reasonable mitigation measures to avoid impacts in the DEIS but failed to do so here. Even in those cases where the extent of impacts may be somewhat uncertain due to the complexity of the issues, BLM is not relieved of its responsibility under NEPA to discuss mitigation of reasonably likely impacts at the outset. Even if the discussion may of necessity be tentative or contingent, NEPA requires that the BLM provide some information regarding whether significant impacts could be avoided. *South Fork Band Council of Western Shoshone v. DOI*, 588 F.3d 718 , 727 (9th Cir. 2009).

The lack of comprehensive surveys is particularly problematic. Failure to conduct sufficient surveys – providing only surveys for a single year or season - is inadequate to evaluate the resources and uses on this large of a project site. Delaying additional surveys to just prior to construction of the project also effectively eliminates the most important function of surveys - using the information from the surveys to avoid and minimize harm caused by the project and reduce the need for mitigation. Often efforts to mitigate harm are far less effective than avoiding and preventing the harm in the first place. In addition, without understanding the scope of harm before it occurs, it is difficult to quantify an appropriate amount and type of mitigation. For example, the DEIS fails to provide survey information for invertebrates or desert kit fox.

The DEIS fails to provide all of the information necessary for decisionmakers and the public to adequately review the proposed project. Therefore the impacts cannot be fully analyzed or mitigated appropriately or fully. For this reason alone, a supplemental or revised DEIS needs to be provided and additional alternatives are included (including a preferred alternative) that avoids and reduces the impacts to biological resources.

Avian Species and Risk Assessment

While the DEIS provides information on survey results, the risk assessment to avian species and collision with wind turbines is buried in the draft Bird and Bat Conservation Plan (DEIS Appendix C-4 starting at PDF pg. 396). It is unclear if this is the final risk assessment. Regardless, recent science shows that "No relationship between variables predicting risk from E[nvironmental] I[mpact] A[ssessments]s and actual recorded mortality was found" and more importantly that "EIAs are usually conducted at the scale of the entire wind farm. The correlation between predicted mortality and actual mortality must be improved in future risk assessment studies by changing the scale of these studies to focus on the locations of proposed individual wind turbine sites and working on a species specific level."[2] However, the DEIS fails to provide a much needed risk assessment based on micrositing (proposed individual wind turbine sites) by species. Indeed the BLM requirements in compliance with the Wind PEIS states "The site-specific NEPA analyses will include analyses of project site configuration and micrositing considerations, monitoring program requirements, and appropriate mitigation measures." (DEIS at Appendix C-J, PDF pg. 494). We could not find any analyses of project site configuration and micrositing considerations, which would help to reduce impact to species by analyzing the use of the propose project site by avian and bat species and designing the project to not site turbines in locations used by those species. We see the layout of the turbines on the site, but we see no evidence of whether or how the data on avian species was used to inform that layout. While the individual wind turbine analysis (microsite analysis) should be done prior to the DEIS in order to avoid and minimize environmental impacts, there is no indication in the DEIS that this was ever done. Providing the risk assessment information early in the environmental review process (and as part of the public review documents along with the DEIS) would then provide information that could also help inform additional siting alternatives that could also be designed to minimize impacts to rare, migratory and resident avian species.

Migratory Birds

The DEIS acknowledges that the Tylerhorse Wind project is located on the Pacific Flyway although it appears to downplay the importance of the proposed project area by stating "birding records do not indicate focused or well-defined migration patterns in the immediate area, but rather broad-front, scattered migration (Sapphos, 2011a)" (DEIS at PDF pg. 242). However, we could not find supporting statements in Sapphos, 2011 (Appendix C-1). Notably, the proposed project area also falls wholly within the boundaries of the globally important Antelope Valley Important Bird Area.[3] Since the 1970's this area has been recognized for its importance to resident, breeding and migratory birds[4]. It is also directly adjacent to another Important Bird Area – the Tehachapi Mountains.

Migratory birds are protected by the Migratory Bird Treaty Act of 1918 and the project must identify, analyze and address these impacts. Recent research has established that species such as golden eagles tend to hunt or migrate at or below ridgelines, potentially putting these species at risk especially for

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[2] Ferrer et al. 2011

3 http://ca.audubon.org/california-iba-interactive-site-map

4 http://netapp.audubon.org/iba/site/270

turbines that are deployed in ridge areas (Manville 2009). The proposed "mitigation" measures fail to provide any real mitigation, but instead appear to be "best management practices". Avoidance measures that should be required include having the proposed full-time biologist during daylight hours of turbine operation, to detect California condors, also detect golden eagles and other sensitive avian species as well as flocks of migrating birds. Upon detection, the biologist must have the ability to shut down the WTGs in portions of the site to help minimize and avoid collisions with WTGs. We have hopes that in the future, technologies such as avian radar systems or high resolution video camera technologies could be implemented for the same purposes, but currently the technology is not proven. The biologist would also be responsible for determining when the eagle or other sensitive avian species has left the project site so that operation of the WTGs could resume. We recognize that this current strategy may not be 100% effective for avoidance of target species and it would do nothing for nocturnal migration, but would provide some "minimization" of impacts.

The DEIS briefly discusses migratory birds, however, it fails to discuss or even include studies on nocturnal bird migration. Recent published scientific reports indicate that greater than 10% of nocturnal migrating songbirds migrating over ridges fly at elevations putting them within the area of rotating turbines.[5] An on-site nocturnal radar study in California's desert at San Gorgonio Pass prior to the wind energy development there, reported that "approximately 37 million birds passed through the Coachella Valley in the fall and an additional "approximately 32 million birds flew through the Coachella Valley during spring 1982," making the total in 1982 approximately 70 million birds. The study concludes "we estimate that approximately 256,000 birds/km could potentially come into contact with wind turbine generators each fall in the WRSA" and "approximately 182,000 birds/km potentially come into contact with wind turbine generators each spring."[6] The DEIS needs to analyze the on site impacts of the large turbines proposed at Tylerhorse on nocturnal and diurnal migratory songbirds and bats in comparison to data on a nearby (non-windfarm) site. It should also use the mortality estimates from existing adjacent wind farms, if available, to help estimate mortality from the proposed project.

California Condors

The critically endangered California condor is just now making its way back from the brink of extinction, thanks to substantial long-term investments from the public and private sector in recovery actions. It is untenable to imagine that a wind farm project would be proposed in an area into which California condors are expanding. No lethal "take" of California condors should be allowed. While the DEIS proposes steps to avoid and minimize the impacts to California condors in WIL-h, i, and j, it fails to address numerous additional issues. For example, grazing and hunting should not be allowed on the proposed project site, in order to eliminate the attraction of condors to the site through scavenging opportunities of animal carcasses.

Acquisition and protection of condor habitat in an area well away from threatening windfarms should also be included as mitigation, to assist in building a safe refugia for condors and in support of their recovery. A 5:1 ratio of conserved lands to impacted lands is a proper ratio for acquisition for such an endangered and wide-ranging species.

Raptors

Of the thirteen raptor species likely to be on site, twelve of them have been documented on site. The significantly high number/diversity of raptors indicates that this site is indeed good habitat for such

5 Mabee at al. 2006
6 McCrary, et al 1982

species. Raptor species on the proposed project site are protected under the federal Migratory Bird Treaty Act as well as California law. None of the impacts to raptors were adequately addressed in the DEIS.

Golden Eagle

The proposed project requires a BGEPA permit under the federal Act, and a Natural Communities Conservation Plan which is the only mechanism to allow for "take" of State fully protected species – which is the golden eagle's status under state law. While the project proponent has currently and inadvisably chosen not to pursue these key paths, and the DEIS fails to adequately address the issue of golden eagle collisions with turbines.

The Final Rule on Eagle Act Take Permits (74 FR 48635) establishes a "no net loss" standard for eagles. The Draft Bird and Bat Conservation Strategy for the proposed project recognizes that "while this document is not an Eagle Conservation Plan (ECP) developed strictly in accordance with each of the recommendations of the USFWS's Eagle Conservation Plan Guidance (ECP Guidance),[1] it will address potential risks to golden eagles and present avoidance and conservation measures aimed to reduce golden eagle take to the "no-net-loss" standard required by the Final Take Permit Regulations under 50 CFR 22.26 and 22.27" (DEIS, Appendix C-4, PDF pg. 321-322). Golden eagles have great fidelity to their nests and nesting territories. Project surveys results found no active nests within 10 miles of the project, yet three golden eagle nesting territories have been identified near the project site by the BLM.[7] Additionally, it is our understanding that recent golden eagle nest/territory surveys have been completed by BLM and the results of those surveys should be included in a revised DEIS.

The DEIS notes that WIL-1i will provide a Golden Eagle Conservation Plan (DEIS at PDF pg. 483) however WIL-1i says nothing about a Golden Eagle Conservation Plan (DEIS at PDF pg. 495-503) and instead is all about California condor avoidance. WIL-1p - Minimize Eagle Mortality (DEIS at PDF pg. 483) actually allows for at least one eagle mortality, does not provide any assurances that no more than one eagle would be killed, and fails to address injury to golden eagles completely. This is unacceptable.

The DEIS Appendix C-1 (PDF pg. 52) states that "several golden eagles were noted foraging within the project property" clearly establishing that golden eagles use the proposed project site. Regarding the nest surveys, data indicates that desert golden eagles do not reliably or successfully nest each year, especially during times of drought[8]. Based on this fact, and the nest/territory fidelity of golden eagles, the precautionary principle should be applied – even if no nesting was recently observed, given the ongoing drought the BLM cannot accurately concluded that no active nests are within 10 miles of the proposed project. Additionally, the National Golden Eagle Colloquium on March 2-3, 2010 attended by 85 participants from various agencies and golden eagle and raptor scientists from across the country also contradicts this analysis. The scientists concluded that "[b]uffers we currently recommend are at least 4 - 10 air miles from a golden eagle *territory*." (emphasis added). Also note that a territory encompasses nest site[9]. Indeed the DEIS documents ten golden eagle nests within 15 miles of the proposed project site (DEIS Appendix C-4 at PDF pg. 368). Based on the fact that a desert eagle territory ranges from 44-52 square miles[10], clearly and as confirmed by on-site observation, golden eagles territory or territories overlap the proposed project site In fact, the DEIS fails to identify the actual number of golden eagle territories that occur on the proposed project site.

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7 http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/cdd/cdcaplan.Par.15259.File.dat/CA_Desert_.pdf
8 http://www.wildlifeprofessional.org/western/raptor/TWS-WS_2011_Raptor_Symp_Feb08_1305_Bittner-web.pdf
9 National Golden Eagle Colloquium 2010
10 https://nrm.dfg.**ca**.gov/FileHandler.ashx?DocumentID=83964

Comparing densities of golden eagles from other parts of the country is inappropriate. The goal of the environmental review is to identify the impacts to the local environment that includes maintaining golden eagles across their natural range. Consequently impacting golden eagles in areas of low densities may have an even greater impact on the species than in areas with higher density; ignoring this issue fails the metric of maintaining eagle populations across their range.

We strongly urge that the DEIS be revised and re-circulated in order to reconsider impacts to golden eagles, and that alternatives, minimization, and mitigation measures be fully addressed before the project proponent seek "take" permits from the wildlife agencies, The agency should comprehensively re-evaluate the site and determine whether it should be abandoned in favor of other off-site alternatives or no-build alternatives due to unacceptable, unmitigable risk to golden eagles.

Red-Tailed Hawk and Other Raptors

For other raptors known to be documented or likely to be present on the site, many of those species are known to be vulnerable to turbine collision such as the red-tailed hawk. Many important questions remain unanswered including, for example, the following:

- How close are red-tailed hawk nests and other raptor species nests located to proposed wind turbines?
- Combined with nest survey results, is red-tailed hawk use (data from point count surveys) of the Tylerhorse Wind project considered reflective of a low or high density of this species as compared to other parts of the County or of the CDCA?
- Is the proposed Tylerhorse Wind project likely to result in impacts to the local population of red-tailed hawks from turbine collision and if so, how will these impacts be minimized?

These and other similar questions for each of the raptor species need to be addressed in a supplemental EIS, because of the potential for significant impacts to local (and migratory) raptor populations, which are simply not analyzed in the DEIS.

Swainson's Hawk

The State-listed threatened Swainson's hawk occurs on the project site both for foraging and migration (DEIS at PDF pg. 244). Yet we could find no avoidance and minimization measures for this species in the DEIS. The DEIS needs to fully address impact avoidance to these rare raptors, which are known to nest in the Antelope Valley. Indeed the Antelope Valley[11] is the southern-most documented nesting sites for this migratory raptor in California. Nesting presence in the Antelope Valley needs to be maintained and measures to avoid, minimize and mitigate impacts to this species must be fully considered in a revised and recirculated DEIS.

Burrowing Owl

The DEIS notes that burrowing owls were documented in the proposed project area (DEIS PDF pg. 251). Recent data from the statewide census identified that the Mojave desert harbors few Western burrowing owls.[12] Even more worrisome is the documented crash of burrowing owls in their former

11 http://www.prbo.org/calpif/htmldocs/species/riparian/swainsons_hawk.htm
12 Wilkerson and Siegel 2011

stronghold in the Imperial Valley. The Imperial Valley has had a documented decline of 27% from 2007to 2008 years[13], and a more recent 18% decline from 2011 to 2012 [14] resulting in an even more dire state for burrowing owls in California. Because burrowing owls are in decline throughout California, and now their "stronghold" is documented to be declining severely, the burrowing owls on this proposed project site (and on other renewable energy projects) become even more important to species conservation efforts. The recirculated or supplemental DEIS needs to evaluate the potential impact of the proposed project on this regional distribution of owls.

The DEIS needs to incorporate the most recent guidance from the California Department of Fish and Game on the impact evaluation and mitigation for burrowing owl[15]. The DEIS needs to include specific burrowing owl mitigation in case, if the project moves forward, burrowing owl are identified on site during pre-construction monitoring. Mean burrowing owl foraging territories are 242 hectares in size, although foraging territories for owl in heavily cultivated areas is only 35 hectares[16]. Regardless, the acquisition for conservation must adequately mitigate for the number of territories found on site, calculated by using the *mean* foraging territory size times the number of owls. Using the *mean* foraging territory size for mitigation calculations may not accurately predict the carrying capacity and may *overestimate* the carrying capacity of the proposed project site especially in this area of the Mojave desert. Lastly, because the carrying capacity for burrowing owls is tied to habitat quality, language should be included that mitigation lands that are acquired for burrowing owl be native habitats on undisturbed lands, not cultivated lands, which are subject to the whims of land use changes. The long-term persistence of burrowing owls lies in their ability to utilize natural landscapes, not human-created ones.

While "passive relocation" does minimize immediate direct take of burrowing owls, ultimately the burrowing owls' available habitat is reduced, and "relocated" birds are forced to compete for resources with other resident burrowing owls and may move into less suitable habitat, ultimately resulting in "take". Other renewable energy projects in the area have been required to construct two burrows for every burrowing owl burrow disturbed or destroyed and this strategy should be included in the supplemental DEIS.

Bats

The DEIS inadequately assesses potential impacts to bats. The DEIS states that no bat roosts were found on site, but provides inadequate information on migrating bats and incompletely evaluates bat foraging on site. In addition, the DEIS fails to address a potential impact that could be avoided – by selecting an appropriate color for the turbine towers. Studies have shown that the color of the typical turbine towers is key in attracting insects on which bats prey at significantly higher levels.[17]

Additionally data suggest that bat mortality at tall wind turbines is directly linked to nocturnal insect migrations[18], yet this issue is also not addressed in the DEIS and needs to be included in a supplemental DEIS. With the numerous bat species that are currently foraging or have potential to forage on the project site, the impact analysis is woefully inadequate.

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13 Manning 2009
14 http://www.iid.com/Modules/ShowDocument.aspx?documentid=8171
15 www.dfg.**ca**.gov/**wildlife**/non**game**/docs/BUOWStaffReport.pdf
16 USFWS 2003http://www.fws.gov/mountain-prairie/species/birds/wbo/Western%20Burrowing%20Owlrev73003a.pdf
17 Long 2011
18 Rydell 2010

Desert Kit Fox and American Badger

The DEIS fails to address adequate baseline information or impact analysis for desert kit fox or American badger. The desert kit fox and American badger are both protected as fur bearing mammals under California Code of Regulations Title 14 Section 460. The DEIS states that both species occur on site (DEIS at PDF pg. 240). One BLM renewable energy project was documented to have the first documented outbreak of canine distemper in desert kit foxes.[19] We believe the DEIS needs to address impacts to both of these species.

Avoidance measures for the American badger are provided (DEIS at PDF pg. 491), however, no analyses for the desert kit fox is included. The supplemental DEIS needs to discuss the desert kit fox in the context of their great site fidelity, challenges of "passive relocation" with this species that generally go to great effort to return to their on-site territories. The DEIS needs to estimate the number of desert kit fox on the project site, and analyze impacts to them from the proposed project. Recent BLM environmental review documents for a large-scale industrial project similar to the proposed project includes much more comprehensive evaluations of desert kit fox occupancy on the project sites and requires significantly greater avoidance, minimization and mitigation measures[20]. The DEIS should include an American Badger and Desert Kit Fox Monitoring and Management Plan that requires measures to be included but not limited to:

- Baseline desert kit fox census and population health survey, by characterizing the demography (e.g., size, structure, and distribution) of the kit fox population on the site and receiving areas, and a testing component in which researchers trap and test a representative subsample of the population for canine distemper, and gene rally describe animal health on the site and receiving areas.
- Incorporation of the baseline desert kit fox census and health survey findings into a cohesive management strategy that minimizes disease risk to kit fox populations; provides a program for tagging, radio-tracking and monitoring of a subset of displaced kit foxes during the construction phase to understand how displacement affects regional kit fox populations; specifically identifies preconstruction survey methods for kit foxes (and large carnivores e.g., badgers) in the Project area; describes preconstruction and construction-phase relocation methods from the site, including the possibility for passive and active relocation from the site (and outlines identified CDFW permit and MOU requirements for active relocation); coordinates survey findings prior to and during construction to meet the information needs of wildlife health officials in monitoring the health of kit fox populations; and includes contingency measures that would be performed if canine distemper were documented in the Project area or in potential relocation areas, and measures to address potential kit fox reoccupancy of the site • Implementation of the desert kit fox/badger management plan that includes preconstruction surveys, avoidance of active den complexes and implementation of measures to monitor, minimize and contain any canine distemper outbreaks.

On 10/22/13, the CDFW veterinarians docketed a draft outline of a new desert kit fox program at the California Energy Commission which identifies many concerns about project impacts and the desert kit

19 http://articles.latimes.com/2012/apr/18/local/la-me-0418-foxes-distemper-20120418
20 BLM 2012. McCoy PA-FEIS Vol. 1 - Chapter 4
http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/Solar.Par.89379.File.dat/Vol1_McCoy%20PAFEIS.pdf

fox[21]. According to the state, passive relocation or hazing activities conducted in an area experiencing or adjacent to distemper cases may enhance disease transmission and spread by multiple mechanisms. Many unanswered questions remain, and the American badger and Desert kit fox monitoring and management plan must include mechanisms to answer them:

- Do passively relocated animals re-establish territories adjacent to the solar site?
- Does this depend on the density or spatial distribution of foxes around a site.
- Do relocated foxes experience lower survival or different causes of mortality that might need to be addressed through mitigation efforts.
- Recursion rate – how likely are relocated foxes going to try to get back on site and return to former den areas?
- What's the demographic shifts of neighbors?
- Reproductive impact appears highly negative (n=1 relocated pair this year had den failure; most other dens were successful this year in producing pups).
- Are artificial dens helpful?
- What are the longer term translocation effects?

The answers to these questions are currently unknown. In addition, the State also identifies that the current monitoring is limited in scope and inadequate to address needs and methods and outcomes for relocation are not evaluated systematically or reported. The American badger and
Desert kit fox monitoring and management plan must address these issues.

The DEIS also fails to acknowledge that the American badger is also protected under California Code of Regulations, Title 14, Chapter 5, Section 460, which prohibits the take of the species for any reason. Therefore, measures to assure that no take occurs needs to be addressed in the American Badger and Desert Kit Fox Monitoring and Management Plan.

Cryptobiotic Soil Crusts Not Identified and Avoided.

The proposed project is located in the Mojave Air Pollution Control District, which is already in non-attainment for PM-10 particulate matter[22]. The construction of the proposed project further increases emissions of these types of particles because of the disruption and elimination of potentially hundreds of acres of cryptobiotic soil crusts which is a concern for air quality and human health (including the risk of valley fever). Cryptobiotic soil crusts are an essential ecological component in arid lands. They are the "glue" that holds surface soil particles together precluding erosion, provide "safe sites" for seed germination, trap and slowly release soil moisture, and provide CO_2 uptake through photosynthesis[23].

The DEIS does not describe the on-site cryptobiotic soil crusts. The proposed project will disturb an unidentified portion of these soil crusts and cause them to lose their capacity to stabilize soils, trap soil moisture and keep small soil particles from becoming airborne (PM_{10}). The DEIS fails to provide a map of the soil crusts over the project site, and to present any avoidance or minimization measures. It is unclear how many acres of cryptobiotics soils will be affected by the project. Satellite technologies have now improved to the point that these types of soils can be detected, and indeed the BLM is inventorying the cryptobiotic soils remotely in the Riverside-East Solar Energy Zone, as part of their monitoring

21 http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-07C/TN200995_20131022T141658_Exhibit_2005__CDFW_Outline_for_Proposed_Desert_Kit_Fox_Health_M.pdf

22 http://www.mdaqmd.ca.gov/index.aspx?page=355

23 Belnap 2003, Belnap et al 2003, Belnap 2006, Belnap et al. 2007

efforts. The revised or supplemental DEIS must identify the extent of the cryptobiotic soils on site and analyze the potential impacts to these essential desert ecosystem components as a result of this project.

The Project Fails Avoid Impacts to All Desert Washes and Ephemeral Streams

Because of the uniqueness of water resources in the desert, all desert washes and ephemeral streams should be avoided. As the BLM is aware desert washes are fragile and disturbance of the soils in these areas can significantly increase erosion and sedimentation. Although water is scarce and flooding infrequent in desert regions, ephemeral and intermittent streams are a significant ecosystem component and washes are critical to the survival of many native plants and animals. *See, e.g.*, Levick, et al. (2008). "Ephemeral and intermittent streams make up approximately 59% of all streams in the United States (excluding Alaska), and over 81% in the arid and semiarid Southwest (Arizona, New Mexico, Nevada, Utah, Colorado and California)." *Id.* at iii. Ephemeral and intermittent streams provide the same ecological and hydrological functions as perennial streams by moving water, nutrients, and sediment throughout the watershed. When functioning properly, these streams provide landscape hydrologic connections; stream energy dissipation during high-water flows to reduce erosion and improve water quality; surface and subsurface water storage and exchange; ground-water recharge and discharge; sediment transport, storage, and deposition to aid in floodplain maintenance and development; nutrient storage and cycling; wildlife habitat and migration corridors; support for vegetation communities to help stabilize stream banks and provide wildlife services; and water supply and water-quality filtering. They provide a wide array of ecological functions including forage, cover, nesting, and movement corridors for wildlife. Because of the relatively higher moisture content in arid and semiarid region streams, vegetation and wildlife abundance and diversity in and near them is proportionally higher than in the surrounding uplands. *Id.*

The use of washes for any of the proposed project facilities, including access roads and transmission should be prohibited as well as destruction of vegetation. Specifically, creation of a network of new roads in the washes to access turbines and infrastructure outside of the washes should be avoided because such roads would destroy vegetation and habitat, increase siltation, and destroy soil integrity.

Key Plans Not Provided

The DEIS relies on numerous "conservation" plans for on-site resources as avoidance and minimization, however only plan that is actually provided for public review (Draft Bird and Bat Conservation Strategy) and it is *draft* only. Absent finalized plans which the wildlife agencies have approved, it remains unclear if the "conservation" plans are actually adequate to minimize and mitigate the consequential impacts. And as noted above, because all of the significant impacts have not yet been identified and analyzed the draft plan cannot be adequate and must be updated once additional, supplemental environmental review is prepared and circulated for public review.

Other missing plans include but are not limited to:

- soil erosion and sedimentation control plan (DEIS at PDF pg. 266)
- Worker Education Awareness Program (DEIS at PDF pg. 487)
- Wildlife Mortality Reporting Program (DEIS at PDF pg. 487)
- California Condor Adaptive Management Strategy (DEIS at PDF pg. 487)
- Condor Monitoring and Avoidance Plan (DEIS at PDF pg. 495)
- Golden Eagle Conservation Plan (DEIS at PDF pg. 487)
- Raven Management Plan (DEIS at PDF pg. 488)
- Post-Construction Bird and Bat Species Mortality Monitoring Program (DEIS at PDF pg. 488)

- Burrowing Owl Mitigation and Monitoring Plan (DEIS at PDF pg. 488)

The DEIS fails to include important plans including but not limited to

- Weed Management Plan
- Habitat Restoration and Revegetation Plan
- Fugitive Dust Control Plans (construction and operation)
- Habitat Restoration/Revegetation Plan
- Desert Kit Fox and American Badger Plan

In the absence of these plans, it is impossible to evaluate the minimization of impacts and the actual impacts to the flora and fauna currently on the project site or the adequacy of proposed mitigation.

General Mitigation Acquisition Requirements Are Flawed

For a number of species – condor, golden eagle etc. - habitat acquisition to off-set impacts is not required. Even for those species where it is requisite (burrowing owl), any acquired habitat must already be inhabited by the same species for which mitigation is sought. This mitigation strategy ensures a *net decrease* in habitat for impacted species. To actually provide mitigation that staunches species' habitat losses, mitigation ratios must actually address the impacts to each species and must be high enough to fully mitigate the impacts to those species.[24] A *minimum* 5:1 mitigation is more appropriate for all habitat impacts to assure, not only that the project impacts are mitigated, but that the net losses of habitat for rare species are stopped.

West Mojave Plan

The DEIS misrepresents the governing land use plan; the WEMO Plan amendment to the CDCA Plan. We were shocked to see the DEIS state "The WEMO is a HCP pursuant to the federal ESA and an approved amendment to the CDCA Plan covering over 9 million acres in five (5) counties with the purpose of creating a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other sensitive species, as well as the natural communities in which they reside." (DEIS at PDF pg. 261). While there was a BLM CDCA plan amendment for the WEMO planning area, the HCP that was under development was never adopted by any county or approved by FWS. This fundamental inaccuracy in the DEIS calls into serious question whether BLM has actually taken a hard look at the environmental impacts or considered the projects consistency with the actual West Mojave Plan amendments as required by FLMPA and NEPA. BLM must fully and accurately consider whether the proposed plan amendment would be consistent with the West Mojave Plan amendment to the CDCA Plan – the DEIS does not show that it has done so to date.

Cumulative Impacts

Cumulative impacts analysis is a critical part of any NEPA analysis. Under NEPA, a cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. The Ninth Circuit requires federal agencies to "catalogue" and provide useful analysis of past, present, and

24 http://onlinelibrary.wiley.com/doi/10.1111/j.1526-100X.2008.00382.x/full
http://www.wcrc.govt.nz/mtwilliam/hearing/applicant/Mark%20Christensen%20-%20Biodiversity%20offset.pdf

future projects. *City of Carmel-By-The-Sea v. U.S. Dept. of Transp.*, 123 F.3d 1142, 1160 (9th Cir. 1997); *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 809-810 (9th Cir. 1999).

"In determining whether a proposed action will significantly impact the human environment, the agency must consider '[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment.' 40 C.F.R. § 1508.27(b)(7)." *Oregon Natural Resources Council v. BLM*, 470 F.3d 818, 822-823 (9th Cir. 2006). NEPA requires that cumulative impacts analysis provide "some quantified or detailed information," because "[w]ithout such information, neither courts nor the public . . . can be assured that the Forest Service provided the hard look that it is required to provide." *Neighbors of Cuddy Mountain v. United States Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1988); *see also id*. ("very general" cumulative impacts information was not hard look required by NEPA). The discussion of future foreseeable actions requires more than a list of the number of acres affected, which is a necessary but not sufficient component of a NEPA analysis; the agency must also consider the actual environmental effects that can be expected from the projects on those acres. *See Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 995-96 (9th Cir. 2004) (finding that the environmental review documents "do not sufficiently identify or discuss the incremental impact that can be expected from each [project], or how those individual impacts might combine or synergistically interact with each other to affect the [] environment. As a result, they do not satisfy the requirements of the NEPA.") Finally, cumulative analysis must be done as early in the environmental review process as possible, it is not appropriate to "defer consideration of cumulative impacts to a future date. 'NEPA requires consideration of the potential impacts of an action *before* the action takes place.'" *Neighbors*, 137 F.3d at 1380 *quoting City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1313 (9th Cir. 1990) (emphasis in original). Because the DEIS fails to adequately identify direct and indirect impacts to many public lands resources, particularly biological resources, water and air quality, the DEIS also inevitable fails to adequately address the cumulative impacts to these resources.

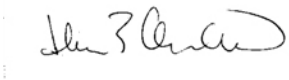
The NEPA regulations also require that indirect effects including changes to land use patterns and induced growth be analyzed. "Indirect effects," include those that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include *growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems*." 40 C.F.R. s.1508.8(b) (emphasis added). *See TOMAC v. Norton*, 240 F. Supp.2d 45, 50-52 (D.D.C. 2003) (finding NEPA review lacking where the agency failed to address secondary growth as it pertained to impacts to groundwater, prime farmland, floodplains and stormwater run-off, wetlands and wildlife and vegetation); *Friends of the Earth v. United States Army Corps of Eng'rs*, 109 F. Supp.2d 30, 43 (D.D.C. 2000) (finding NEPA required analysis of inevitable secondary development that would result from casinos, and the agency failed to adequately consider the cumulative impact of casino construction in the area); *see also Mullin v. Skinner*, 756 F. Supp. 904, 925 (E.D.N.C. 1990) (Agency enjoined from proceeding with bridge project which induced growth in island community until it prepared an adequate EIS identifying and discussing in detail the direct, indirect, and cumulative impacts of and alternatives to the proposed Project); *City of Davis v. Coleman*, 521 F.2d 661 (9th Cir. 1975) (requiring agency to prepare an EIS on effects of proposed freeway interchange on a major interstate highway in an agricultural area and to include a full analysis of both the environmental effects of the exchange itself and of the development potential that it would create).

The DEIS fails to include an analysis of the growth inducing cumulative impacts from this project. For example, the additional roads that would be required for proposed project construction would not only fragment the landscape, which is of biological concern, but would also open up greater access to an area that is currently limited.

Conclusion

The DEIS is inadequate because it omits important information regarding potentially significant impacts especially to California condor, golden eagles, and other rare and unique biological species and resources, fails to consider a range of alternatives that will avoid the impacts to sensitive biological resources, and fails to consider adequate minimization and mitigation measures for these resources. In addition, the BLM failed to accurately assess the proposed plan amendment in the context of the current, adopted land use plan for this area. On these bases, and others, the Center urges the BLM to revise the environmental review documents and provide a supplemental DEIS circulated for public review and comment that addresses all of the inadequacies detailed in our letter above. Please feel free to contact me with any questions.

Sincerely,



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Re: Draft EIS for Tylerhorse Wind Project

Dear Mr. Perry;

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the proposed Tylerhorse Wind Project (Project). These comments are submitted by Defenders of Wildlife (Defenders), Sierra Club and Audubon California.

Defenders has approximately 1.2 million members and supporters nationally including approximately 170,000 in California. Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, we employ science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions in order to impede the accelerating rate of extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

The Sierra Club is a national nonprofit organization of approximately 2.5 million members and supporters (over 380,000 who live in California) dedicated to exploring, enjoying, and protecting the wild places of the earth. The Sierra Club's concerns encompass protecting our lands, wildlife, air and water while at the same time rapidly increasing use of renewable energy to reduce global warming. While the Sierra Club works vigorously to create a clean energy future, we also believe this transition must be sustainable and renewable energy projects, like other forms of development, should be sited, constructed and operated to avoid and minimize harm to sensitive wildlife and wildspaces.

Now in its second century, Audubon connects people with birds, nature and the environment that supports us all. Our national network of community-based nature centers, chapters, scientific, education, and advocacy programs engages millions of people from all walks of life in conservation action to protect and restore the natural world. With over 150,000 members and supporters, Audubon California is the state program of Audubon.

Our organizations have a long history of promoting the conservation of public lands and their sensitive resources within the California Desert Conservation Area (CDCA). Since approximately 2009 we have actively participated in the planning and environmental review for a large number of renewable energy projects on public land as well as participating in the development of the Desert Renewable Energy Conservation Plan (DRECP) as a designated stakeholder.

As we transition toward a clean energy future, it is imperative for our future and the future of our wild places and wildlife that we strike a balance between addressing the near term impacts of large scale wind energy development with the long-term impacts of climate change on our biological diversity, fish and wildlife habitat, and natural landscapes. To ensure that the proper balance is achieved, we need smart planning for renewable power that avoids and minimizes adverse impacts on wildlife and wild lands. These projects should be placed in the least harmful locations, near existing transmission lines and already disturbed lands. We support the approval of renewable energy projects that are proposed in environmentally suitable locations and that will be sustainably developed, operated and decommissioned.

Defenders provided scoping comments on the Project in a letter to BLM dated August 12, 2011. Based on our review of the Project DEIS, we are pleased that essentially all of our scoping comments and recommendations have been addressed or incorporated into the project, such as specific surveys for various sensitive wildlife species, mitigation measures and specific design specifications for project facilities. We offer the following comments which are intended to assist BLM in developing a Final EIS that includes refinements to the Project, appropriate impact mitigation measures and that allows BLM to proceed quickly with a final decision.

1. General: The Project, involving approximately 1,200 acres of non-contiguous public land southwest of Mojave, California, and the construction and operation of 40 wind turbines, is located in the Tehachapi Wind Resource Area and in an area comprised largely of private land. Adjacent private land supports three large existing wind energy projects (i.e., Manzana Wind Energy Project, Pacific Wind and Pacific Wind Infill) which are located on approximately 18,000 acres.

The Project is located on public lands designated as Unclassified in the CDCA Plan, as amended. Unclassified public lands are generally of low conservation value and isolated from larger blocks of public land, and are potentially suitable for disposal through exchange or sale. The Project could be described as an in-fill development because it is located in the midst of the three above-named wind projects. We support development on lands of low conservation value. The project is in an area that is already mechanically disturbed by wind development. We also note that the Project will share existing facilities located on adjacent private land including access roads, staging areas, refueling areas, a concrete batch plant, an operations and maintenance facility, a collector substation, and a 220 kV transmission line. That being said, there is still the potential for impacts on avian species, especially raptors and migratory birds, and these impacts have not been effectively avoided, minimized or mitigated in the DEIS.

With better analyses and avoidance, minimization and mitigation measures, detailed in specific comments below, we hope that BLM can reach a final decision that approves the Project in an efficient and timely fashion. We also encourage the developer to use this project and the condor and golden eagle avoidance measures to raptor and migratory bird protection measures to the adjacent Manzana Wind Energy Project.

2. Alternatives to the Project: The Project, which BLM has identified as its Preferred Alternative, calls for 40 wind turbines on about 1100 acres. Alternative 2, the Modified Action, would be slightly smaller – 37 wind turbines located on approximately 1100 acres. This slight reduction in project size and power output would provide some reduction in potential impacts to the public using the Pacific Crest Trail. However, given the existing and planned wind projects in the area, we do not consider Alternative 2 as providing any significant benefits over the proposed Project.

3. Biological Resources – Impacts, Mitigation and Monitoring: Various surveys of wildlife occurring on or near the Project area have been conducted since about 2004 including more recent surveys for the desert tortoise, Mohave ground squirrel, birds and bats. Based on the results of these surveys, impacts to the desert tortoise and Mohave ground squirrel are not expected because none were observed on or adjacent to the Project or located on adjacent wind project sites.

Natural vegetation communities: Implementation of the Proposed Action would result in the direct disturbance of 190.9 acres of natural vegetation communities, or approximately 15.8 percent of the total Project area. This includes approximately 16.8 acres of Joshua Tree Woodland, 79.4 acres of Mojave Juniper Woodland and Scrub, 42.6 acres of Non-native Grassland, 2.3 acre of Mojave Desert Wash Scrub, and 49.8 acres of Mojave Mixed Woody Scrub. Following construction, portions of the WTG pad sites, unused portions of roads and the electrical collection system and extra workspace areas would be reclaimed. Therefore the total permanent vegetation disturbance would be 23.6 acres and temporary disturbance would be 167.3 acres. Joshua Tree Woodland is identified as a sensitive natural community within the project area.

Compensatory mitigation for permanent loss of 16.8 acres of Joshua Tree Woodland lands is proposed at a 1:1 ratio. Because it is considered the only sensitive plant community within the Project area, and is especially important to various raptors including the state-threatened Swainson's hawk, we recommend that the compensatory mitigation be increased to a ratio of 3:1 and directed to lands directly adjacent to other lands conserved for Swainson's Hawk foraging habitat in the Antelope Valley in Los Angeles or Kern County.

Impacts to Avian Species:
Although the DEIS concludes that the Project would pose a low risk to resident and migratory birds, adverse impacts may occur over its 30-year operational life on various species of special concern including the California condor, golden eagle, Swainson's hawk and burrowing owl. The

risk assessment in the DEIS is derived from the biological resources technical report for the Project submitted by the project applicant. Based on resident and migratory bird survey data we believe the risk to birds is greater than reported in the DEIS and the biological resources technical report. We recommend BLM revisit this issue in concert with experts from CDFW and USFWS and make any necessary changes in the risk assessment in the Final EIS. If the risk is determined to be higher, then the proposed impact avoidance and minimization measures should be increased commensurate with the degree of risk.

Avoidance, minimization and mitigation measures to address impacts to species of special concern are included in the DEIS. Below we provide comments on these mitigation measures including recommendations for additional measures for certain species.

California condor: The DEIS accurately describes the current distribution of the California condor relative to the Project and specifically that the nearest occurrence of a radio-tagged individual is approximately 3.9 miles. The DEIS also indicates the wildlife agencies anticipate the California condor will continue to expand its range into suitable habitat based on historic records and recently expanding populations in the Tehachapi region; the historic range of the condor is within 2.2 miles of the proposed project. Thus, it is likely that over 30 years, California condors would be subject to risk of mortality or injury due to collision with operating wind turbines. We consider all projects in the Tehachapi area to be of risk to California Condor, and that all risk to California must be avoided. This is best achieved by a consultation with the USFWS to prepare a biological opinion on what the impact of potential "take" of even one Condor at the project would be on the population and recovery of California Condor over the next 30 years, and what measures must be in place to fully avoid "take" to the extent possible as was prepared for Alta East. However, we are concerned that authorizing take of even one Condor at each wind energy project, as at Alta East, is not a compatible strategy for recovery of Condor nor for future permitting of wind projects in the area. We support a wind resource wide HCP or NCCP that engages all the wind projects in the wind resource area in the recovery of California Condor, and that considers and promises upgrades to the effectiveness of detection and avoidance strategies and technologies.

We appreciate high level of attention to measures intended to avoid and minimize impacts to California condors, such as the requirement to deploy a tested and operational detection system before construction is authorized. The detection and avoidance system is very similar to that of the Alta East project in the same wind resource area. It includes a radio-based detection system for radio equipped birds and an observation tower staffed by a qualified wildlife biologist for the life of the project. Furthermore, we are pleased that the impact avoidance measures include the authority of the wildlife biologist for the project to order curtailment of wind turbine rotation if a Condor comes within two-miles of turbine arrays. However, the DEIS indicates that only half of the wild California population are tracked using GPS transmitters and that such tracking provides some indication of condor use areas, but because half the population are not tracked, the current distribution of condors is considered larger than what is indicated by mapped GPS locations. Considering that the

Recovery Plan for California Condor does not call for all wild born Condors to be trapped and tagged with transmitting devices, and avoidance regimens that rely on these transmitting devices over the life of a wind project, the detection and avoidance system proposed may not be sufficiently effective as an avoidance strategy for the life of the project. Thus, we support human verification by an on-site qualified biologist followed by curtailment or shutdown of turbines as an effective failsafe strategy to any detection and avoidance regime.

Due to the critical importance of measures to ensure avoidance and minimization of impacts to the California condor, we recommend that BLM make the annual monitoring reports available to the public through the Project website. We also recommend that the applicant commit to similar California condor avoidance and minimization measures for their adjacent Manzana Wind Project.

Golden eagle: Golden eagle survey results from the adjacent Manzana wind project were used to a large degree in establishing use of the Project site. Those results established that golden eagles use the general area throughout the year both as residents and migrants. Resident golden eagles were observed foraging in the Project area in 2004, 2005, 2011, and were also observed during spring and fall migration. Fall season migrants were generally observed flying above 1,000 feet, but the more numerous residents frequently foraged lower over Joshua tree woodland and other habitats. During fall migration surveys conducted for the adjacent Manzana wind project, 45 golden eagles were observed during 474 hours of survey. During the spring season migration, 11 golden eagles were observed during 198 hours of survey. Surveys also confirmed that golden eagles spend the winter season in the area in addition to the resident population.

Despite the fact that golden eagle use of the project site was established based on the prior eagle use surveys described above, the project proponent used an input of zero eagle minutes for assessing eagle mortality risk at the site using the FWS's Bayesian model. This input resulted from three 30-minute Bird Use Count (BUC) surveys across the whole project area conducted in 2011-2012. During these surveys, no eagle occurrences were recorded and this information was used to inform the eagle risk assessment. However, the BUC surveys conducted by the project proponent and used as the underpinning for the eagle risk assessment do not utilize the recommended approach as detailed in the FWS's Eagle Conservation Plan Guidance (ECPG), Module 1 (See pp. 53-54 "Point count surveys). Specifically the ECPG makes the following recommendation:

> the Service recommends counts of 1, 2, or more hours duration instead of 20- to 40-minute counts typically used (Strickland *et al.* 2011). Longer counts also facilitate integration of other survey types (*e.g.*, development of utilization distribution profiles). Many raptor biologists have suggested that the likelihood of detecting an eagle during a 20- to 40-minute point count survey is extremely low in all but locales of greatest eagle activity and datasets generated by pre-construction point count surveys of this duration typically are replete with counts of zero eagles, resulting in unwieldy confidence intervals and much uncertainty.

Considering the surveys were of 30 minute duration, the inputs into, and thus the results from, the Bayesian model for the Tylerhorse Wind Project are uncertain and imprecise.

We recommend that the point count surveys be revised based on the methodology included in the ECPG, specifically that point count surveys are conducted for 1 hour or longer over at least 30% of the project area. (ECPG at p. 54) With new inputs from point count survey data with more certainty, the risk assessment should be revised to more accurately represent eagle mortality risk.

Even considering the uncertainty of the eagle mortality risk assessment, eagle mortality was estimated as 0.16 eagles/year which is more than the 0.03 eagles/year threshold, above which the FWS recommends seeking golden eagle take coverage. Considering the likelihood that eagle mortality risk may be even higher if new point count survey results are used as inputs in the Bayesian model, we strongly recommend the project proponent seekan eagle take permit following the ECPG. According to the DEIS, implementation of a FWS-approved ECP is required to address the potential take of eagles (WIL-1k1). As of now, the project proponent has not provided an ECP that will outline the conservation measures to avoid and minimize impacts on golden eagles and to meet the legal requirements of the Bald and Golden Eagle Protection Act. Due to the fact that the Manzana Wind Project is operated by the same parent development company, we encourage the project proponent to explore the possibility of seeking eagle take coverage for both projects.

Due to the uncertainty regarding the current risk assessment, we recommend that additional mitigation and adaptive management measures for golden eagles be included as part of the ECP until such time that a more accurate risk assessment shows lower risk to eagles. Specifically, we recommend the project proponent implement observer-triggered temporary shutdown of WTGs when eagles are observed within a high collision risk zone. This could be accomplished by including golden eagles in the enhanced measures for the California condor, realizing that the biologist in the on-site observation tower could detect eagles and order turbine curtailment in high collision risk situations.

Lastly, we are concerned the surveys during 2011-2012 yielded zero eagle minutes while in 2004 and 2005, golden eagles were commonly observed in and adjacent to the Project area, as this may suggest that they may have largely disappeared from the area due to mortality or injury associated with the significant increase in operating wind energy projects in the Tehachapi Wind Resource Area. We urge BLM to further investigate this issue and report findings in the Final EIS for the Project. If regional eagle populations are declining to the point that individual sightings during standardized point counts are absent or very infrequent, we recommend that a regional conservation plan for the species be developed and implemented in coordination with Kern County, CDFW and the USFWS.

<u>Swainson's hawk</u>: The DEIR for the Project describes Swainson's hawks as a species that was documented migrating through the Project area during studies conducted in the Fall season of 2005 for the adjacent PdV wind project. Given that Swainson's hawks are a state listed threatened species and a BLM Sensitive Species in California, the observation of 48 individuals flying through the project area during the fall migration period is significant because of the severe decline in populations of this species statewide. Furthermore, it was noted at least 35 individuals were observed flying below 350 feet, well within the rotor swept area of the wind turbines to be used for

the project. No information was provided on the number of individuals observed during the spring migration period.

We strongly recommend additional impact mitigation measures for Swainson hawks including curtailment of turbine rotation during the spring and fall migration when the number of individuals passing through the project area is high; and compensatory mitigation at a 3:1 ratio for permanent impacts to Joshua Tree Woodland, a community known to be utilized by Swainson's hawks for foraging. Curtailment of turbine rotation can be addressed through a plan involving detection of migrating Swainson's hawks by the bird observation tower that will be active for the life of the project. We believe enhanced mitigation measures noted above are reasonable given that the 2005 migration study found that Swainson's hawks passed through the Project area in a relatively short period of time. Over the 30 year operational life, the project and those existing wind projects nearby, will pose a significant risk to this species and potentially have significant impacts to its population in the region.

We thank you for the opportunity to provide these comments on the Tylerhorse Wind Project. Please contact us if you have further questions.

Sincerely,

Stephanie Dashiell
California Representative
Defenders of Wildlife
sdashiell@defenders.org

Jeff Aardahl
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Serious drought.
Help save water!

May 1, 2014

Mr. Cedric Perry
Bureau of Land Management (BLM)
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553

File: Ker-14-3.0
DEIS
SCH#: 20140044002

Tylerhorse Wind Project (TWP) – DOI-BLM-CA-CAD000-2014-0001-EIS

Dear Mr. Perry:

The California Department of Transportation (Caltrans) District 9 appreciates the opportunity to review the DEIS for the wind energy project proposed in Kern County, east of Rosamond. We offer the following comments:

- The "STATE" paragraph regarding Caltrans on page 3.16-8 could be clarified as follow:

  The use of the state highway system (SHS) for other than transportation purposes requires an encroachment permit. The Caltrans Standard Encroachment Permit Application, Form TR-0100 is required for utilities, developers, and non-profit organizations to conduct activities other than transportation (e.g., traffic controls, landscape work, utility installation, film production) within the ROW. The completed application would be submitted to Caltrans District 9, where the TWP site is located. The California Manual of Uniform Traffic Control Devices (2012), Part 6, provides guidance for Temporary Traffic Controls. Also, any TWP requirement to transport oversize or overweight loads would require approval from Caltrans.

- The contact information for oversize/overweight permits has changed since our August 10, 2011 letter. For permitting of such loads see: http://www.dot.ca.gov/hq/traffops/permits/.

We value a cooperative working relationship with the BLM related to transportation issues. Please contact me at (760) 872-0785, with any questions.

Sincerely,

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: State Clearinghouse
Mark Reistetter, Caltrans

Cristina Gispert

From: cperry@blm.gov on behalf of Tylerhorse_Wind_Project, BLM_CA <blm_ca_tylerhorse_wind_project@blm.gov>
Sent: Monday, July 14, 2014 3:30 PM
To: Cristina Gispert
Subject: Fwd: EKAPCD Comments

---------- Forwarded message ----------
From: **Jeremiah Cravens** <CravensJ@co.kern.ca.us>
Date: Fri, May 9, 2014 at 12:09 PM
Subject: EKAPCD Comments
To: blm_ca_tylerhorse_wind_project@blm.gov

The Eastern Kern Air Pollution Control District (District) is in receipt of the Draft EIR for the Tylerhorse Wind Project (Draft EIR). Thank you for providing a copy of this document for review. Although Sections 3.2 and 4.2 of the Draft EIR address air quality issues and Rule/Regulation requirements within the District, be advised that a Fugitive Dust Emission Control Plan will be required and must be approved prior to any grading pursuant to District Rule 402, Fugitive Dust. In addition, stationary engines such used on power generators and standby generators will require a District Permit to Operate (PTO) pursuant to Rule 201, Permits Required.

Should you have any questions feel free to contact me at (661) 862-5250 or Cravensj@co.kern.ca.us.

Thanks,
Jeremiah Cravens

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

Cedric Perry, Project Manager
California Desert District Office
Bureau of Land Management
22835 Calle San Juan de Los Lagos
Moreno Valley, California 92553

JUL 17 2014

Subject: Draft Environmental Impact Statement for the Proposed Tylerhorse Wind Project, Kern County, California (CEQ #20140114)

Dear Mr. Perry:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Proposed Tylerhorse Wind Project (Proposed Action). Our review and comments are provided pursuant to the National Environmental Policy Act, the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA continues to support increasing the development of renewable energy resources in an expeditious and well planned manner. Using renewable energy resources such as wind power can help the nation meet its energy requirements while reducing greenhouse gas emissions. We encourage BLM to apply its land management and regulatory authorities in a manner that will promote a long-term sustainable balance between available energy supplies, energy demand, and protection of ecosystems and human health.

EPA provided extensive formal scoping comments for the project on August 15, 2011, including detailed recommendations regarding purpose and need, range of alternatives, cumulative impacts, biological and water resources, air quality, and other resource areas of concern. We were pleased to see that the DEIS addresses some of our scoping comments including a comprehensive climate change discussion, air quality analysis, and information on tribal consultation.

Following our review of the DEIS, we have identified concerns with potential impacts to site hydrology, air quality, sensitive receptors from noise and Valley Fever exposure, and to users of the Pacific Crest trail. We are also concerned about potential impacts to avian species, particularly the golden eagle and California condor. Based on our review of the DEIS, we have rated the project and document as *Environmental Concerns – Insufficient Information* (EC-2) (see the enclosed "Summary of EPA Rating Definitions").

The enclosed detailed comments elaborate on the above concerns and provide specific recommendations regarding analyses and documentation needed to assist in assessing potential significant impacts from the Proposed Action, and for minimizing adverse impacts. We are available to further discuss all recommendations provided. If you have any questions, please contact me at (415) 972-3843 or contact Anne Ardillo, the lead reviewer for this project. Anne can be reached at (415) 947-4257 or ardillo.anne@epa.gov.

Sincerely,

Connell Dunning

For Kathleen Martyn Goforth, Manager
Environmental Review Office

Enclosures: Summary of EPA Rating Definitions
EPA's Detailed Comments

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED TYLERHORSE WIND PROJECT, KERN COUNTY, CALIFORNIA, JULY 17, 2014

Water Resources

The proposed Tylerhorse Wind Project has the potential to disrupt natural site hydrology and cause erosion. According to the DEIS, hydrology and erosion-related effects of the Proposed Action will be minimized through mitigation measures WATER-1 through WATER-3 (pg. 4.19-8). We support the Project Proponent's intent to avoid disruption of natural flows, lessen erosion and sedimentation, and incorporate best management practices prior to, during, and post construction. In addition, we have several recommendations to further reduce project impacts.

Recommendations:

In the FEIS, revise Mitigation Measure WATER-1 to include a detailed description of the size and location of proposed detention basins for providing water quality control measures. Additionally, to reduce the potential for basins with standing water to be an attractant and a hazard to wildlife, identify specific measures to deter birds and other wildlife from pond use.

EPA recommends the minimizing the use of hard structures such as the rip-rap proposed in Mitigation Measure WATER-2 at the end of the access road watercourse crossings when the road is "in-sloped". To better protect and maintain existing ecosystem functioning, address the feasibility of bridging and/or bottomless arch culverts to disperse stormwater flow and dissipate energy. Include any updated design measures in the FEIS.

Mitigation Measures WATER-3 and WATER-4 propose the preparation of a Comprehensive Drainage Plan and Operations Period Drainage Maintenance Plan respectively. EPA recommends that these plans be included in the FEIS in order to facilitate assessment of impacts and effectiveness of mitigation measures.

According to the DEIS "preliminary jurisdictional evaluations have been completed in support of the Tylerhorse Wind Project. These evaluations will be made permanent during final engineering and design of the TWP. Acquisition of a Streambed Alteration Agreement, if required, would occur prior to construction of the TWP, thus demonstrating compliance with Section1602 of the California Fish and Game Code" (pg. 3.19-8).

Recommendation:

In the FEIS, confirm completion of the Streambed Alteration Agreement in the FEIS, or provide a status and schedule for its estimated completion.

A number of unnamed ephemeral washes and drainages occur throughout the project area. These areas generally contain a diversity of desert shrub species, have more structured and complex vegetative assemblages, and possess higher wildlife diversity than the surrounding upland habitats (pg. 3.2-2). Many plant populations are dependent on these aquatic ecosystems and have adapted to their unique conditions. The potential damage that could result from disturbance of washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems, such as adequate capacity for flood control, energy dissipation, and sediment movement; as well as impacts to valuable habitat for desert species.

Recommendations:

To avoid and minimize direct and indirect impacts to ephemeral washes (such as erosion, migration of channels, and local scour), EPA recommends including the following commitments in the FEIS:

- Avoid placing turbine support structures in ephemeral washes to the maximum extent practicable;

- Implement all practicable opportunities to further reduce the footprint of project elements (parking, buildings, roads, etc.);
- Use natural washes, in their present location and natural state, and include adequate natural buffers for flood control to the maximum extent practicable; and
- Minimize the number of road crossings across ephemeral washes and design crossings to provide adequate flow-through during storm events.

Water supply
The DEIS describes site water needed for construction and operation as being very minor; seven acre-feet per year (AF/Y) for construction activities and two AF/Y for the operation phase. These volumes of water would not be withdrawn from any on site groundwater wells, but would instead be trucked in from offsite. The proposed offsite water supplies could potentially be derived from groundwater. However, because the proposed onsite water usage requirements are so minor, they would not be expected to result in substantial drawdown of groundwater levels at source wells (pgs. 3.91-4, 4.19-5).

Even if the amount required is considered minor, we remain concerned about the potential groundwater drawdown and cumulative impacts to the area's basins given the concurrent construction and operational phases of approved and reasonably foreseeable projects in the vicinity. The DEIS indicates that parts of the Antelope Valley groundwater basin have experienced declining groundwater levels (pg. 3.19.2). As prior BLM NEPA documents have noted, even modest drawdowns of 0.3 foot can adversely affect vegetation if groundwater drops below the effective rooting levels for a sustained period of time.[1] A drop in groundwater levels could also impact neighboring wells, lower the water table, and adversely affect groundwater-dependent vegetation and woodlands.

Recommendation:
The FEIS should confirm the availability of an adequate water supply for construction and operations of the Proposed Action. If the water is to be derived from groundwater, the FEIS should disclose its source and evaluate the environmental impacts associated with the ultimately proposed supply of water.

Air Quality
Cumulative Air Quality
EPA is concerned about the direct, indirect and cumulative impacts of construction emissions and fugitive dust associated with the project, even after mitigation measures have been taken into account. The Proposed Action is located in Mojave Desert Air Basin under the jurisdiction of the Eastern Kern Air Pollution Control District, which as shown in Table 3.2-3, is designated as serious non-attainment and marginal non-attainment of the federal PM_{10} and ozone standards, respectively. The DEIS includes estimated emissions for criteria pollutants and a description of the mitigation measures that would be implemented to reduce the adverse air impacts identified in the DEIS; however, even with implementation of these mitigation measures, daily emissions of NOx, and cumulative emissions of NOx, PM, and VOCs would remain significant when considered in conjunction with construction of the related cumulative past, present, or reasonably foreseeable, probable future projects (pg. 4.2.7-17). In light of the area's nonattainment status, potential health impacts to local residents, and the construction of reasonably foreseeable wind and transmission projects in the area, all feasible measures should be implemented to reduce and mitigate air quality impacts to the greatest extent possible.

Recommendations:
In consultation with the EKAPCD, use the cumulative emissions data to develop a phased construction schedule for projects that will undergo construction concurrently, to avoid any violations of local, state, or

[1] For example: Bureau of Land Management and California Energy Commission, March 2010. Staff Assessment and Draft Environmental Impact Statement for Genesis Solar Energy Project, p. C.2-4.

federal air quality regulations. EPA recommends incremental construction on-site to ensure air quality standards are not exceeded.

After committing to a phased construction schedule, and understanding the remaining cumulative emissions impacts, the FEIS should indicate if additional mitigation measures would be needed or if the project would affect the ability of other foreseeable projects to be permitted due to construction emissions.

Additional mitigation for non-road and on-road engines
EPA supports incorporating mitigation strategies to reduce or minimize fugitive dust emissions, as well as more stringent emission controls for PM and ozone precursors for construction-related activity. We commend BLM for incorporating EKAPCD's Rule 402 to reduce PM emissions during construction, as well as Air-1 to further reduce fugitive dust on unpaved roads and particulate emissions from onsite dedicated equipment exhaust (pg. 4.2.6-15). We note that Air-2 requires all off-road diesel engines with a rated output of greater than 50 horsepower to, at a minimum, meet the Tier 32 California Emissions Standards for Off-Road Compression Ignition Engines. Alternatively, if reasonably available, Tier 23 engines with diesel particulate filters and lean-NOX catalysts (or, or equivalent control devices) will be employed (pg. 4.2.6-16). We believe that the DEIS may have a typographic error and assume that the intent of the mitigation measure was to meet Tier 3 and Tier 2 emission standards, respectively. EPA began phasing-in Tier 4 standards for non-road engines in 2008[2]; however, the DEIS does not mention the availability of Tier 4 non-road engines. The use of such engines would result in an approximately 90% reduction in NO_x and PM emissions as compared to Tier 3.

Recommendations:
In the FEIS, include emission tables for various classifications of on-road and non-road engines and identify emission levels for PM_{10}, $PM_{2.5}$ and NO_x.

Provide in the FEIS list of the equipment to be used during construction and indicate the expected availability of Tier 3 and Tier 4 engines for each application.

Include a commitment to using non-road construction equipment that meets Tier 4 emission standards when available, and best available emission control technology for construction that occurs prior to Tier 4 standards availability.

Commit to implementing best available emission control technologies for construction ahead of the California Air Resources Board's in-use off-road diesel vehicle regulations, regardless of fleet size.[3]

Include all applicable State and local requirements and the additional and/or revised measures listed above, and include a condition that the Project Proponent incorporate all such measures into construction contracts.

Greenhouse Gas Emissions - Construction and Operation Bid Specifications
To minimize greenhouse gas emissions from project construction and operations, EPA recommends that the FEIS and ROD include commitments to incorporate the following into all contract solicitations:

a) Soliciting bids that include use of energy- and fuel-efficient fleets;

[2] See EPA website: http://www.epa.gov/nonroad-diesel/2004fr/420f04032.htm#standards
[3] See CARB's Factsheet at: http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf

b) Requiring that contractors ensure, to the extent possible, that construction activities utilize grid-based electricity and/or onsite renewable electricity generation rather than diesel and/or gasoline powered generators;
c) Employing the use of zero emission or alternative fueled vehicles;
d) Using lighting systems that are energy efficient, such as LED technology;
e) Using the minimum amount of GHG-emitting construction materials that is feasible;
f) Using cement blended with the maximum feasible amount of fly ash or other supplemental cementitious materials that reduce GHG emissions from cement production;
g) Using lighter-colored pavement where feasible; and,
h) Recycling construction debris to maximum extent feasible.

Climate Change

EPA commends the BLM for including estimates of greenhouse gas emissions from construction and operation of the project. While the DEIS discusses the environmental impacts of climate change, no discussion is provided on the potential impacts of climate change on the project specifically.

Recommendation:

Considering that the project is planned to be in operation for 30 years, the FEIS should include a description of how climate change may affect the project, particularly its sources of groundwater and reclamation and restoration efforts after construction and decommissioning. The FEIS should also discuss how climate change may affect the project's impacts on sensitive species.

Public Health

According to the California Department of Public Health, Kern County has a high incidence rate of Valley Fever, with 15.1 to 183 cases per every 100,000 people (CDPH, 2009). Soils that possess the potential to contain valley fever spores are typically dry, alkaline, semi-arid or arid soils similar to those found in the TWP site. Project construction would disturb the soil and potentially cause present fungal spores to become airborne, putting construction personnel and wildlife at risk of contracting Valley Fever (pg. 4.11-5). The proposed Dust Control Plan requires a number of dust suppression activities during Project construction that would minimize the spread of fungal spores; however, Valley Fever impacts would not be completely avoided (pg. 4.11-5).

The nearest potential sensitive receptor is 0.25 mile northeast from the closest proposed turbine pad and the nearest sensitive receptor that may be affected by dust is located more than 0.5 miles downwind of construction activities (pg. 4.2-4). The Centers for Disease Control and Prevention states that workers engaged in soil-disturbing activities in endemic areas should be considered at risk for the disease.[4] Occupational groups at risk include farmers, agricultural workers, construction workers, and archaeologists. The DEIS concludes that the construction emissions and dust air quality impacts will be minimal to nearby residents. However since the spread of fungal spores will not be completely avoided as stated in the DEIS, EPA is concerned that the nearby residents and workers at the TWP may still be at risk of exposure.

Recommendations:

Incorporate a mitigation measure in the FEIS ensuring that sensitive receptors are informed of these potential risks of Valley Fever in advance of construction. This information should be provided concurrently with advanced notification of construction provided as mitigation for noise impacts.

The Environmental Awareness Program for the workers should include training on the health hazards of Valley Fever, how it is contracted, what symptoms to look for, proper work procedures, how to use

[4] Coccidioidomycosis. Technical Information. 2008 Centers for Disease Control and Prevention.

personal protective equipment, the need to wash prior to eating, smoking or drinking and at the end of the shift, and the need to inform the supervisor of suspected symptoms of work-related Valley Fever. The training should identify those groups of individuals most at risk and urge individuals to seek prompt medical treatment if Valley Fever symptoms (flu-like illness with cough, fever, chest pain, headache, muscle aches, and tiredness) develop.[5]

In addition to regulatory required fugitive dust controls, the Applicant should:

- Avoid areas that may harbor the fungus if practicable.
- Restrict high risk workers from contaminated areas if possible.
- Require that grading and construction equipment cabs be enclosed, HEPA ventilated, and air-conditioned.
- Use personal protective equipment in dusty work areas:
    - Disposable clothing.
    - Method to clean work boots at the end of the shift.
    - NIOSH certified N95 respirator, at a minimum, or one with a higher protection factor.
- Provide personal hygiene (washing) facilities.
- Require crews to work upwind from excavation sites.
- Minimize ground disturbance as much as possible. Revegetate temporarily disturbed areas promptly.
- Discourage workers from carrying any fomites home with them. Institute hygiene measures to limit dust transport offsite.
- Consider limiting visitor site access without proper training or personal protective equipment.
- Prohibit work activities when wind speeds exceed 25 mph.
- Consider mitigation measures that would provide advanced notification to sensitive receptors of the potential effects of a *Coccidioides* infection.
- Provide local public health officials with a schedule of project activities that disturb soil.

Biological Resources

Endangered Species and Other Species of Concern

The site supports a diversity of mammals, birds, reptiles, and bats, including special status wildlife species. According to the DEIS, the Endangered Species Act section 7 formal consultation has been initiated by the BLM with the submittal of a Biological Assessment (BA) to the US Fish and Wildlife Service (pg. 5-3). The Biological Opinion will play an important role in informing the decision on which alternative to approve and what commitments, terms, and conditions must accompany that approval. The DEIS also indicates that a draft Bird and Bat Conservation Strategy (Appendix C-4) was submitted to agencies for review on April 28, 2011. While USFWS and California Department of Fish and Wildlife protocol-level surveys were conducted to assess the project's biological resources, it is unclear what the current status of wildlife monitoring and survey results is.

Recommendations:

Provide an update on the ESA consultation process and include the Biological Opinion, if one is issued.

Provide an update on the Bird and Bat Conservation Strategy and include the finalized plan in the FEIS.

The FEIS and ROD should include any additional mitigation and monitoring measures that result from consultation with USFWS to protect sensitive biological resources, including desert tortoise, burrowing owl, golden eagles, and the California condor

[5] http://www.cdph.ca.gov/HealthInfo/discond/Pages/Coccidioidomysosis.aspx

The FEIS should discuss coordination with USFWS and CDFW and their review of the submitted surveying, monitoring, and reporting protocols completed to date.

Surveys from the neighboring Manzana Project found that golden eagles were using the general area throughout the year. While no nests were identified within the project area of either Manzana or Tylerhorse, observations clearly indicate that the general area contains and supports resident eagles (pg. 3.22-15). It is expected that golden eagles may occur in the project area where they are anticipated to be an uncommon year-round, non-breeding visitor or non-breeding resident. The DEIS indicates that the Project Proponent has submitted a draft Eagle Conservation Plan to agencies for review on March 23, 2011 (pg.4.21-27). It is our understanding USFWS is working with the Project Proponent and BLM in review and development of an Eagle Conservation Plan.

Recommendation:
Include the final Eagle Conservation Plan as an appendix in the FEIS. Discuss whether the Project Proponent will be applying for a Programmatic Eagle Take Permit.

As the DEIS notes, the locations of known California condor sightings in close proximity to the project area indicate that there is a moderate level of risk to the California condor from the Proposed Action. It is conceivable for a California condor to occur within the Project area (pg. 4.21-11).

Recommendations:
Include in the FEIS the results of ESA consultation with the USFWS regarding the California condor and demonstrate how the project will comply with the MBTA for this species.

Address the potential for the transmission towers to provide attractive perching and roosting opportunities for the condor.

Through mitigation measure WIL-li a Condor Monitoring and Avoidance Plan will be submitted, which includes the use of the Remote Condor Observation Network detection system. While the DEIS includes an extensive description on the system's use under different scenarios, EPA further recommends the FEIS elaborate on the following factors:

- Its limitations, including how weather may affect its performance and whether the system has any potential 'blindspots';
- Contingency plans in the event of technical or mechanical failure; and,
- Any results from other projects that have used this approach.

Compensatory Mitigation
The DEIS includes mitigation measures implemented to minimize and mitigate for direct and indirect impacts to aquatic resources and biological resources, including compensatory mitigation land acquisition. The DEIS does not, however, indicate that specific compensation lands are available. In light of the numerous energy projects under construction or proposed, the availability of land to adequately compensate for environmental impacts to resources such as Joshua tree woodlands may not be easily identifiable and may serve as a limiting factor for development. EPA understands that the Project Proponent has proposed in-lieu monetary funding as another option for compensatory mitigation.

Recommendations:
The FEIS should identify compensatory mitigation lands or quantify available lands for compensatory habitat mitigation for this project, as well as reasonably foreseeable projects in the Tehachapi Wind Resource Area.

Specify a clear timetable in the FEIS and ROD for ensuring adequate compensatory mitigation has been identified, approved, and purchased. Describe the implications on project construction if the timetable is not met.

Pacific Crest Trail

As the DEIS acknowledges, the Tylerhorse Wind Project is in close proximity to the Pacific Crest Trail. The western parcel is located adjacent to the PCT's western side; the central parcel is located approximately 1 mile east from the PCT at its closest point; and the third parcel is approximately 2 miles east from the PCT at its closest point. The western parcel includes three wind turbine generators located approximately 500 feet east of the trail corridor conforming to the Kern County setback requirements (pg. 4.18.9). As noted in the DEIS, the Pacific Crest Scenic trail was created under the National Trails System Act to provide for outdoor recreation opportunities and the conservation of significant scenic, historic, natural, or cultural qualities (pg 3.18-8). Section 7(c) of the National Trails Act states that agencies may permit uses that will not substantially interfere with the nature and purposes of National Trails, and efforts shall be made to avoid activities that are incompatible with the purposes for which such trails were established.[6] The DEIS does not clearly state whether the Proposed Action, especially with the presence of three wind turbines 500 feet from the trail, is consistent with the National Trails Act intent.

The DEIS discusses the potential impacts of the PCT, including fugitive dust, noise and visual intrusions from the wind towers. Specific mitigation measures for construction, operations, and maintenance activities have been proposed to reduce these impacts. However, even with adherence to the proposed mitigation measures, visual impacts to the PCT would remain high based on the high sensitivity of recreational users and the fact the trail has national significance as a congressionally designated scenic trail. Compensatory mitigation consisting of 1,207 acres of off-site land acquisition has been proposed to mitigate the anticipated impacts.

Recommendations:

Expand the discussion on the nature and purposes of the Pacific Crest Trail and discuss whether the Proposed Action substantially interferes with them nature and purposes.

Provide updated information on the consultation with the USFS and Pacific Crest Trail Association, including any feedback on the adequacy of the proposed 1,207 acre compensation.

In September of 2012, the BLM Director approved the agency's National Trails System Manual Series, a comprehensive set of policies for trails that are covered under the provisions of the National Trails System Act[6]. The FEIS should include a discussion of these manuals and their applicability to the TWP.

Consider eliminating the three wind generating turbines that are closest to the trail. According to the DEIS, eliminating the three turbines on the southwest parcel will also potentially result in fewer biological, cultural, and other impacts while maintaining a contiguous footprint for development. Land disturbance would also be reduced because 3 fewer turbine foundations/crane pads would be required and fewer access roads and collectors needed (pg. 2-22).

Noise Impacts

Operational Noise

According to the DEIS, the Kern County Zoning Ordinance, which states, "audible noise due to wind turbine operations shall not be created which causes the exterior noise level to exceed forty-five (45) dBA threshold" (pg. 3.9-8), was used for the noise impact analysis. However, the Noise Technical Report states that Kern County does

[6] http://www.ntc.blm.gov/krc/uploads/686/NationalScenicHistoricTrails_Transcript.pdf

not have jurisdiction over the Project and the discussion of their noise levels is provided for completeness and reference (pg. E-15). Therefore, it is not clear that these will be the enforceable noise levels for the project.

The DEIS states that the highest predicted project noise level from the maximum turbine layout at a potential residential structure is predicted to be 52 dBA equivalent continuous sound level (Leq), and that noise levels at two residences would exceed the 45 dBA level but not the Kern County General Plan level of 65 dBA day-night average (DNL)(pg. 4.9-4). The DEIS also implies that the cumulative impacts from the turbines surrounding the project site would add an additional 3 dBA to these values (pg. E-26).

EPA is concerned that the analysis did not measure the baseline noise levels at the receptors, but rather referenced published levels. The DEIS states "based on the referenced information, existing background noise levels in the vicinity of the Project are reasonably expected to be approximately 40 dBA or less....wind-induced noise and operations of existing turbines may result in these levels being exceeded periodically" (pg. 3.9-4). This adds substantial uncertainty to the baseline noise assumption and casts doubt on the noise impact analysis results. In addition, the analysis did not consider the fact that the project area is a rural and naturally quiet environment where increases in noise might have a greater impact.

The noise analysis also did not consider low-frequency sound, which is associated with wind turbines, nor how attenuation would apply to low-frequency sound. The relative amount of low-frequency noise is higher for large turbines (2.3-3.6 MW) than for small turbines (≤ 2 MW)[7]. In addition, the methods used in the noise analysis calculated the sound pressure level that would occur after losses from distance, air absorption, ground effects, and screening are considered (pg. 4.9-3); however, lower frequency noise is less attenuated by the atmosphere and building materials than noise at higher frequencies[8].

The Appendix to the Noise Technical Report shows potential residences #33, 34, and #35 as located very close to Turbines T36,T37 and/or T1, yet no noise estimate is provided for these receptors

Recommendations:
Confirm that the outdoor noise level of 45 dBA will be the level BLM is using as the allowable upper level for the project and indicate whether this will be included as a stipulation in the final BLM Right-of-Way Grant.

Discuss the baseline levels used and their appropriateness given the qualifier in the DEIS stating that existing turbines can affect this level. Discuss the uncertainty of this estimate and indicate why no field noise measurements were taken for the analysis.

Discuss the decibel increase expected at the nearest receptors and how this could relate to factors such as annoyance and sleep disruption.

Evaluate impacts from low-frequency sound and the applicability of the sound attenuation used in the noise model to low frequency sound.

Include the missing noise measurements for the nearby receptors as identified above.

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[7] Møller H, Pedersen CS. Low-frequency noise from large wind turbines. J Acoust Soc Am. 2011 Jun;129(6):3727-44.
[8] Bruel & Kjaer Sound and Measurement A/S. Environmental Noise. 2000 [cited 2011 June 28]; Available: http://www.nonoise.org/library/envnoise/index.htm .

Noise mitigation
Operational noise mitigation measures include a post-decision acoustical analysis based on the final layout with the selected turbines to document projected sound levels. If the 45 dBA sound level is exceeded, possible actions include changing the locations of the wind turbine generators (pg. 4.9-7). The configuration and number of turbines shown in Figure A-1 of the Noise Technical Report show little area on the project parcels not already containing turbines. It does not appear that this is a reasonable mitigation option unless the elimination of turbines is also considered.

The implementation of the property owner agreements granting excess noise levels on their property is not disclosed in the DEIS. The DEIS indicates on pg. 3.9-9 that where noise levels indicated in the preceding text are exceeded, the Project Applicant will obtain easements or agreements from neighboring property owners granting consent to allow noise levels to exceed the maximum limits allowed.

The preceding text discusses the Kern County Zoning Ordinance (Title 19) Wind Energy (WE) Combining District development standards and conditions, which reference several noise levels, including the exterior 45 dBA level, low-frequency noise levels which were not evaluated in the DEIS, and conditions where noise consists of both pure tone and repetitive sounds, also not evaluated in the DEIS (pg. 3.9-8). It is not clear whether the final acoustical analysis will include these metrics and whether these estimates, along with an interpretation of the results, will be disclosed to affected residents prior to or when presenting the property agreements.

In addition, the mitigation measures include creation of a post-construction noise complaint resolution process (Noise-6, p. 4.9-7) which states that the Project Applicant shall document, investigate, evaluate, and attempt to resolve legitimate project-related noise complaints and document actions taken to evaluate and resolve the complaint. It is not clear what would constitute a legitimate noise complaint, how this would be evaluated, and what actions could be taken post-construction to minimize noise impacts. If operations can be modified, the requirement to do so and under what noise levels should be clearly documented.

> *Recommendations:*
> The measures to reduce noise impacts in mitigation Noise-5 should include the option to eliminate turbines closest to affected residents.
>
> Provide additional information regarding the metrics that will be used in the post-decision acoustical analysis and whether the additional metrics from the Kern County Zoning Ordinance (Title 19) Wind Energy (WE) Combining District development standards and conditions will be included.
>
> Discuss the process for measuring excess noise levels, how complaints will be deemed legitimate, and who would be responsible for measurements taken once operations have commenced.

<u>Cultural Resources and Coordination with Tribal Governments</u>
According to the DEIS, BLM has received one formal response letter from the tribes that were contacted as part of government-to-government consultation. The Bishop Tribal Council of the Bishop Paiute Tribe recommended that a Tribal Cultural Monitor be hired for monitoring purposed during all ground disturbing activities and that artifacts should be protected from vandals as well as construction crew. The Tribe also expressed concern regarding Bald Eagles, Golden Eagles, and other bird species. (pg. 3.4-9). The document states the BLM is committed to continuing consultation and collaboration efforts with these Tribes and tribal communities regarding the Project (pg. 5-5).

> *Recommendation:*
> The FEIS should include an update on the government-to-government consultation between the BLM and the Bishop Paiute Tribe and a description of how the tribe's concerns were addressed.

IBERDROLA
RENEWABLES

July 25, 2014

VIA ELECTRONIC MAIL **to: blm_ca_tylerhorse_wind_project@blm.gov**

Tylerhorse Wind Project–Public Comments
c/o Cedric Perry, Project Manager
Bureau of Land Management
California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92555

Re: Comments of Iberdrola Renewables LLC on the Draft Plan Amendment/Environmental Impact Statement (DEIS) for the Tylerhorse Wind Project

Dear Mr. Perry:

Iberdrola Renewables, LLC, proponent of the Tylerhorse Wind Project, has reviewed the *Draft Plan Amendment/Environmental Impact Statement (DEIS) of the Tylerhorse Wind Project* and submits these comments on behalf of the applicant Heartland Wind, LLC (Heartland), a wholly owned subsidiary of Iberdrola Renewables, LLC, for your review and consideration. Heartland's comments consist of four general components: (1) this cover letter summarizing key comments on the DEIS and minor modifications to the Tylerhorse Wind Project that reduce its total environmental impacts, (2) copies of the supporting documentation for the minor project modifications that Heartland sent to the BLM on May 30, 2014 (3) a table of specific comments and suggested edits to the DEIS, and (4) the revised Air Quality Impact Technical Report, dated July 2014.

Minor Project Modifications

Since publication of the DEIS, Heartland modified the conceptual site plan depicted on Figure 2.2 in the DEIS based on a field visit with the project lead meteorologist and design engineers with the objective of decreasing potential impacts associated with the project by reducing road and collector line lengths. On May 30, 2014, Heartland submitted to BLM a map of the modified conceptual layout, tables of total disturbance, and tables of vegetation and land cover impacts. These tables demonstrated that the modified conceptual layout has fewer temporary and permanent impacts than the current conceptual layout, which was analyzed in the DEIS. Copies of the May 30, 2014 email, map and table attachments are included as Enclosure 1 to this comment letter.

Heartland also presented the revised conceptual site plan to the public during the open house on June 18, 2014 and the public meeting on July 11, 2014, and the BLM posted the presentation on the project website. Heartland explained to the BLM and public that this is a

conceptual layout and the final layout will be modified between the ROD and NTP based on the final permit conditions and turbine selection. It is not necessary to update the technical reports to reflect the May modified conceptual layout because the overall impacts of the modified conceptual layout are lower than those impacts described in the DEIS.

Heartland has stated that it would use three-bladed wind turbine generators, ranging from 1.5 MW to 3.0 MW (generator nameplate capacity). Since publication of the DEIS, Heartland has determined that the turbine types could range up to 3.5 MW nameplate capacity. As Section 2.2 of the DEIS states, wind turbine technology is continually improving and the cost and availability of specific types of turbines vary from year to year. While the range of turbine nameplate capacity changes from 1.5 to 3.0 MW to 1.5 to 3.5 MW, there would be no change to disturbance area or maximum turbine height. The proposed project still consists of up to 40 turbines with a maximum total height of up to approximately 500 feet, generating up to 60 MW. There would be no change to the environmental impacts or analysis in the DEIS.

Key DEIS Comments

Project Benefits

The DEIS recognizes many of the project benefits associated with the Tylerhorse Wind Project, including increased employment and economic stimulus, contribution to federal and state renewable energy policy goals, and reduction of greenhouse gas emissions. However, additional project benefits should be considered, including the reduction in criteria and other air pollutants and in water use by offsetting the need for conventional fossil fuel-fired generation plants being built to meet future demand. Each of these benefits is an essential part of the Tylerhorse Wind Project and must be considered in the analysis of the No Project Alternatives 3 through 5 and Tylerhorse Wind Alternative 2.

Air Resources

The DEIS should reflect that operation of the Tylerhorse Wind Project will reduce greenhouse gas (GHG) emissions and improve air quality by reducing the sulfur dioxide, nitrogen oxide, carbon monoxide, volatile organic compounds, and PM_{10} emitted by fossil fuel-fired generation. The Tylerhorse Wind Project would offset 60,423 metric tons of CO_2 emissions per year by displacing fossil fuel–based electricity generation, while only resulting in 788 metric tons of CO_2 emissions from operations and 348 metric tons of CO_2 emissions from construction amortized over 30 years of operations, creating a net reduction in CO_2 emissions of 59,287 metric tons per year.[1] If the GHG emissions offset from the embodied energy in water saved from the Tylerhorse Wind Project is added (632 metric tons of CO_2 emissions per year), the Tylerhorse Wind Project would offset 59,919 metric tons of CO_2 emissions per year. Since the Tylerhorse Wind Project is expected to have a 30-year lifetime, it would be expected to result in a net reduction of approximately 1,797,540 metric tons of CO_2 emissions over a 30-year period. Furthermore, the Tylerhorse Wind Project would offset criteria air pollutants that would otherwise be emitted by fossil-fuel based electricity generation, conservatively estimated at 5.5 metric tons per year of oxides of nitrogen (NO_X), 2.3 metric tons per year of particulate matter 10 microns or less in size (PM_{10}), 6.4 metric

[1] This calculation accounts for both the Tylerhorse Wind Project's own yearly operational emissions and amortized construction emissions. See Section 2.6.5.2 of the July 2014 Air Quality Impact Technical Report.

tons per year of carbon monoxide (CO), 1.8 metric tons per year of oxides of sulfur (SO_X), and 1.7 metric tons per year of volatile organic compounds (VOC).[2] The DEIS should reflect this benefit of the Tylerhorse Wind Project in Section 4.3 (Global Climate Change), as described in the attached table of specific comments and suggested edits to the DEIS.

For clarification, the Air Quality Impact Technical Report included as Appendix H to the DEIS was updated and transmitted to ESA for inclusion in the DEIS on March 28 and again on April 8, 2014; the revisions to the Air Quality Impact Technical Report in March and April updated the construction assumptions for the URBEMIS model and the resulting daily and annual construction emissions, emissions for conformity determination, and GHG emissions impacts and the operational impacts and its ability to offset emissions. However, some of the April updates were not included in the DEIS. Subsequent to DEIS publishing, in July 2014, Sapphos updated the cumulative impacts analysis in Appendix H based on consultation with Kern County, and added GHG emissions offset from the embodied energy in water saved, criteria area pollutants, and water use that would otherwise result from electricity production from a fossil fuel-based electricity generation. Because the CCAR General Reporting Protocol used in the original Appendix H does not provide a method for calculating particulate matter, SOx, and VOC offset, the July updates were made based on a comparison with the Palomar Power Plant. These updates were made to better define the project benefits. The updated July 2014 Appendix H is attached (with all changes between the March and July versions shown in tracked changes) and should replace the March 2014 version in the FEIS.

Water Resources

The reviewing agencies should also acknowledge the significant benefits to water resources associated with the Tylerhorse Wind Project. Because wind power requires no cooling water, it reduces water use for electricity generation by offsetting the annual water use requirements of non-renewable power plants that require large amounts of water for cooling. By displacing fossil-fueled generation, the Tylerhorse Wind Project would offset annual water use of approximately 49.7 million gallons per year after accounting for its own water use (using a modern, gas-fired plant as a comparison), based on a 60 MW wind project operating with a typical 35% net capacity factor.[3] The DEIS should reflect the benefit of the Tylerhorse Wind Project in Section 4.19 (Water Resources), as described in the attached table of specific comments and suggested edits to the DEIS.

The Tylerhorse Wind Project would have a beneficial impact to both air and water resources because it would reduce greenhouse gas emissions, criteria air pollutant emissions, and water use below that estimated in the environmental baseline.

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[2] See Section 2.6.3, Table 2.6.3-1, of the July 2014 Air Quality Impact Technical Report

[3] Page 4.9-A24 of the Final Staff Assessment for the Palomar Power Project specified the consumption of 2,500 gallons per minute, or 150,000 gallons per hour. It is anticipated that Palomar would generate up to 546 MW. A consumption rate of 150,000 gallons per hour for 546 MW is equivalent to 274 gallons per MW hour. Section 2.6.5.2 of the July 2014 Air Quality Impact Technical Report specified the annual generation rate for the 60-MW Tylerhorse Wind Project as 183,960 MW hour. Therefore, a consumption rate of 274 gallons per MW hour, together with a generation rate of 183,960 MW hour per year, results in 50.4 million gallons. Table 11 of the revised March 19, 2014, Plan of Development specified the total construction water use for Tylerhorse at 2,400,006 gallons, which is equivalent to 80,000.2 gallons per year amortized over 30 years of operation. The Plan of Development also specified the annual operation water use for Tylerhorse at 714,816 gallons. Therefore, the total annual water use for Tylerhorse is 794,816.2 gallons, and the resulting net annual water use offset would be 49.7 million gallons per year.

Pacific Crest Trail

The DEIS accurately states on page 4.12-1 that "The TWP site does not have public access nor does it contain any designated recreational resources such as OHV routes or camping grounds, so the construction, operation, maintenance, and decommissioning of the TWP would not directly disrupt any recreational resources onsite." The coordination required in Mitigation measure REC-1 will ensure impacts to recreation are avoided or minimized. With regard to the PCT, existing operating turbines are already visible along the PCT in this area, as described in the table of comments and suggested revisions (see Sections 4.12, 4.15 and 4.18). PCT users would pass through the existing Manzana Wind and Pacific Wind Energy Projects when approaching the TWP site from both the north and the south along the trail. Rather than creating a new visual intrusion, the TWP is an infill project, and the TWP turbines would appear in the context of pre-existing wind energy turbines. The VIS-1 requirement for a 150 feet setback from the PCT easement is consistent with Kern County WE zoning ordinance as described on page 3.22-30 and the measures implemented at the adjacent Manzana and Pacific Wind projects. Because existing operating turbines are already visible along the PCT in this area, and the visual contrast for all Key Observation Points has been classified as “weak to moderate,” the use of the word "severe" overestimates the impacts. For example, on page 4.18-11, DEIS says "However, the primary reason that the impact is moderate (as opposed to strong/major) is because the existing cumulative conditions are of a landscape heavily modified by existing wind energy development." Heartland suggests revising the language here and elsewhere in DEIS to make it consistency with the Visibility Tech Report. Heartland also recommends including a Figure in the FEIS showing the location of operating turbines in proximity to the TWP and PCT.

With regard to the DEIS’s prescribed land acquisition to compensate for impacts to visual resources along the PCT, the referenced plan is a Draft Plan that has not yet been adopted to our knowledge. According to the Visibility Technical Report, as mentioned above, all findings at all three KOPs are Weak to Moderate degree of contrast. The Proposed Action is an infill project located within operating wind projects; turbines are already visible along the PCT in this area. There are existing visual intrusions on the TWP parcels. Furthermore, TWP would not introduce significant additional visual contrast to this area of the PCT. PCT users looking towards the two largest TWP parcels located approximately 1 and 2 miles to the northeast of the PCT would see existing operating turbines in the foreground and TWP turbines in the background, which would not create a moderate or strong visual contrast, therefore mitigation ratios for these parcels should be lower than for the parcel immediately adjacent to the PCT and may not be necessary. On the western-most TWP parcel that borders the PCT, users would see TWP turbines in the foreground only to the west of the trail and existing operating Manzana Wind and Pacific Wind Energy Project turbines to the north, east, and south of the trail, including one existing operating turbine approximately 550 feet from the PCT on the east side of the trail. The mitigation ratio policy should be commensurate with the impacts. Like was done between the DEIS and FEIS for Alta East, the Final EIS should include a graduated approach to mitigation ratios, based on the distance between the PCT and each individual TWP parcel (which ranges between 0 feet and 2 miles), and the presence of existing visual disturbance in the form of existing operating wind energy turbines. Given the disparity in distance and visual contrast between the PCT and each of the three parcels, applying a 1:1 mitigation ratio, as is currently prescribed in VIS-4, does not appear to be commensurate with actual impacts.

The Tylerhorse Wind Project is an infill project that minimizes environmental impacts by locating adjacent to other operating and approved projects and utilizing existing and approved infrastructure, and the southwest parcel is an important part of the Proposed Action.

California Condors

In 2011, the BLM and United States Fish and Wildlife Service (USFWS) were engaged in information consultation on the Alta East and Tylerhorse projects, and the USFWS recommended that the BLM include California condor in requests for consultation, pursuant to section 7(a)(2) of the Endangered Species Act[4]. In early 2012, Heartland began working with the BLM and FWS on a draft condor monitoring and avoidance plan (Draft Plan) for the Tylerhorse project. Heartland, BLM and FWS participated in several in person meetings on May 31, 2012, January 16, 2013, and May 15, 2013 (at TWP) and numerous conference calls during 2012, 2013 and 2014. On October 25, 2013, the Draft Plan was provided to the BLM and ESA to be included in the DEIS for the project. The Draft Plan outlined the procedures to be taken by the project owner to implement focused curtailment of wind turbine generators if a California condor is detected within this 2-mile perimeter. The Draft Plan also referenced an alternative detection system that may be developed to reliably detect condors when VHF tagging of the Southern California flock is discontinued by the U.S. Fish and Wildlife Service (USFWS) Condor Recovery Team and more than 30 percent of the Southern California flock is not equipped with VHF transmitters until the USFWS reaches the 70 percent transmitter threshold again. The measures outlined in the Draft Plan were included as mitigation measure conditions in Section 4.21 Wildlife Resources (WIL-1h through WIL-1j).

The condor monitoring and avoidance measures will continue to be modified and adjusted based on consultation with the BLM and USFWS as part of the section 7(a)(2) of the Endangered Species Act consultation process. For example, subsequent to the October 25, 2013 submittal and in response to a BLM request, on March 21, 2014 Heartland submitted a technical report which described the Very High Frequency (VHF)-based Condor Monitoring System (ReCON™) in more detail and updated the Draft Plan measures based on agency comments. After several revisions integrating BLM and FWS comments, Heartland submitted a subsequent draft of the technical report on May 22, 2014. Heartland anticipates there will be additional modifications to the condor monitoring and avoidance plan based on system testing and agency comments during the formal section 7(a)(2) consultation. Rather than include exact measures in the FEIS, Heartland believes it is critical that the FEIS simply specify that the terms and conditions of the section 7(a)(2) consultation and the subsequent Biological Opinion shall supersede and override earlier draft monitoring and avoidance measures. The terms and conditions of the Biological Opinion will include measured reviewed by both the BLM and USFWS and will likely include flexibility for the agencies to accept alternative measures that may be developed in the future. Heartland is concerned that if the FEIS is too prescriptive, there will be insufficient flexibility in the NEPA document to adaptively manage the project with respect to condors without additional NEPA analysis. In conclusion, Heartland recommends that Mitigation Measures WIL-1h through WIL-1j be replaced with the following mitigation measure in the FEIS: *Conform to the terms and conditions of the approved Biological Opinion. The conditions supersede MM WIL-1h through WIL-1j*.

[4] May 20, 2011. Acting Regional Director, Pacific Southwest Region, Sacramento, CA. Letter to Acting State Director, BLM, California State Office, Sacramento, CA. Subject: Informal Consultation for Four Wind Energy Projects, Alta East (CACA-0052537), Rising Tree (CACA-052362), Tylerhorse (CACA-051561), and North Sky River (CACA-047847) regarding Golden Eagles and California Condors (1510 (P) CA930).

April 15, 2011. Acting State Director, California State Office, BLM. Letter to Regional Director, USFWS, Region 8. Subject: Consultation for Four Wind Projects regarding Golden Eagles and California Condors.

For similar reasons, Heartland recommends changes to the golden eagle measures as well. Mitigation measure WIL-1k2 is only one measure that could result from mitigation measure WIL-1k3 and the BLM consultation involved in mitigation measure WIL-1k3. Again, Heartland is concerned that if the FEIS is too prescriptive, there will be insufficient flexibility in the NEPA document to adaptively manage the project with respect to golden eagles without additional NEPA analysis. Also, the EIS should be clarified to specify that should Heartland obtain a BGEPA take permit, the terms and conditions of that permit should supersede and override the golden eagle measures in the EIS, similar to the Biological Opinion superseding the condor mitigation measures in the EIS.

Invasive Species Management

Heartland would like to ensure that the management of invasive and noxious weeds for the Tylerhorse Wind Project will be sufficiently analyzed in the FEIS to meet BLM Instruction Memorandum (IM) No. CA-2012-004 and the *Programmatic Vegetation Treatment Using Herbicides on Bureau of Land Management Lands in 17 Western States*/Record of Decision (PEIS) (2007), to enable the BLM to approve a Pesticide Use Proposal for the project without additional or supplemental NEPA. The management of invasive and noxious weeds for the Tylerhorse Wind Project has been described in the Weed Management Plan, Appendix J of the DEIS, throughout the DEIS, and is further analyzed in the attached table of specific comments and suggested edits to the DEIS. If further information is required, Heartland will provide that information promptly upon request.

Kern County

The proposed action is located entirely on BLM land and is not under County jurisdiction. However, because of Kern County's wind turbine zoning experience and building code expertise, Heartland is voluntarily developing a Memorandum of Understanding with the County for the County to review building plans for the Tylerhorse Wind Energy Project and coordinate on traffic and fire control, sales tax revenue and local hiring. For example, Heartland will work with the County on a Construction Traffic Control Plan in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook, and coordinate with the County on transporting to and from the site along 170th Street West via Rosamond Boulevard, the most prudent and expeditious route for the project. Heartland plans to provide a copy of the Memorandum of Understanding to the BLM, and asks the BLM to consider having the County act as the BLM's agent for reviewing engineering designs and construction plans.

Clarifications

In addition to the key comments summarized above, other clarifications or typo corrections could be made to the DEIS. These are also provided as suggested edits to the DEIS in the attached table.

Conclusion

Iberdrola Renewables, LLC and Heartland Wind LLC thank the BLM for its careful consideration of these comments and supporting documentation, and respectfully requests modifications to the DEIS suggested in these comments.

Yours Sincerely,

Sara Parsons
Senior Business Developer

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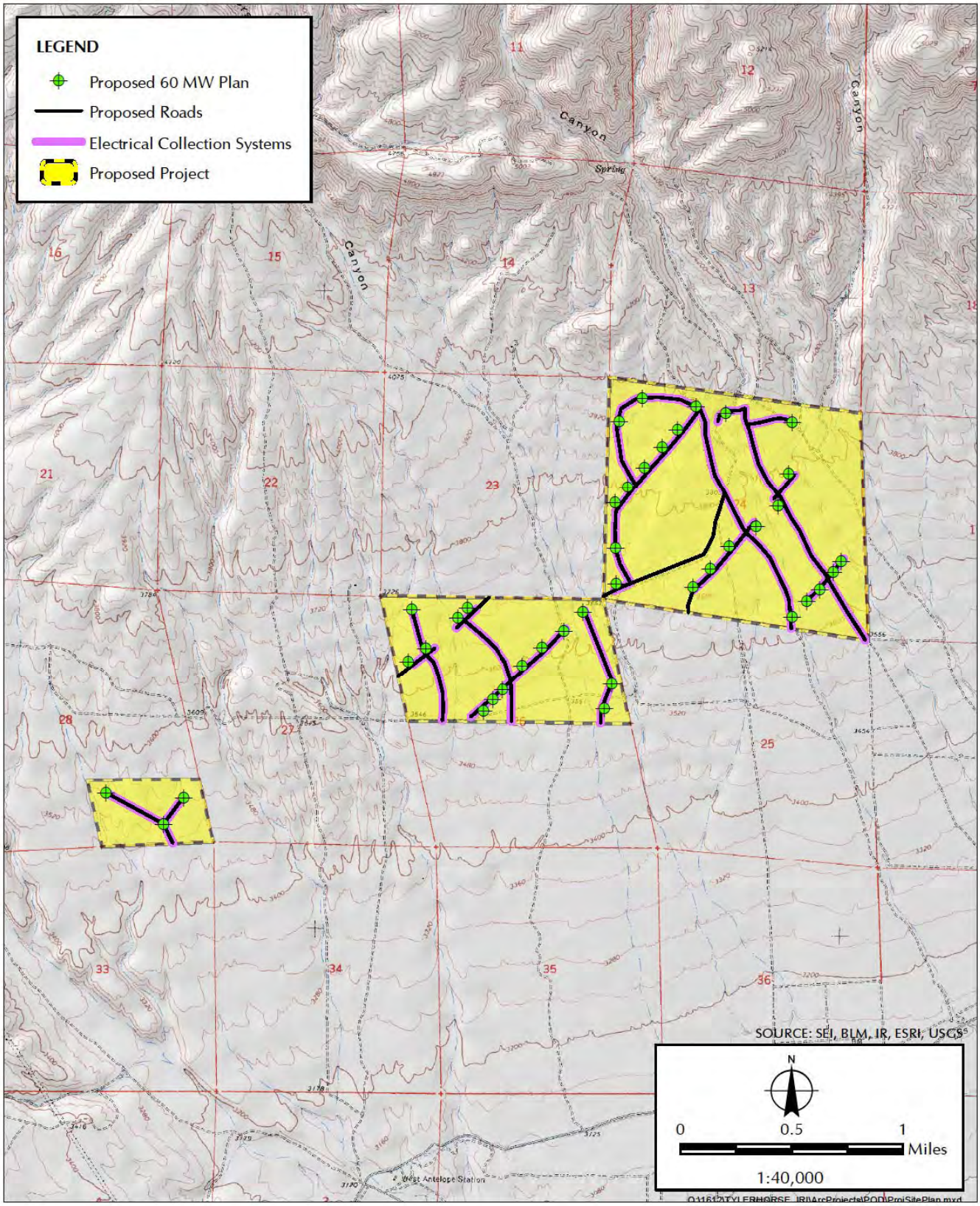
Enclosure 1: May 30, 2014 email, map and table attachments from Sara Parsons to the BLM, providing supporting documentation for the minor project modifications
Enclosure 2: Table of specific comments and suggested edits to the DEIS
Enclosure 3: Revised Air Quality Impact Technical Report, dated July 2014



SOURCE: Heartland Wind, 2014.

Tylerhorse Wind Project PA/DEIS . 211185

Figure 2-2
Conceptual Layout

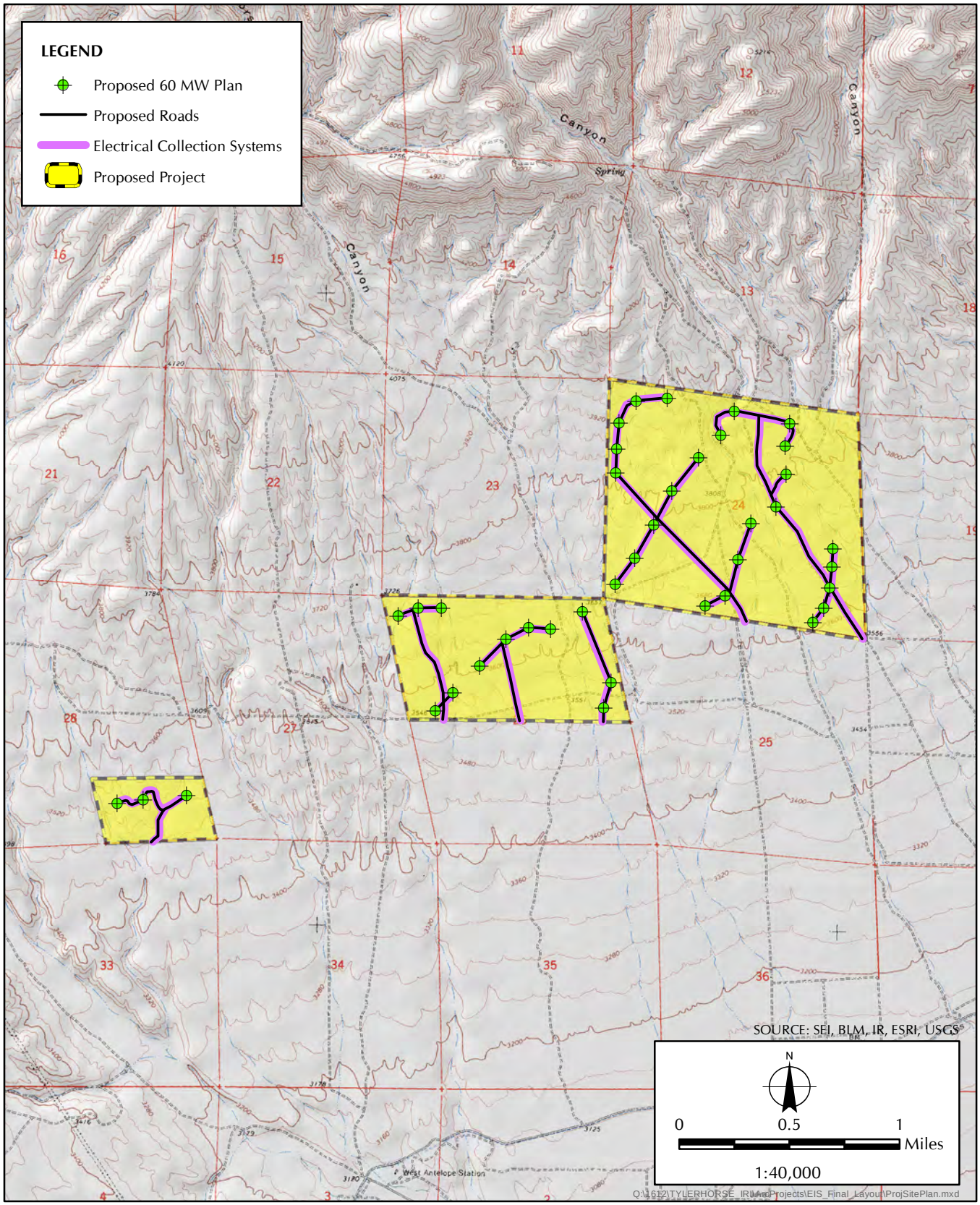


FIGURE 2

Revised Conceptual Layout

PROPOSED ACTION (ALTERNATIVE 1)

Component	Draft EIS Layout		Final EIS Layout		Alt1 - Difference between Final EIS and Draft EI	
	Temporary Disturbance	**Permanent Disturbance**	**Temporary Disturbance**	**Permanent Disturbance**	**Temporary Disturbance**	**Permanent Disturbance**
Wind Turbine Tower Pads (55 by 40 feet permanent turbine pad, within a 220 feet radius temporary work area)	139.4 Acres	2.0 Acres	137.4 Acres	2.0 Acres	2.0 Acres	0
Electrical Collection System (14-feet on one side of access road)	43,306 feet 13.9 Acres	0	39,209 feet 12.5 Acres	0	4,097 feet 1.4 Acres	0
Access Roads (20 feet wide permanent travel width, with 8 feet wide temporary shoulders on each side of road)	48,489 feet 17.8 Acres	48,489 feet 22.3 Acres	39,328 feet 14.3 Acres	39,328 feet 18.1 Acres	9,161 feet 3.5 Acres	9,161 feet 4.2 acres
Fiber Optic Cable	Within electrical collection system disturbance					
Material Storage/Staging/ Laydown Areas	N/A	N/A	N/A	N/A	Total Difference	Total Difference
Concrete Batch Plant	N/A	N/A	N/A	N/A	6.9 Acres	4.2 Acres

Alt 1 Total Impacts Removed
11.1 Acres of impacts removed by using Final EIR Layout

ALTERNATIVE 2

Component	Draft EIS Layout		Final EIS Layout		Alt2 -Difference between Final EIS and Draft EI	
	Temporary Disturbance	**Permanent Disturbance**	**Temporary Disturbance**	**Permanent Disturbance**	**Temporary Disturbance**	**Permanent Disturbance**
Wind Turbine Tower Pads (55 by 40 feet permanent turbine pad, within a 220 feet radius temporary work area)	128.9 Acres	1.9 Acres	127.1 Acres	1.9 Acres	1.8 Acres	0
Electrical Collection System (14-feet on one side of access road)	40,451 feet 13.0 Acres	0	36,065 feet 11.4 Acres	0	4,386 feet 1.6 Acres	0
Access Roads (20 feet wide permanent travel width, with 8 feet wide temporary shoulders on each side of road)	45,635 feet 16.7 Acres	45,635 feet 20.9 Acres	36,213 feet 13.1 Acres	36,213 feet 16.6 Acres	9,422 feet 3.6 Acres	9,422 feet 4.3 acres
Fiber Optic Cable	Within electrical collection system disturbance					
Material Storage/Staging/ Laydown Areas	N/A	N/A	N/A	N/A	Total Difference	Total Difference
Concrete Batch Plant	N/A	N/A	N/A	N/A	7.0 Acres	4.3 Acres

Alt 2 Total Impacts Removed
11.3 Acres of impacts removed by using Final EIR Layout

Parsons, Sara

From: Parsons, Sara
Sent: Friday, May 30, 2014 3:36 PM
To: Perry, Cedric C; Cristina Gispert (CGispert@esassoc.com)
Cc: Parsons, Amy
Subject: Tylerhorse - revised conceptual layout
Attachments:

Cedric and Cristina,

As previously discussed, we have modified the conceptual site plan based on a field visit with our lead meteorologist and design engineers with the objective of decreasing potential impacts associated with the project by reducing road and collector line lengths. Attached please find our modified conceptual layout with fewer temporary and permanent impacts than the current conceptual layout in the DEIS. We will still need to microsite the final layout between the ROD and NTP based on the final permit conditions and turbine selection, but this layout is further refined than the one in the DEIS and is submitted to show our efforts to reduce the impacts described in the DEIS. We plan to submit this layout with our other comments on the DEIS, but I wanted to send this to you as soon as possible so that we could discuss it and present it at the public meeting on June 18th. As we discussed in the last few project conference calls, we plan to depict both layouts in the public meeting. In addition to the revised layout, attached are tables comparing impact calculations for this layout and the DEIS layout.

1. Figure 2 (map of layout)
2. Tables of total disturbance, comparing this version to DEIS version
3. Tables of veg/land cover impacts, comparing this version to DEIS version

Note that for all project elements, the new project layouts have a smaller footprint than the DEIS project layouts. This is true for both Alts 1 and 2.

Please let me know if you have any questions.
Sara

Sara McMahon Parsons, (503) 796-7732; **NEW** Cell (503) 830-5160

PROPOSED ACTION (ALTERNATIVE 1)

	Project Element	Veg Community / Land Cover	Draft EIS Acreage	Final EIS Acreage
TEMP IMPACTS	Electrical 14 ft wide, one side of the road	Disturbed (is a land cover, not a veg commun	0.4	0.4
		Joshua Tree Woodland	1.0	0.9
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.1	0.0
		Mojave Mixed Woody Scrub	3.5	3.5
		Mojavean Juniper Woodland and Scrub	6.3	5.5
		Non-Native Grassland	2.6	2.2
	Road 8 ft shoulder on each side	Disturbed	0.7	0.6
		Joshua Tree Woodland	1.2	1.0
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.0	< 0.1
		Mojave Mixed Woody Scrub	4.5	4.0
		Mojavean Juniper Woodland and Scrub	8.1	6.2
		Non-Native Grassland	3.3	2.5
	Turbine 220 ft radius (excludes turbine pad, see below)	Disturbed	2.8	2.8
		Joshua Tree Woodland	12.9	10.2
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	2.1	2.3
		Mojave Mixed Woody Scrub	35.7	35.5
		Mojavean Juniper Woodland and Scrub	54.0	64.8
		Non-Native Grassland	32.0	21.8
		Total Temporary Impacts:*	**171.2**	**164.2**

	Project Element	Veg Community / Land Cover	Draft EIS Acreage	Final EIS Acreage
PERM IMPACTS	Road 20 ft wide	Disturbed	0.7	1.0
		Joshua Tree Woodland	1.5	1.3
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.1	< 0.1
		Mojave Mixed Woody Scrub	5.6	5.1
		Mojavean Juniper Woodland and Scrub	10.2	7.8
		Non-Native Grassland	4.2	2.9
	Turbine 40x55ft pad	Disturbed	0.0	0.1
		Joshua Tree Woodland	0.2	0.2
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.0	0.0
		Mojave Mixed Woody Scrub	0.5	0.5
		Mojavean Juniper Woodland and Scrub	0.8	0.9
		Non-Native Grassland	0.5	0.3
		Total Permanent Impacts:*	**24.3**	**20.1**

ALTERNATIVE 2

	Project Element	Veg Community / Land Cover	Draft EIS Acreage	Final EIS Acreage
TEMP IMPACTS	Electrical 14 ft wide, one side of the road	Disturbed	0.4	0.3
		Joshua Tree Woodland	1.0	0.9
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.1	0.0
		Mojave Mixed Woody Scrub	3.5	3.5
		Mojavean Juniper Woodland and Scrub	5.3	4.6
		Non-Native Grassland	2.6	2.1
	Road 8 ft shoulder on each side	Disturbed	0.6	0.5
		Joshua Tree Woodland	1.2	1.0
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.0	< 0.1
		Mojave Mixed Woody Scrub	4.5	4.0
		Mojavean Juniper Woodland and Scrub	7.0	5.2
		Non-Native Grassland	3.3	2.4
	Turbine 220 ft radius (excludes turbine pad, see below)	Disturbed	2.5	2.7
		Joshua Tree Woodland	12.9	10.2
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	2.1	2.3
		Mojave Mixed Woody Scrub	35.7	35.5
		Mojavean Juniper Woodland and Scrub	43.8	54.6
		Non-Native Grassland	32.0	21.8
		Total Temporary Impacts:*	**158.5**	**151.6**

	Project Element	Veg Community / Land Cover	Draft EIS Acreage	Final EIS Acreage
PERM IMPACTS	Road 20 ft wide	Disturbed	0.7	0.9
		Joshua Tree Woodland	1.5	1.3
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.1	< 0.1
		Mojave Mixed Woody Scrub	5.6	5.1
		Mojavean Juniper Woodland and Scrub	8.9	6.5
		Non-Native Grassland	4.2	2.8
	Turbine 40x55ft pad	Disturbed	0.0	0.1
		Joshua Tree Woodland	0.2	0.2
		Mojave Creosote Bush Scrub	0.0	0.0
		Mojave Desert Wash Scrub	0.0	0.0
		Mojave Mixed Woody Scrub	0.5	0.5
		Mojavean Juniper Woodland and Scrub	0.7	0.8
		Non-Native Grassland	0.5	0.3
		Total Permanent Impacts:*	**22.9**	**18.5**

Tylerhorse Wind Project Draft Environmental Impact Statement
Iberdrola Renewables LLC
Comments and Suggested Revisions

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
1	Executive Summary	ES-4	Table ES-1, Air Resources, Proposed Action: 40 Wind Turbine Generators	Summary for Proposed Action should reflect data within the updated July 2014 Tylerhorse Air Quality Technical Report: "Mitigated *Annual* Construction Emissions...*Mitigated Annual* Operations and Maintenance Emissions - ROG - <1 tons/yr, NO_x - 1 tons/yr, CO - 1 tons/yr, SO_X - 0 tons/yr, PM_{10} - ~~3~~ *1 tons/yr* , $PM_{2.5}$ - ~~1 tons/yr~~ *<1 tons/yr*	Table ES-1 should accurately reflect technical data within July 2014 Air Quality Technical Report, and be more explicit on what these numbers convey.
2	Executive Summary	ES-4	Table ES-1, Air Resources, Alternative 2: 37 Wind Turbine Generators	Summary for Alternative 2 should reflect data within the updated July 2014 Tylerhorse Air Quality Technical Report: "Mitigated *Annual* Construction Emissions - ROG - 2 tons/yr, NO_x - ~~8 tons/yr~~ *13 tons/year* , CO - 8 tons/yr, SO_X - ~~0 tons/yr~~*<1 tons/year* , PM_{10} - ~~10 tons/yr~~ *12 tons/yr* , $PM_{2.5}$ - 2 tons/yr *Mitigated Annual* Operations and Maintenance Emissions - ROG - <1 tons/yr, NO_x - ~~<1 tons/yr~~ *1 tons/yr* , CO - 1 tons/yr, SO_X - 0 tons/yr, PM_{10} - ~~3~~ *1 tons/yr* , $PM_{2.5}$ - ~~1 tons/yr~~ *<1 tons/yr*	Table ES-1 should accurately reflect technical data within July 2014 Air Quality Technical Report, and be more explicit on what these numbers convey.
3	Executive Summary	ES-4	Table ES-1, Global Climate Change, Proposed Action: 40 Wind Turbine Generators	Summary for Proposed action should reflect data within the updated July 2014 Tylerhorse Air Quality Technical Report: "Construction: CO_{2e} - ~~38,338~~ *38,292* tons/year…Operation: CO_{2e} - ~~2,893~~ *2,890* tons/yr	Table ES-1 should accurately reflect technical data within July 2014 Air Quality Technical Report.
4	Executive Summary	ES-4	Table ES-1, Livestock Grazing: Alternative 2 - 37 Wind Turbine Generators	Revise as follows: "Alternative 2 would be slightly decreased relative to the Proposed Action, *as* a total of ~~94~~ *181* acres of foraging acreage would be affected during construction. The permanent disturbance associated with Alternative 2 are estimated to be 23 acres of the total 960 acre total."	The Proposed Action would affect a total of 195 acres of foraging acreage, as stated in the Proposed Action. Alternative 2 would remove the 94-acre western-most parcel from the project, but would not affect 94 acres of foraging acreage, as the sentence currently states. The total acreage affected under the Alternative 2 is 181 acres (a total of 14.0 acres less than the Proposed Action). The location of the 22.8 (~23), acres of permanent impacts should be checked against the 960 acres of grazing allotment in the TWP to determine if all 23 acres of permanent impacts fall within the 960 grazing allotment acres.
5	Executive Summary	ES-7	Table ES-1, Vegetation Resources, Alternative 2 - 37 Wind Turbine Generators	Please revise as follows: "The nature of these impacts are similar to the Proposed Action, but Alternative 2 would decrease impacts to vegetation communities by approximately ~~9.5~~ *13.7* acres as compared to the Proposed Action.	Impacts to vegetation differ by 13.7 acres between Alternative 1 and Alternative 2
6	Executive Summary	ES-8	Table ES-1, Wildlife Resources, Alternative 2 - 40 Wind Turbine Generators	Please revise as follows: "Direct disturbance of ~~190.0~~ *190.9* acres of wildlife habitat."	Acreage typo correction.
7	Executive Summary	ES-8	Table ES-1, Wildlife Resources, Alternative 2: 37 Wind Turbine Generators	Please revise as follows: "Construction: Construction-related *impacts* with Alternative 2 would be similar in type as those described ~~above~~ for the Proposed Action, but the direct disturbance to Mojavean Juniper Woodland scrub ~~and Non-native Grassland~~ would be reduced in proportion to the reduction in Project size for Alternative 2. Operation and Maintenance: Direct and indirect operations and maintenance impacts associated with Alternative 2 would be similar in type as those described for the Proposed Action, but the ~~direct disturbance of the Mojavean Juniper Woodland scrub and Non-native Grassland~~ *magnitude* would be reduced in proportion to the reduction in project size for Alternative 2."	Mojavean Juniper Woodland scrub is the only vegetation type that has a decreased level of construction-related impact between Alternative 2 and the Proposed Action. No non-native grassland is impacted in the western-most parcel. Also direct and indirect operations and maintenance impacts are not necessarily vegetation related, and a more general sentence of the change in magnitude of operations impacts between the Proposed Action and Alternative 2, as written on page 4.21-19 seems more appropriate.
8	Chapter 1: Introduction and Purpose and Need	1-3	Applicant's Objectives, 5th bullet	Recommend revising text: Avoiding Desert Wildlife Management Areas *(DWMA)* , Critical Habitat, and Areas of Critical Environmental Concern.	The acronym is not defined in the glossary or in the introduction. References to DWMA later in the document may be unclear.
9	Chapter 1: Introduction and Purpose and Need	1-4	1.2 General Location and Map, 1st paragraph	Recommend the following revision: "Ancillary facilities will be located on *adjacent private parcels entitled for* the adjacent MWEP, ~~and~~ PWEP *and CREP* that *were* ~~was~~ approved on private lands by the Kern County Board of Supervisors ~~on July 29, 2008 and is currently under construction~~ *(see Figure 2-1)* . *MWEP, PWEP and CREP are* separate *renewable energy projects approved by the Kern County Board of Supervisors on private lands."*	These projects are no longer in construction, and as written, it is unclear whether the approval date refers to MWEP, PWEP, or both. Added CREP as well for consistency with POD and rest of DEIS.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
10	Chapter 1: Introduction and Purpose and Need	1-5	1.4.2 California Desert Conservation Area (CDCA) Plan	Recommend the following revision: "The CDCA Plan states that unclassified parcels, which do not ~~to~~ contain sensitive resources and would be better used for development purposes will be considered for disposal after appropriate inventories and consultation with local governments are completed."	Typo.
11	Chapter 2: Proposed Action and Alternatives	2-26	2.8.3 Other Types of Energy Projects, final sentence of this paragraph	Recommend revising text: ~~"Each of these alternative technologies not carried forward for analysis are addressed in Table 2-9 below."~~	There is no Table 2-9 in the text or the TOC, so this sentence should either be removed entirely, or the table should be provided.
12	Chapter 2: Proposed Action and Alternatives	2-27	2.8.4 Distributed Generation	Recommend the following revision: "In addition, the Energy Policy Act of 2005 ~~set for the sense of Congress that~~ *establishes a goal for* the Secretary of the Interior ~~should~~ *to* approve 10,000 MWs of electricity from non-hydropower renewable energy projects located on public lands."	Sentence is awkward as written. Added language reflects that included in BLM IM 2011-059.
13	Air Resources	3.2-1	3.2 Air Resources	Regarding the following sentence in the first paragraph of this section, "The discussion provided in this section is based on the information provided in the *Tylerhorse Wind Energy Project Air Quality Impact Technical Repor*t, March 2014, prepared by Sapphos Environmental, Inc. (see Appendix H) and updated where applicable." No text revisions, see justification for summary of updates to Appendix H.	For clarification, the Air Quality Impact Technical Report, included as Appendix H to the DEIS, was updated and transmitted to ESA for inclusion in the DEIS on March 28 and again on April 8, 2014; the revisions to the AQ Tech Report in March and April updated the construction assumptions for the URBEMIS model and the resulting daily and annual construction emissions, emissions for conformity determination, and GHG emissions impacts and the operational impacts and its ability to offset emissions. However, some of the April updates were not included in the DEIS and the March 2014 version was attached to the DEIS rather than the April 8, 2014 version. Subsequent to DEIS publishing, in July 2014, Sapphos updated the AQTR cumulative impacts analysis based on consultation with Kern County, and also added GHG emissions offset from the embodied energy in water saved, criteria air pollutants, and water use that would otherwise result from electricity production from a fossil fuel-based electricity generation facility. Because the CCAR General Reporting Protocol used in the original Appendix H does not provide a method for calculating PM, SOx and VOC, the July updates were made based on a comparison with the Palomar Power Plant. These updates were made to better define the project benefits. This updated July 2014 AQ tech report revision is attached to this comment matrix (with all changes between the March and July versions shown in tracked changes) and should replace the March 2014 version within the FEIS. DEIS Text Revisions are suggested in this comment matrix for consistency with the updated July 2014 Appendix H. On May 30, 2014, the project proponent sent the BLM a map of a modified conceptual layout (with fewer temporary and permanent impacts), tables of total disturbance, and tables of vegetation and land cover impacts. The overall impacts are lower than those described in the Air Quality Impact Technical Report and DEIS, so it is not necessary to update the July 2014 Air Quality Impact Technical Report with the May modified conceptual layout. A copy of the May 30, 2014 transmittal to the BLM is included with this comment matrix. The final layout will depend on turbine selection, engineering and environmental constraints and the final BLM ROD conditions.
14	Air Resources	3.2-2	Existing Air Quality	Text should read: "Table 3.2-1 presents a three-year summary of air quality data collected at the monitoring stations for ozone, ~~and~~ particulate matter, *carbon monoxide, and nitrogen dioxide.*	Table 3.2.1 also includes carbon monoxide and nitrogen dioxide and should be included in this sentence.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
15	Global Climate Change	3.3-1	3.3, Global Climate Change, first sentence	Revise to include the following: "This section describes the existing global climate change setting and the applicable regulations, plans, and standards. *This discussion is based, in part upon information provided in the Tylerhorse Wind Energy Project Air Quality Impact Technical Report, March 2014, prepared by Sapphos Environmental, Inc. (see Appendix H) and updated where applicable.*	Other chapter 3 introductions mention the primary sources used for that section, and Global Climate Change should be no different. For clarification, the Air Quality Impact Technical Report, included as Appendix H to the DEIS, was updated and transmitted to ESA for inclusion in the DEIS on March 28 and again on April 8, 2014; the revisions to the AQ Tech Report in March and April updated the construction assumptions for the URBEMIS model and the resulting daily and annual construction emissions, emissions for conformity determination, and GHG emissions impacts and the operational impacts and its ability to offset emissions. However, some of the April updates were not included in the DEIS and the March 2014 version was attached to the DEIS rather than the April 8, 2014 version. Subsequent to DEIS publishing, in July 2014, Sapphos updated the AQTR cumulative impacts analysis based on consultation with Kern County, and also added GHG emissions offset from the embodied energy in water saved, criteria air pollutants, and water use that would otherwise result from electricity production from a fossil fuel-based electricity generation facility. Because the CCAR General Reporting Protocol used in the original Appendix H does not provide a method for calculating PM, SOx and VOC, the July updates were made based on a comparison with the Palomar Power Plant. These updates were made to better define the project benefits. This updated July 2014 AQ tech report revision is attached to this comment matrix (with all changes between the March and July versions shown in tracked changes) and should replace the March 2014 version within the FEIS. DEIS Text Revisions are suggested in this comment matrix for consistency with the updated July 2014 Appendix H. The project proponent sent the BLM a map of the May modified conceptual layout (with fewer temporary and permanent impacts), tables of total disturbance, and tables of vegetation and land cover impacts to the BLM on May 30, 2014, and the overall impacts are lower than those described in the Air Quality Impact Technical Report and DEIS, so it is not necessary to update the July 2014 Air Quality Impact Technical Report with the May modified conceptual layout. A copy of the May 30, 2014 transmittal to the BLM is included with this comment matrix. The final layout will depend on turbine selection, engineering and environmental constraints and the final BLM ROD conditions.
16	Cultural Resources	3.4-2	In between Area of Potential Effects and Physical Setting	Please include a short description of the DIZ after the discussion of the Area of Potential Effects. This is the language utilized in the CRTR: "*Direct impact zone (DIZ) measures 354.1 acres and consists of areas that will be subjected to direct effects, such as direct ground disturbance associated with the construction, operation, and maintenance of up to 40 wind turbines, access roads, and a 34.5-kilovolt (kV) underground electrical collection system. The DIZ also includes a 100-foot buffer around the areas of direct ground disturbance that will account for incidental effects such as dust, erosion caused by grading, accidental vehicular traffic, and so forth*."	The use of the term DIZ is a technical term that requires definition.
17	Cultural Resources	3.4-9	Class III Intensive Field Surveys	Recommend adding text: "Sapphos conducted Class III intensive field surveys in accordance with the supplemental instructions provided by the BLM and the SHPO and within the guidelines of the BLM Manual 8110, section 210. Class III surveys are full-coverage surveys intended to completely assess the presence of cultural resources within the area surveyed. *The BLM reviewed and approved the work plan and issued a Cultural Use Permit CA-10-37 prior to execution of the surveys..."*	This is to express that all work plans were approved by the BLM before any surveys were conducted
18	Cultural Resources	3.4-17	Eligibility of Prehistoric and Historic Archaeological Resources	Please correct number of historic period isolates as follows: "…, and ~~three~~ *four* historic-period isolates (TY-Isolage-2, TY-Isolage-3, TY-Isolate-4, and TY-Isolate 5)."	The sentence names four historic period isolates, and the following table, Table 3.4-5, clearly shows there are 4 historic period isolates
19	Cultural Resources	3.4-19	Summary of Cultural Resources, last sentence of first paragraph	Revise as follows: "This total includes one previously recorded *prehistoric* site (CA-KER-1906, which was re-located); four new prehistoric sites (TY-Site-1, TY-Site-2, TY-Site-3, and TY-Site-4), one prehistoric isolate (TY-Isolate-1)~~.~~; *two* historic sites (TY-*Site*-5 and TY-*Site*-~~5~~6), and *four historic* isolates (TY-*Isolate*-2, TY-*Isolate*-3, TY-*Isolate*-4, and TY-*Isolate*-5.)"	Correct typo in the number of historic sites and their naming scheme.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
20	Cultural Resources	3.4-19	Summary of Cultural Resources, first sentence of 2nd paragraph	Revise as follows: "None of these resources are located within the proposed Project's Direct Impact Zone, and as such, will not be affected by the construction, operation, or decommissioning of the project.~~).~~"	Typo (remove extra parenthesis and period at end of sentence)
21	Lands & Realty	3.6-1	5th paragraph, numbered 3	CACA 45552~~3~~	Typo, correct CACA # is 45553
22	Lands & Realty	3.6-1	Bottom of page	Recommend inserting text as follows: In addition to the adjacent MWEP, PWEP and CREP, additional uses on private land within roughly a 15-mile radius include three private airstrips, one public airstrip, one public airport facility, the western boundary of Edwards Air Force Base, and Willow Springs International Motorsports Park (PWEP, Draft Environmental Impact Report, 2010). *The nearest sensitive receptors identified in the vicinity of the Proposed Action are a residence located approximately 440 feet north of Section 24 and a residence located approximately 990 feet west of Section 28, as shown on Figure 3.6-X. A residence is defined as an occupied dwelling on record with the tax assessor.*	Recommend BLM provide further information on closest sensitive receptor in the affected environment, including a figure in Section 3.6 Lands and Realty. Also, BLM should define what constitutes a dwelling in the BLM analysis, including the date at which point the dwelling should be on record.
23	Noise	3.9-1	Environmental Noise Fundamentals	Revise text as follows: "Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad *range* ~~band~~ of frequencies. *The normal audible* v~~arying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a~~ sound spectrum *covers* ~~ranging in~~ frequen*cies* ~~y~~ from 20 to 20,000 Hz ~~is plotted. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum."~~	Sound power differs from magnitude or volume. Sound pressure level is a more accurate measure of amplitude/magnitude. "Force" is a rather strong word given the "force" of a loud sound (94 dB)is similar to that of 0.004 inches of water.
24	Noise	3.9-1	Noise Exposure and Community Noise	Revise text as follows: "An individual's noise *or sound* exposure is a measure of noise over a period of time. *In this report noise and sound are used interchangeably.* A noise *or sound* level is a measure of ~~noise~~ *the sound pressure level* at a given time~~, however, they rarely persist consistently over a long period of time.~~"	Clarification
25	Noise	3.9-1	Noise Exposure and Community Noise	Revise text as follows: "Community noise is primarily the product of many distant noise sources, which *may* constitute a relatively stable background noise exposure, with the individual contributors unidentifiable."	Background noise is not always stable, this is particularly true in areas with variable wind speed.
26	Noise	3.9-3	Last sentence of 2nd full paragraph	Revise text as follows: "With regard to increases in A-weighted noise level, the following relationships occur *when comparing similar sounds:"*	Clarify that when comparing different sounds, these relationships are not realized.
27	Noise	3.9-4	3.9.1.2 Physical Setting, and Global Change	CH2M HILL is all caps with a space.	Typo
28	Noise	3.9-6	3.9.2, Applicable Regulations, Plans, and Standards, Kern County General Plan	The last sentence for the Kern County General Plan should be revised as follows: "~~The following General Plan goals and policies are~~ *Of the 8 policies outlined in the Kern County General Plan* , *the following 7 policies are* applicable to the proposed Project."	This clarifies that Policy 6 was intentionally left out.
29	Paleontological Resources	3.10-2	Paleontological Resources Inventory, end of 2nd paragraph	Please add the following paragraph: *The TWP site is immediately adjacent to two operational wind energy projects that were monitored for paleontological resources during construction. No fossils or indications of fossils were located during these efforts.* Reference: Paleo Solutions, Inc. 2012. Final Paleontological Monitoring Report, Manzana Wind Energy Project, Kern County, California, August	Substantial evidence to support EIS analysis.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
30	Public Health and Safety	3.11-2	1st sentence on top of page	Recommend revising text: The nearest sensitive receptors identified in the vicinity of the Proposed Action *are a residence located approximately 440 feet north of Section 24 and a residence located approximately 990 feet west of Section 28, as shown on Figure 3.6-X. A residence is defined as an occupied dwelling on record with the tax assessor.* ~~is located approximately 1,365 feet from the nearest construction site.~~	Recommend BLM provide further information on closest sensitive receptor in the affected environment, including a figure in Section 3.6 Lands and Realty. Also, BLM should define what constitutes a dwelling in the BLM analysis, including the date at which point the dwelling should be on record.
31	Public Health and Safety	3.11-3	Shadow Flicker	Revise text as follows: "Shadow flicker is the alternating change in light and intensity that occur when rotating wind turbine blades cast moving shadows on the ground or on structures. ~~Shadow flicker effects may have the potential to cause seizures in individuals prone to epilepsy. Flicker from wind turbines that interrupt or reflect sunlight at frequencies greater than 3 Hertz (equivalent to 180 rotations per minute) poses a potential risk of inducing photosensitive seizures (Harding et al., 2008).~~"	The allegation is sometimes made that shadow flicker from wind turbines can cause epileptic seizures. This is not true—shadow flicker from wind turbines occurs much more slowly than the light "strobing" associated with seizures. The strobe rates generally necessary to cause seizures in people with photosensitive epilepsy are 5 to 30 flashes per second and large wind turbine blades cannot rotate this quickly. http://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures
32	Public Health and Safety	3.11-3	Waste Management, last sentence	Recommend revising text: The next closest landfill is the Mojave-Rosamond Landfill (about 20 miles *northeast* from the site).	Provide reader with directional orientation
33	Public Health and Safety	3.11-4	Unexploded Ordinance (UXOO), 3rd sentence	Revise to read "In 1942, an Army Air Base *was established* near Muroc Lake, which later became Edwards Air Force Base (AFB)."	Editorial comment
34	Public Health and Safety	3.11-4	Abandoned Mine Lands (AML), last sentence	Revise as follows: "In some areas of Kern County, there are abandoned mine shafts which, if not secured, could ~~contribute~~ *cause an* ~~to the~~ injury ~~of~~ or fatality to unsuspecting members of the public."	Editorial comment
35	Public Health and Safety	3.11-4	Abandoned Mine Lands (AML)	Revise last sentence of paragraph to include direction of nearest mine: "The closest known abandoned mine site is the Tylerhorse Canyon Deposit, which is approximately three miles *to the (direction)* ~~away~~ from the TWP site."	Provide reader with directional orientation
36	Public Health and Safety	3.11-4	Interference with Radio-Frequency Communication, 2nd paragraph, 2nd sentence	Define "AM" interference (amplitude modulated?)	Editorial comment
37	Public Health and Safety	3.11-5	Fire Hazards, 2nd sentence	Revise to include distance and direction of nearest fire station: "The nearest fire station to the TWP site is Kern County Fire Station 15 located *approximately 15 miles to the east* in Rosamond.	Provide reader with distance and directional orientation
38	Public Health and Safety	3.11-5	Nuisance Shocks, 1st sentence	Revise: "Nuisance shocks are caused by *electrical* current flow at levels generally incapable of causing significant physiological harm."	Editorial comment
39	Public Health and Safety	3.11-6	EMF	Recommend revising text: Possible health effects associated with exposure to EMFs have been the subject of scientific investigation since the 1970s. Concern about EMF originally focused on electric fields; however, much of the recent research has focused on magnetic fields. *Magnetic field levels in the vicinity of wind turbines have been found to be lower than those produced by many common household electrical devices and were well below any existing regulatory guidelines with respect to human health.* Although the health effects of EMF remain uncertain, field intensity, transients, harmonics, and changes in intensity over time are some of the EMF characteristics that may need to be assessed to ascertain eventual human exposure effects. These characteristics may vary from power lines to appliances to home wiring and so may create different types of exposures. The exposure most often considered is intensity or magnitude of the field. It is recognized that public concern and scientific uncertainty remain regarding the potential health effects of EMF exposure. However, agencies such as the California Public Utilities Commission (CPUC) have yet to adopt any specific numerical standard for EMFs. Currently, the State has not adopted any specific limits or regulation for EMF levels related to electric power facilities.	Update text with latest research and clarify the low level of EMF associated with wind turbines. http://www.ehjournal.net/content/13/1/9 https://www.bpa.gov/Projects/Projects/I-5/2012documents/EMF-Final-Report-11-23-09.pdf

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
40	Recreation	3.12-2	Table 3.12-1: Regional Recreation Areas	Add a definition of OHV below ACEC = Areas of Critical Environmental Concern at the bottom of the table that says "*OHV = Off-Highway Vehicles* "	Although the term OHV is defined in the Transportation section and the glossary, the tables in the introduction for recreation and within the Recreation section are where the term is first used.
41	Special Designations	3.15-2	Section 3.15.1 Environmental Setting, National Scenic and Historic Trails	Recommend revising text: The proposed TWP is adjacent to a segment of the Pacific Crest National Scenic Trail (PCT) in the southern half of Section 28, Township 10 North, Range 15 West of the San Bernardino Meridian*, as shown on Figure 3.12-1 and Figure X [insert ESA Figure from Public Meetings showing PCT in relation to existing environment (including existing turbines) and proposed TWP turbines.*	Reference to the figure provides a useful visual of a text description. Figure 3.12-1 is first referenced in the Recreation chapter but should also be referenced in the PCT discussion in the paragraph describing National Scenic and Historic Trails. The Figure from the public meeting should also be included to show the location of the PCT in relation to the existing setting, including operational turbines, and the proposed action.
42	Vegetation	3.17-2	Natural Communities	Insert the following language between the 1st and 2nd Paragraph on this page, immediate before "The Project area...": "*Sapphos Environmental, Inc. conducted plant community mapping at the proposed action area in 2005 and 2011. Proposed action data and aerial photographs were reviewed, and site visits were conducted on April 14 and 15, 2005, to map and characterize the vegetation communities within the proposed action property. The site was revisited on November 23, 2011 to further refine the boundaries of the plant communities present on-site (Sapphos 2011a).* "	All other sections in 3.17.1 mention methods at least briefly, methods for plant community mapping should be added for consistency, based on description in original BRTR (Sapphos 2011a, which has no "a" designation in the reference for this section).
43	Vegetation	3.17-2	Natural Communities - 2nd Paragraph, 2nd Sentence	Revise text: 'Of these communities, Mojavean juniper woodland and scrub is the predominant association at approximately ~~567~~ *565* acres (47 percent), followed by Mojave mixed woody scrub at ~~278~~ *276* acres (23 percent), non-native grassland at roughly ~~205~~ *202* acres (17 percent), Joshua tree woodland at ~~96~~ *98* acres (8 percent), and Mojave desert wash scrub at ~~36~~ *40* acres (3 percent) (Table 3.17-1) (~~Sapphos, 2011a,~~ *Sapphos, 2014*). An additional ~~25~~ *26* acres (2 percent) of lands are classified as "Disturbed" to account for impacted areas where minimal to no native vegetation is present.'	Numbers and citation should be updated to reflect the correct vegetation community impacts for the conceptual layout shown on Figure 2-2 in the DEIS, and contained within the December 22, 2011 Biological Assessment (Sapphos 2011b) and the Bird and Bat Conservation Strategy (Sapphos 2013, which is not included as a reference in this document, but is in the Appendix). After these documents were finalized and the DEIS was published, the proponent provided the BLM with a modified conceptual layout with fewer temporary and permanent impacts on May 30, 2014; neither these documents nor the DEIS reflect the May modified conceptual layout. However, the proponent sent a map of the layout, tables of total disturbance, and tables of vegetation and land cover impacts to the BLM with the transmittal on May 30, 2014. A copy of this transmittal is included with this comment matrix. The final layout will depend on turbine selection, engineering and environmental constraints and the final BLM ROD conditions.
44	Vegetation	3.17-2	Table 3.17-1	Update table to reflect correct vegetation impact numbers included above.	See Comment on page 3.17-2, above (Comment No. 43)
45	Vegetation	3.17-3	Joshua Tree Woodland - 2nd Paragraph, 1st sentence	Revise: "Joshua tree woodland occupies approximately ~~96~~ *98* acres of the *proposed action* area (Table 3.17-1; Figure 3.17-1)."	See Comment on page 3.17-2, above (Comment No. 43)
46	Vegetation	3.17-3	Mojave Desert Wash Scrub - 4th line	Revise: "Mojave Desert wash scrub occupies approximately ~~36~~ *40* acres of the *proposed action* area (Table 3.17-1; Figure 3.17-1)."	See Comment on page 3.17-2, above (Comment No. 43)
47	Vegetation	3.17-3	Mojavean Juniper Woodland and Scrub - 6th line	Revise: "Mojavean juniper woodland and scrub occupies approximately ~~567~~ *565* acres of the *proposed action* area (Table 3.17-1; Figure 3.17-1)."	See Comment on page 3.17-2, above (Comment No. 43)
48	Vegetation	3.17-4	Mojave Mixed Woody Scrub - 2nd Paragraph, 1st Line	Revise: "Mojave mixed woody scrub occupies approximately ~~278~~ *276* acres of the *proposed action* area (Table 3.17-1; Figure 3.17-1)."	See Comment on page 3.17-2, above (Comment No. 43)
49	Vegetation	3.17-4	Non-Native Grassland - 3rd line	Revise: "Non-native grassland occupies approximately ~~205~~ *202* acres of the *proposed action* area."	See Comment on page 3.17-2, above (Comment No. 43)
50	Vegetation	3.17-7	Special Status Plants - 2nd to last Paragraph, 2nd Sentence	Revise as follows: "Special attention was given to those areas ~~supporting areas~~ with high potential to support special-status plant species, such as riparian areas and areas with calcareous soils."	Revise sentence for clarity.
51	Vegetation	3.17-8 and 3.17-9	Table 3.17-2, Special-Status Plan Species with Potential to Occur in the Project Area	Revise: Four additional special-status species were surveyed for during the spring 2012 surveys that are not included in the table, including: Barstow wooly sunflower, Red Rock Poppy, Charlotte's phacelia, and Grey-leaved violet, as described in Addendum No. 1 to the BRTR (Sapphos 2013) in Table 2 within Attachment 3. These should be added to Table 3.17-2.	Table should be updated to reflect all considered special status plant species.

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52	Visual Resources	3.18-1	Section 3.18.1, Regional Setting	Revise as follows: "The City of Tehachapi *is* located approximately *13* ~~15~~ miles north of the Project site, and the unincorporated community of Rosamond is located approximately *15* ~~17~~ miles to the west-southwest."	Sentence is missing a verb. Also, based on Google earth, Tehachapi is approximately 13 miles north of the Project site, not 15, and Rosamond is 15 miles away from the project, not 17.
53	Visual Resources	3.18-3	Paragraph 4	Please revise this sentence by removing the word Project and adding a period and spaces: "as a basis for constraining or encouraging surface disturbing activities. ~~Project~~ They are considered the baseline data for…"	Typo - project does not make sense in this portion of the sentence. A period should be added between activities and They.
54	Visual Resources	3.18-5	Sources of Visual Resource Inventory Data	Add a space between the words Appendix and G at bottom of paragraph.	Typo - missing space
55	Visual Resources	3.18-5	SQRU No. 017 (Sierra Nevada Foothills) and SQRU No. 031 (Mojave Valley)	In both sections, scores given for each element of scenic quality have extra spaces between the ones digit and the tenth digit after the decimal. For ex. (landform, 3. 5; vegetation, 3. 5;)	Typo - excessive spaces after periods that are not located at the end of sentences making reading and interpretation of scores difficult.
56	Visual Resources	3.18-7	BLM Visual Resources Management Classification	Remove extra parenthesis before BLM: "As part of its planning efforts, the ~~(~~BLM conducts…"	Typo - extra parenthesis
57	Visual Resources	3.18-8	National Park Service, National Trails System Act, Paragraph 2	"approximately 2 miles east of the PCT at its closes t point"	Typo - Should be closest instead of closet.
58	Visual Resources	3.18-8	National Park Service, National Trails System Act, Paragraph 2	Please add a period at the end of last sentence of paragraph.	Typo - missing period
59	Water Resources	3.19-3	3.19.1. Surface Water Hydrology and Drainage, 3rd paragraph, last word	Change "overland flow," to "sheet flow."	More accurate description of flow
60	Water Resources	3.19-4	3.19.1, Flooding, 2nd to last sentence	Insert "the entire *proposed action* property is designated as Flood Zone "C" (areas of minimal flooding and no standing water).	More accurate description of flood hazard, and to be consistent with the tech report
61	Water Resources	3.19-5	Wastewater	Revise as follows: "Wastewater from these toilets would be removed on an as-needed basis *by a licensed hauler* , and treated at ~~regionally located facilities~~ *an existing municipal sewage treatment facility* . No onsite wastewater disposal would occur. *A Waste Management Plan would be developed for the TWP by the Applicant.* "	Section should be consistent with section 2.2.5 Environmental Plan
62	Wildland Fire Ecology	3.21-1	Last paragraph on page	Please add Mojave mixed woody scrub to vegetation-fuel types: "The vegetation-fuel types in the Study Area~~:~~, *including* Joshua tree woodland, Mojave Desert wash scrub, Mojavean juniper woodland and scrub, *Mojave mixed woody scrub,* and non-native grassland, are not fire-adapted.	There are 5 plant community types in the study area (see Bird and Bat Conservation Strategy, Sapphos, 2013) and Mojave mixed woody scrub was not included in this paragraph.
63	Wildland Fire Ecology	3.21-2	Second paragraph	The second paragraph has the incorrect plant community acreages. Please see revisions below: "Within the TWP study area, Mojavean juniper woodland and scrub is the predominant vegetation community and represents the largest area at *47* ~~74~~ percent (~~813~~ *565* acres), followed by *Mojave mixed woody scrub at 23 percent (276 acres),* non-native grassland at ~~about~~ 17 percent (~~185~~*202* acres)~~.~~, Joshua tree woodland ~~contributes to another~~ *at* 8 percent (~~92~~*98* acres)~~ of the total~~, and ~~while the remaining 1~~ *Mojave Desert wash scrub at 3* percent (~~10~~*40* acres). ~~of the Project area includes Mojave Desert wash scrub~~. *An additional 2 percent (26 acres) of the study area is mapped as disturbed.* With the exception of non-native grassland *and disturbed areas* , major threats to these community types include fire, grazing, off-road vehicles, and invasions of alien species."	These are incorrect acreages (Bird and Bat Conservation Strategy, Sapphos, 2013) and an additional plant community was not incorporated into this paragraph.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
64	Wildlife Resources	3.22-1	3.22 Wildlife Resources	Add Bird and Bat Conservation Strategy (Sapphos 2013) and the Golden Eagle Nest Survey MFR (Sapphos 2013) as primary sources	These documents provide more recent, comprehensive summary information about bird surveys conducted on the project between 2011 and 2013, subsequent to drafting of the original BRTR or BA, some parts of which are out of date.
65	Wildlife Resources	3.22-3	Avian Species	Recommend the following revision: "As characterized in the BRTR *and Addendums No. 1 and 2 to the BRTR* (see Appendi~~x~~*ces* C-1*, 2, and 3* of this Draft EIS), avian use data for the project area from site specific studies and ~~recent~~ surveys for the adjacent (and to a degree, encompassing) Manzana Wind Energy Project and Pacific Wind Energy Project *were* conducted between 2004 and 2013 (Sapphos, 2011a; *Sapphos 2013; Sapphos 2014)* "	Sentence did not have a verb, also opening the sentence in this way focused on old surveys conducted between 2004 and 2006, rather than the much more recent surveys conducted in 2011-2013. The opening sentence should contain reference to the bio tech report as well as the addendums to give an overall sense of avian use surveys on the project. The two addendums should be cited here and added to the 3.22 references section.
66	Wildlife Resources	3.22-4	Avian Species	Recommend the following revision: "Avian *point* count surveys *(bird use counts) and burrowing owl occupancy surveys* were additionally performed on the project site between December 2011 and November 2012 (Sapphos, 2013)."	Specify the types of surveys, and add burrowing owl surveys.
67	Wildlife Resources	3.22-4	First complete paragraph.	Change first sentence to include the aerial surveys conducted in 2013: "Additional aerial surveys, focusing on golden eagles, were conducted by helicopter on May 20 to 31, 2010, February 28 to March 10, 2011, ~~and~~ May 25 to June 1, 2011*, and April 11 to May 31, 2013* to determine the presence or absence of golden eagle nests, and the nests of other raptors.	Surveys were conducted in 2013 also, as described in the BBCS (Appendix C-4 of this EIS).
68	Wildlife Resources	3.22-4	2nd paragraph	Change DeTech to DeTect, Inc.	Company name is DeTect, Inc.
69	Wildlife Resources	3.22-4	Avian Species	Recommend the following revision: "Table 3.22-1 summarizes avian surveys conducted ~~on~~ *in the project area, including adjacent* project sites, that were summarized in the BRTR*, Addendums No. 1 and 2 to the BRTR, and the BBCS."*	The table includes some surveys not described in the BRTR, so this sentence should be more inclusive. The 2013 eagle surveys are only referenced via the BBCS, so that should be included as well.
70	Wildlife Resources	3.22-4	Table 3.22-1	Remove duplicate mention of 2011-2012 bird use counts, keeping the more descriptive comments column. Merge duplicate cell mentions of Diurnal Avian Surveys in left-hand column.	Formatting correction.
71	Wildlife Resources	3.22-4	Table 3.22-1	Add Aerial raptor surveys conducted in 2010, 2011, and 2013, and Burrowing Owl Surveys conducted in 2011 and 2012.	These surveys are not included in the table. The methods and results of the 2010 and 2011 surveys are described in the BRTR. The methods and results of the 2013 surveys are described in the BBCS (Appendix C-4 of this EIS). The Burrowing Owl Surveys are described in Addendum No. 1 to the BRTR.
72	Wildlife Resources	3.22-5	Mammals - 1st line	Revise the following sentence: "~~Most desert mammals are nocturnal, but occasionally a few may be seen during the day.~~ *Desert mammals are primarily nocturnal; however, nocturnal desert mammals may be occasionally observed during daylight hours and some species of desert mammals are primarily diurnal* ."	Sentence requires clarification. It is unclear whether it refers to the fact that some nocturnal desert mammals may be seen during the day, or that some desert mammals are diurnal, and thus can be seen during the day.
73	Wildlife Resources	3.22-6	Mammals	After the first paragraph of this page, a new paragraph should be added before "Two ungulate species" to describe the methods for MGS trapping, which is summarized in Addendum No. 1 to the BRTR.	Other small mammal surveys are described here, therefore MGS surveys and results should also be described.
74	Wildlife Resources	3.22-6	Mammals	Within the last paragraph of the mammals section, a general description of the bat surveys conducted in and around the project area should be described. These are summarized in the BRTR and the BBCS.	Other mammal survey types are described here, therefore bat surveys and results should also be described.
75	Wildlife Resources	3.22-6	Mammals - Last Paragraph, 2nd to last line.	Insert the following language before the last sentence of this paragraph: "*The Townsend's big-eared bat (Corynorhinus townsendii), which was recently accepted as a candidate for listing as threatened pursuant to the California Endangered Species Act was not detected during focused bat surveys and was determined unlikely to be present in the project area.* "	Townsend's big-eared bat was recently accepted as a candidate for threatened status under the California ESA and should be discussed/assessed further in this section as suggested here.
76	Wildlife Resources	3.22-8	Table 3.22-2, Special-Status Wildlife Species with Potential to Occur in the Project Area	Adjust Low-Moderate-High/Present designations to be consistent throughout table.	present/absent designations and seasonal occurrence information is often in boldface within Table 3.22-2, but this is not used consistently throughout the table.
77	Wildlife Resources	3.22-8	Table 3.22-2	Explain how the 'Potential Occurrence in the Project Area' was defined/assigned.	
78	Wildlife Resources	3.22-8+	Throughout	Order species alphabetically or by status under taxonomic group in Table 3.22-1 and following discussion, reorder if necessary.	Order of species does not appear to be taxonomic or alphabetical, making it difficult to search for particular species in the text.

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79	Wildlife Resources	3.22-8+	Table 3.22-2 and entire section 3.22, Section 4.21, Glossary	Clarify Special-status vs. sensitive and which statuses warranted individual discussion.	Table 3.22-2 and the Glossary (p. Glossary-13 of this EIS), imply that all of the statuses provided in the table are considered special statuses, and that all species with any of these statuses are included in the table and following discussions. However, species that only have "lower" statuses (e.g., USFWS Bird of Conservation Concern, state Watch List) and not a "higher" special status with more formal protections (are not T&E, CDFW BCC, state fully protected, BGEPA, etc.), are not mentioned in the table or individually discussed (e.g., Costa's hummingbird and Nuttall's woodpecker are both USFWS BCC). Recommend clarifying in at least one part of the text and/or glossary which special-status levels warranted a species' individual discussion.
80	Wildlife Resources	3.22-8	Table 3.22-2 - Desert Tortoise	Revise Table to say "low" potential occurrence for desert tortoise, consistent with the BRTR and DEIS text on page 3.22-14, which states: "Therefore, while no desert tortoises were identified in the project area, there is a low potential for tortoises to move into the area due to available habitat and the relatively close proximity of known occurrences."	Table 3.22-2 states the potential for occurrence of desert tortoise is moderate. Revise the table for consistency.
81	Wildlife Resources	3.22-8	Table 3.22-2	For Cooper's hawk, remove CSC status and add Watch List status	Regulatory Correction. See the CDFW Special Animals List (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf).
82	Wildlife Resources	3.22-9	Table 3.22-1	Add BGEPA protection to golden eagle status. Also in footnote and description on pg. 3.22-7	Regulatory Correction.
83	Wildlife Resources	3.22-9	Table 3.22-2	For ferruginous hawk, remove CSC status and add Watch List status	Regulatory Correction. See the CDFW Special Animals List (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf).
84	Wildlife Resources	3.22-10	Table 3.22-2	For merlin, remove CSC status and add Watch List status	Regulatory Correction. See the CDFW Special Animals List (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf).
85	Wildlife Resources	3.22-10	Table 3.22-2	For prairie falcon, remove CSC status and add Watch List status	Regulatory Correction. See the CDFW Special Animals List (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf).
86	Wildlife Resources	3.22-10	Table 3.22-2	Add CFP status to American Peregrine Falcon	Regulatory Correction. See: http://www.dfg.ca.gov/wildlife/nongame/t_e_spp/fully_pro.html
87	Wildlife Resources	3.22-10	Table 3.22-2	Remove CSC status from Le Conte's thrasher or add a footnote that explains that the Antelope valley population of this species is not CSC, consistent with the BRTR.	Regulatory Correction. See the CDFW Special Animals List (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf). Le Conte's thrasher is a CSC (CDFW Species of Special Concern) only for the population in the San Joaquin valley. Other populations, including the one in the Antelope Valley, are not.
88	Wildlife Resources	3.22-11	Table 3.22-2	Update mammals section of table to include Townsend's big-eared bat. The following information should be included: ***Status:*** *--/SCT/CSC/BLM/--* ***Habitat:*** *Inhabits cliff, desert, conifer forest, hardwood forest, mixed forest, grassland/herbaceous, old field, savanna, shrubland/chaparral, conifer woodland, hardwood woodland, and mixed woodland habitats. Roosts in caves and mine tunnels.* ***Potential Occurrence in the Proposed Action Area: Low****. No local CNDDB records and no roosts detected in the project area. Species was not detected nor determined to be potentially present during USFS acoustic surveys.* **NOTE:** SCT stands for State Candidate Threatened and should be included in the Key for this Table.	Townsend's big-eared bat was recently accepted as a candidate for threatened status under the California ESA and should be assessed in this table.
89	Wildlife Resources	3.22-13	Desert Tortoise- 2nd Paragraph, 6th line	Include citation for following sentence: "However, surveys at the Nevada Test Site revealed that tortoise sign (e.g., scat, burrows, tracks, shells) was…[Insert Reference]."	The "Nevada Test Site" is not mentioned elsewhere in the DEIS, nor are the "Nevada Test Site surveys" cited. These surveys are not described in the BRTR. Please include adequate citation for the surveys.
90	Wildlife Resources	3.22-14	Desert Tortoise- Last Paragraph - 2nd Line	"Additionally, an active burrow located six miles to the east and two separate live tortoise sightings approximately five miles to the east *were observed* (Sapphos, 2011a)."	Incomplete sentence, revise as shown.
91	Wildlife Resources	3.22-14	Avian Species	Recommend the following revision: "Several special-status species were identified as *occurring, or* potentially occurring, in the Manzana Project study area, which is considered representative of the project area, *and the TWP project area itself*. As previously indicated, surveys for avian species included directed presence/absence surveys*, avian point counts,* ~~and~~ counts of winter raptors, spring and fall migration surveys, raptor nest surveys, and songbird surveys."	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, as well as those conducted on Manzana.

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92	Wildlife Resources	3.22-14	Cooper's hawk	Recommend the following addition, after the last existing sentence for cooper's hawk: ": *No Cooper's hawks were observed as a result of avian point counts conducted on the TWP project area in 2011 and 2012 (Sapphos 2013)."*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself.
93	Wildlife Resources	3.22-14	Sharp-shinned hawk	Recommend the following addition at the end of the paragraph describing sharp-shinned hawk: *"No sharp-shinned hawks were observed as a result of avian point counts conducted on the TWP project area in 2011 and 2012 (Sapphos 2013)."*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself.
94	Wildlife Resources	3.22-15	Golden Eagle-first line	Revise text: "The golden eagle (Aquila chrysaetos) *is protected under the Bald and Golden Eagle Protection Act (BGEP* A), *and* is a USFWS Bird of Conservation Concern, BLM Sensitive Species, and a state fully protected species.	Regulatory Correction.
95	Wildlife Resources	3.22-15	Golden Eagle	Recommend the following revision: "~~Resident~~ Golden eagles, *presumed to be resident birds* from nearby areas *based on behavior* , were observed foraging in the *Manzana* Project area *during avian surveys conducted* in 2004~~,~~ and 2005~~, 2011. and~~ *A mix of presumed resident eagles and migrants* were observed in the *Manzana* project area during *both* spring and fall migration, *as well as over winter* ."	Clarify where eagles were seen (on Manzana project area) and in what years/seasons. No golden eagles were recorded on the Manzana or the Tylerhorse project areas during 2011, so this should be corrected.
96	Wildlife Resources	3.22-15	Golden Eagle	Recommend the following revision: "Winter surveys document~~s~~ed wintering eagles in the *Manzana Project* ~~study~~ area in addition to the presumed resident eagles (Sapphos, 2013)."	Verb tense correction and clarification of where eagles were documented.
97	Wildlife Resources	3.22-15	Last paragraph on the page	Clarify in first sentence that a pair of eagles was observed, but no nest was found. Recommend revising text as follows: "A ~~nesting~~ golden eagle pair was observed by Bloom Biological, Inc. during directed surveys for raptor nests for the Manzana Project study area in ~~July and~~ August 2004, approximately 4.3 miles west of the northwestern corner of the project area. However, ~~the exact location of this nest could not be confirmed~~ *no active nest site was observed (Bloom 2004).*	First sentence of the paragraph inaccurately states that Bloom Biological observed a nesting pair of golden eagles. Also, the survey dates are inaccurate: a single aerial survey was conducted on August 13, 2004. Because the survey was conducted in August after the completion of the nesting season, this observation could not have been of an actively nesting pair. The report does not mention any chicks or fledglings observed in the proposed nest site. The report of the 2004 survey (report prepared in 2006) described the observation as "No golden eagle nests were found onsite but one adult pair was observed with a nest in either a cliff, digger pine, or valley oak." No nest was found in this location during the 2013 survey, as described within the BBCS (Appendix C-4 of this EIS). The Bloom report of the 2004 survey and Sapphos' 2013 aerial survey report are not currently attached to the EIS or appendices, though they are summarized, albeit in ways that are not as clear as they could be (esp. for the Bloom report). However, the Bloom report is already public because it was in the Manzana/PdV EIR (http://www.co.kern.ca.us/planning/pdfs/eirs/PdV/Vol%20II_13%20Appendix%20C%20BIOLOGICAL%20PdV%20DEIR.pdf). It is awkward to be citing all these summaries, it is recommended that the original reports are cited here. After the DEIS was published, Bloom Biological discovered an active golden eagle nest containing two young chicks in the Tehachapi Mountains on May 15, 2014 while conducting an aerial raptor nesting survey for the Manzana Wind Plant in Kern County, California. The tree nest, two young, and two adults were located 4.73 miles (7.62 kilometers) north-northwest from the most west of the three parcels comprising the Tylerhorse Wind Project. Bloom prepared a technical memorandum summarizing the location which was provided to the BLM.
98	Wildlife Resources	3.22-15	Last paragraph on the page	Recommend revising text to accurately describe surveys and include 2014 Bloom data: "Subsequent aerial surveys conducted for nesting golden eagles in ~~May~~ 2010*, 2011 and 2013* by Sapphos Environmental, Inc. within a large geographic area that included the area surveyed by Bloom Biological, Inc. failed to detect golden eagle nests in the area reported by Bloom Biological, Inc *(Bloom 2004; Sapphos 2013, Sapphos 2011a) . After the DEIS was published, Bloom Biological discovered an active golden eagle nest containing two young chicks in the Tehachapi Mountains on May 15, 2014 while conducting an aerial raptor nesting survey for the Manzana Wind Plant in Kern County, California. The tree nest, two young, and two adults were located 4.73 miles (7.62 kilometers) north-northwest from the most west of the three parcels comprising the Tylerhorse Wind Project (insert reference to technical memorandum summarizing the location which was provided to the BLM). "*	Aerial surveys were conducted in 2010, 2011 and 2013, and described in the BRTR (Sapphos 2011a), 2013 Aerial Survey MFR (Sapphos 2013 [this would need to have a letter qualifier as there is already a Sapphos 2013 reference]), and BBCS (Appendix C-4).

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99	Wildlife Resources	3.22-16	Golden Eagle	Recommend the following revision: "Based on the findings of ~~three~~ aerial surveys performed in 2010, ~~and~~ 2011, *and 2013,* no golden eagle nests were identified within 10 miles of the project area, and the nearest active golden eagle nest was approximately 15 miles west of the project area (see Appendix C-1, pg. 5-22 *and Appendix C-4*)."	Reflect 2013 aerial surveys in sentence, and cite the BBCS, which contains the results of these surveys.
100	Wildlife Resources	3.22-16	Burrowing Owl	Recommend the following revision: "*Between 2004-2006, t*his species was observed over-wintering within grassland and open shrub habitats in the *Manzana* project area, but nesting ~~has~~ *was* not ~~been~~ observed *with* in the *Manzana* project area (Sapphos, 2011a). ~~A~~ *One* burrow with owl sign (whitewash) was noted on~~-site~~ *the Manzana Project area* during desert tortoise protocol surveys in spring 2005. Four burrowing owls and three owl burrows were observed during focused surveys *on the TWP project area* in fall 2011 (Sapphos, 2011a; Appendix C-1, pg. 524)."	Clarification of where certain burrowing owl results occurred. There should be a focus on clarifying where species were seen on Manzana, and where they were seen on the project (TWP) itself.
101	Wildlife Resources	3.22-16	Ferruginous hawk	Recommend that this sentence be deleted, and replaced with text directly from the BRTR, as follows: "~~In 2004, 23 ferruginous hawk observations were made in and near the project area during winter surveys, and during spring and fall raptor migration surveys, with approximately five individual haws hunting over the project vicinity in winter (Sapphos, 2011a).~~ *Moderate numbers of ferruginous hawks, a total of 23 observations in the fall of 2005 alone, were observed during surveys conducted within the Manzana Project area during winter presence surveys and spring and fall raptor migration surveys. Although use of the project area was moderate for migration in the fall, only approximately five individual hawks hunted over the project vicinity over winter (Sapphos, 2011a). A single ferruginous hawk was observed during the course of reconnaissance surveys on the TWP project area in April 2012 (Sapphos 2013)."*	Existing sentence misrepresents the data within the BRTR and complicates it unnecessarily. Updated data from Addendum No. 1 (Sapphos 2013) on special status species should be included.
102	Wildlife Resources	3.22-17	Last paragraph on the page	Clarify that 48 observations of individual Swainson's hawks were made, not 48 individuals. Suggested language: "During 2005 fall migration surveys, 48 ~~birds were observed and~~ *separate Swainson's hawk observations were made, and of these 48,* at least 35 ~~*observations were made of*~~ ~~individuals were reported~~ flying below 330 feet above ground level (AGL) (Sapphos, 2011a). *The same individuals could have been recorded over multiple observations. A single Swainson's hawk was observed incidentally on the TWP project during special status plant surveys in April 2012, but the species was not otherwise observed during avian use surveys on the TWP project area in 2011 and 2012 (Sapphos 2013).*	Sentence is confusing, and should clarify the difference between individuals and observations (which could be of the same individuals over multiple observations). A sentence describing observations of the species during 2011 and 2012 surveys should be added.
103	Wildlife Resources	3.22-18	Vaux's Swift	Recommend the following revision: "This migratory species is known to sporadically occur in Kern County, and several hundred individuals were observed during various field surveys *within the Manzana* Project area during spring and fall migrations *between 2004-2006* (*Sapphos 2011a*). *No Vaux's swift were observed during the course of avian surveys on the TWP project area in 2011 and 2012 (Sapphos 2013)."*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
104	Wildlife Resources	3.22-18	Northern harrier	Recommend the following revision: "*Between 2004-2005,* Northern harriers were observed in the *Manzana* project area during raptor surveys and are believed to be a winter resident species (Sapphos, 2011a). *A total of two northern harriers were observed during the course of avian surveys on the TWP project area in 2011 and 2012 (Sapphos 2013)"*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
105	Wildlife Resources	3.22-18	White-tailed kite	Recommend the following revision: "During site surveys, a single kite was observed near the *Manzana* project area in November 2005; flying over grassland at an elevation of 100 feet (Sapphos, 2011a). *No kites were observed during the course of avian surveys on the TWP Project area in 2011 and 2012 (Sapphos 2013)."*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
106	Wildlife Resources	3.22-18	Merlin	Recommend the following revision: "All of the merlin observations occurred during fall and spring migration through the Antelope Valley, suggesting low use of the ~~project property~~ *TWP Project area and the surrounding vicinity* (Sapphos, 2011a; Sapphos 2013)"	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself.

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107	Wildlife Resources	3.22-18,19	Prairie Falcon	Recommend the following revision: "No nests were identified during field surveys conducted for the Manzana Project study area.~~, but the p~~ Prairie falcon was observed foraging within most habitats within the *Manzana* project area during both the winter raptor surveys and the spring and fall migratory surveys *between 2004-2006* (Sapphos, 2011a). S*imilarly, prairie falcon was observed at least three times during the course of winter, summer, and fall point count surveys on the TWP Project area in 2012 (Sapphos 2013)."*	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
108	Wildlife Resources	3.22-19	American Peregrine falcon	Recommend the following revision: "~~Avian surveys in the project area verified that p~~ Peregrine falcons *are migratory and may pass* through the project area ~~during a short window of time~~ during fall and spring migrations. A single peregrine falcon was observed flying at above 500 feet AGL during the fall 2005 survey (Sapphos, 2011a). *No peregrine falcons were subsequently observed during the course of avian surveys on the TWP Project area in 2011 and 2012 (Sapphos 2013).* There are no records for nesting American peregrine falcons in the Tehachapi Mountains."	The BRTR does not conclude that surveys verified that this species migrates through the area, just that one was observed during this time period. A strong assertion should not be made from this one sighting. Further, the paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself.
109	Wildlife Resources	3.22-19	California Condor	Recommend the following revision: "As of ~~April 30, 2011~~ *March 31, 2014* , the wild condor population in California numbered ~~106~~ *131* individuals. The southern California flock, which is the flock nearest the project area, consisted of ~~34~~ 70 free-flying released ~~adults, 10~~ *and* wild-fledged birds~~, and 3 chicks in wild nests for a total of 47 birds (USFWS, 2012)~~ *(USFWS 2014)* ."	These numbers are out of date and should be updated. Also the reference here is listed as the Land-based Wind Energy Guidelines in the 3.22 reference section, which does not contain this information. The appropriate citations is: U.S. Fish and Wildlife Service. 2014. California Condor Recovery Program Population Size and Distribution Overview Page, March 31, 2014. California Condor Recovery Program. Available at: http://www.fws.gov/cno/es/calcondor/PDF_files/2014/Condor%20Program%20Monthly%20Status%20Report%202014-3-31.pdf
110	Wildlife Resources	3.22-20	California Condor	Recommend updating FEIS with latest condor flock locations from USFWS GPS data.	Latest biological information.
111	Wildlife Resources	3.22-21	Loggerhead shrike	Recommend the following revision: "Loggerhead shrikes were observed during numerous surveys of the *Manzana* project area, with the detection of approximately 10 to 15 breeding individuals (Sapphos, 2011a). *Between 4 and 9 observations were made of this species during each season of avian surveys on the TWP project in 2011 and 2012* , and ~~are a~~ *the species is considered a* year-round resident of the project area *(Sapphos 2013)* ."	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
112	Wildlife Resources	3.22-21	American white pelican	Recommend the following revision: "...favoring shallow water. *No American white pelicans were observed as a result of avian point counts conducted on the TWP project area in 2011 and 2012 (Sapphos 2013).* American white pelicans…"	The paragraphs summarizing special-status avian species should include species-specific results from the 2011-2013 surveys conducted on the project itself, and it should be made clear what project the species were observed on.
113	Wildlife Resources	3.22-21	Le Conte's Thrasher	Remove CSC status from Le Conte's thrasher	Le Conte's thrasher is a CSC (CDFW Species of Special Concern) only for the population in the San Joaquin valley. Other populations, including the one in the Antelope Valley, are not.
114	Wildlife Resources	3.22-21	Mammals	Revise as follows: "Four terrestrial special-status mammals were identified *as potentially occurring* in the project region: southern grasshopper mouse (*Onychomys torridus*), San Joaquin pocket mouse (*Perognathus inornatus*), American badger (*Taxidea taxus*), and Mohave ground squirrel (*Xerospermophilus* (=*Spermophilus*) *mohavensis*). These species and special-status bats are discussed below."	MGS was not identified in the "project region", therefore the sentence has been modified to say potentially occurring.
115	Wildlife Resources	3.22-22	Mohave Ground Squirrel	Insert and remove the following language: "A habitat assessment identified non-suitable habitat for the Mohave ground squirrel in the project area~~; therefore, surveys were not conducted for this species.~~ *however, d* etailed field surveys were conducted *within the proposed action area in 2012 as well as* for the Manzana Project following CDFW survey protocols, with negative survey findings. Based on the results of literature review, agency coordination, consultation with experts, and detailed field surveys within *the proposed action area and* the Manzana Project study area, it has been determined that this species is likely absent from the proposed action area (Sapphos, 2011a, *2013*)."	Mohave Ground Squirrel surveys were in fact conducted in the proposed action area. Details from these surveys can be found in Addendum-1 to the BRTR (Appendix C-2). Update this section, Table 3.22-2, and all other relevant sections to reflect this. Ensure the proper citation is listed here and within the References section.

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116	Wildlife Resources	3.22-23	Bats - 1st Paragraph, last sentence.	Insert the following language at the end of paragraph 1: "*The Townsend's big-eared bat (Corynorhinus townsendii), which was recently accepted as a candidate for listing as threatened pursuant to the California Endangered Species Act, was not detected during USFS bat surveys and was determined unlikely to be present in the proposed action area."*	Townsend's big-eared bat was recently accepted as a candidate for threatened status under the California ESA and should be discussed/assessed further in this section as suggested here.
117	Wildlife Resources	3.22-23	First sentence of 2nd paragraph.	Clarify the end of the sentence. Suggested revision: "roosting sites are believed to be considerably more widespread *than are* represented in the database."	Missing words obscure the sentence's meaning.
118	Environmental Consequences	4.1-5	Renewable Energy Projects Included in the Cumulative Scenario	No text comment, see justification for problem with sentence which includes: "these projects are identified in Table 4.1-1 (see those identified by footnote number 1 in the "Project Type" column)."	These projects do not appear to have a footnote in the "Project Type" column of Table 4.1-1. This should be added.
119	Environmental Consequences	4.1-5	4th paragraph, numbered 1	1. Not all developers will develop the detailed information necessary to meet ~~BLM~~ *environmental and regulatory* standards.	Not all projects are on BLM land.
120	Environmental Consequences	4.1-5	6th paragraph, numbered 3	3. After project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent *on project economics (including any reduction in energy output and costs of permit compliance),* the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.	While all projects must obtain permits, project fruition is driven more by project economics than permit schedules and the last three paragraphs on this page underestimate the importance of financial factors in determining which projects will be funded and constructed. It is important for the public and BLM to recognize that Alternatives that reduce the project energy generation and increase permit compliance costs may render the project economically unviable and result in the No Action Alternative.
121	Environmental Consequences	4.1-5 and 6	2nd paragraph on page 4.1-5 and Table 4.1-1 on page 4.1-6.	Revise the following language to clarify the criteria used to compile the list of projects in Table 4.1-1 (i.e. Tehachapi area, southern Kern County, or within a certain mile radius based on the various geographical scopes analyzed for each environmental resource): "As of January 2013, there were 53 wind and solar development projects *within X miles of Proposed Action [or within the various geographic scopes for each Section?]* totaling 14,293 MW proposed in California in various stages of the environmental review process or under construction. Of these 53 renewable projects, 3 wind projects have been proposed in BLM's Ridgecrest Field Office service area; these projects are identified in Table 4.1-1 (see those identified by footnote number 1 in the "Project Type" column). In addition to these development proposals, 29 wind testing projects are under review or have been approved by the Ridgecrest Field Office."	There are more than 53 projects in development and construction in CA, so the DEIS appears to have limited the list of projects to include only those near the proposed action. For example, the Kingbird project is listed on the Kern County planning website but is not listed. Also, project details should be updated; for ex, the Recurrent Columbia project near Mojave is not a DG project and is in construction and the Avalon project has been approved. We have not compiled a comprehensive list. Also, the project lists in each cumulative impact section should only include the projects in the geographic scope for each resource area, and the lists should be checked for consistency with Tables 4.1-1 and 4.1-2.
122	Environmental Consequences	4.1-6	Table 4.1-1. ID#: 4	Revise as follows: "Formerly the PdV Wind Project, consists of 126 1.5 MW WTGs with a total capacity of 189 MW. *Kern County Final EIR approved a 300 MW project."*	Description should include the entire permitted MW, not just the operating capacity.
123	Environmental Consequences	4.1-7	Table 4.1-1, ID# 9, Project Description	Revise as follows: "*MWEP, formerly* PdV Infill Project...*Part of MWEP, formerly PdV Infill Project*. The infill project entails the relocation of turbines to private lands adjacent to the approved PdV Wind Project. Expanded the approved PdV Wind Project boundary and reconfigured the location of the WTGs, but did not include any increase in the number of WTGs or its MW capacity. C*onsists of 126 1.5 MW WTGs with a total capacity of 189 MW. Kern County Final EIR approved a 300 MW project."*	Clarify that the PdV Infill Project is part of MWEP.
124	Environmental Consequences	4.1-7	Table 4.1-1, ID# 11, Project Description	Revise as follows: "*Part of PWEP.* Refinement of the Pacific Wind Energy Project to relocate WTGs onto land adjacent to the Pacific Wind Energy Project."	Clarify that the Pacific Wind Infill Project (PWIP) is part of PWEP.
125	Air Resources	4.2-1 through 19	Section 4.2	Pages should be numbered 4.2-1, 4.2-2, 4.2-3...	Global format

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126	Air Resources	4.2-1	2nd full paragraph	Recommend adding text: "The TWP would include a maximum of 40 wind turbines, producing up to 60 MW power, on a small proportion of the approximately 1,207-acre TWP site. Because the TWP project lacks an industrial component that would be considered a lead emission source, the concentrations and emissions of lead were not analyzed for the Proposed Action or alternatives. *The TWP would be constructed in a single phase. Construction of the Proposed Action is expected to take 4 months. However, construction could be delayed by weather or other unforeseen circumstances. Therefore, a two-year pre-operating period has been requested by the Applicant to allow adequate time for construction.* The following factors were assumed in the technical analyses of air quality using the URBEMIS 2007 emission model: 1) Total construction would take a maximum of 4 months…"	The air quality technical report is based on a 4 month construction schedule. However, as stated in Chapter 2, construction could be delayed by weather or other unforeseen circumstances. The technical report has been updated to clarify this as well.
127	Air Resources	4.2-1	4.2.1, Methodology for Analysis, bottom of the page, immediately following the discussion of the URBEMIS model	Should include discussion of EMFAC 2007 Model and assumptions for model from Appendix H, Section 2.4.2. Please add the following text: "*For a more detailed analysis of on-road trips, separate model runs in the CARB EMFAC 2007 model, version 2.3, were performed to analyze the mobile source emissions from equipment traveling to and from the proposed project property during construction and operation. It was assumed that water would be trucked from a location near Rosamond, approximately 21 miles away, and that all other deliveries would be trucked from Palmdale, approximately 42 miles away. To quantify emissions from on-road employee commute trips, it was assumed that 50 percent of the employees commuting to the site for construction activities would be traveling from Palmdale, 25 percent would be traveling from Bakersfield, and 25 percent would be traveling from Tehachapi. It is anticipated that most of these workers would carpool to the corner of Rosamond Boulevard and north along 170th Street West, then along access roads constructed for the Manzana project. Based on these assumptions, the average trip length would be approximately 36 miles. In addition, it was also assumed that each trip would travel 0.5 mile farther along unpaved roads.* *The following additional assumptions were made in the technical analyses of air quality using the EMFAC 2007, version 2.3, model:* *1. Consistent with the traffic study prepared for the proposed project, 477 average daily traffic (ADT) trips would be generated during construction.* *2. Consistent with the traffic study prepared for the proposed project, 24 average daily traffic (ADT) trips would be generated during operation and maintenance activities.* *3. The analysis year for construction- and operation-related mobile sources was set to 2014."*	This model was used to evaluate emissions of mobile sources, and the methodology should be presented within the DEIS.
128	Air Resources	4.2-4	4.2.2, Discussion of Direct and Indirect Impacts, second paragraph, second sentence	Text should read: "The maximum daily regional total CO emission from construction of the Proposed Action is approximately *351 pounds/day* (Table 4.2-1), and the maximum annual regional total CO emission from construction of the Proposed Project is approximately *8 short tons/year* (Table 4.2-2)." On page 3, Table 4.2-1, CO column, Electrical Trenching row, the value should be rounded up to *50*. On page 3, Table 4.2-1, NOx column, Fine Site Grading row, the value should be rounded up to *191*.	The revisions suggested here are consistent with the updated Appendix H. The DEIS text does not match the emissions in Tables 2.6.2.1-1 and 2.6.2.1-2, which were updated in Appendix H. The corresponding text in Appendix H, Section 2.6.2.2, fourth paragraph, second sentence has been be changed to "8.49 short tons/year."

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129	Air Resources	4.2-4	4.2.2, Discussion of Direct and Indirect Impacts, Construction, include text immediately before Operational Impact section on page 4	Subsection should read: "*Implementation of the Weed Management Plan (Mitigation measure VEG-1c) may result in additional impacts to air resources. The potential impacts of applying BLM-approved pesticides to local and regional air quality would be nominal. Spray drift (movement of pesticide in the air to unintended locations) and volatilization (the evaporation of liquid to gas) of pesticides would temporarily result in pesticide particles in the air, which may be inhaled. Pesticide particles can be transported away from the target location, depending on weather conditions and the pesticide application method. All pesticides used for this project would contain marker dyes to make the pesticide visible wherever it is applied. Chemical volatilization is temporary in nature, and none of the chemicals proposed for use are likely to result in substantial volatilization from soils (U.S. Department of Interior, Bureau of Land Management (BLM) 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. June. Available at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html).* *Removal of invasive plants would be limited to a relatively small portion of the project. Further, pesticide concentrations in the air tend to increase up to 1.5 kilometers from the point of application (concentrations may double between 0.6 and 1.5 kilometers from the application site), but then decrease slowly at greater distances (BLM 2007). The weed removal areas are not adjacent to any sensitive receptors (e.g., residences, businesses, schools, etc.), so the probability of affecting such receptors is small. Manual treatments would not result in adverse effects to air quality, due to the fact that relatively little of the weed management areas would be manually treated and no sensitive receptors are adjacent to these areas. Accordingly, residual impacts to air resources resulting from the implementation of the Weed Management Plan will be minimal. No additional residual impacts to air resources would occur with the implementation of the avoidance, minimization, and mitigation measures* ."	Implementation of the WMP will not adversely affect air resources, but these impacts should be discussed. See CA IM-2012-004.
130	Air Resources	4.2-5	4.2.2, Discussion of Direct and Indirect Impacts, Construction, first paragraph, fifth sentence	Text should read: "In addition, the TWP would be anticipated to prevent the emission of approximately ~~57~~ *6.1* short tons *(5.5 metric tons)* of NOx per year due to the displacement of fossil fuel ~~use~~ *based electricity generation* , which is equivalent to approximately ~~312~~ *33* pounds of NOx per day based on a generation capacity of 60 MW."	Section 2.6.3, Table 2.6.3-1, of the revised Appendix H provides calculations of criteria pollutants that would be offset by the operation of the proposed project.
131	Air Resources	4.2-5	4.2.2, Discussion of Direct and Indirect Impacts, Operation, include text immediately before Local Operational Impacts on page 5	Add the following text: "*The operational impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction* ."	Implementation of the WMP will not adversely affect air resources, but these impacts should be discussed.
132	Air Resources	4.2-7	Conformity Determination, Table 4.2-5	In the De Minimus Level row, replace "10" with "50" for VOCs and "100" for NOx.	The text references 100 tons per year of NOx and 50 tons per year VOC, but the table uses the extreme nonattainment area standard. Table 2.6.4-1 of the revised Appendix H has been updated accordingly.
133	Air Resources	4.2-7	Decommissioning	Add the following text: "*The decommissioning impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction and operation* ."	Implementation of the WMP will not adversely affect air resources, but these impacts should be discussed.
134	Air Resources	4.2-7	Alternative 2, first sentence	Revise as follows: "Alternative 2 would be similar to the Proposed Action; however under this alternative, the overall size would be reduced by ~~94~~ *14.0* acres *of ground disturbing impacts (1.5 acres of permanent disturbance and 12.5 acres of temporary disturbance) and 3* fewer wind turbine generators would be constructed."	Quantify difference between Proposed Action and Alt 2.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
135	Air Resources	4.2-12	4.2.4, Reasonably Foreseeable Projects, second paragraph, first sentence	The list of projects contributing to cumulative annual emissions has been updated in coordination with Kern County. This is updated in the revised Appendix H. Text should read: "Other proposed projects located within a 6-mile radius include the Avalon Wind Energy Project, the Southern California Edison Tehachapi Renewable Transmission (SCE TRTP) Project,~~-~~the Alta~~–~~Oak Creek Mojave Project, the Antelope Valley Solar Development, ~~the David Firestone Solar Project, the Mon Wei Lin Solar Project,~~ the Morgan Hills Wind Project, the Rosamond Solar Project by First Solar, and the Rosamond Solar Project by SGS. Of the related projects located within a 1-mile and 6-mile radius, the SCE TRTP Project, the Alta~~–~~Oak Creek Mojave Project, the MWEP and the PWEP have completed their construction phases, and therefore only their operational emissions were included in the analysis. *Furthermore, the Catalina Renewable Energy Project, Antelope Valley Solar Development, and Rosamond Solar by First Solar are scheduled to be fully operational by the time construction of the TWP begins.* "	SCE TRTP was already mentioned in the previous paragraph. David Firestone and Mon Wei Lin were both removed from the list of projects by Kern County.
136	Air Resources	4.2-12	4.2.5, Construction, Operations and Maintenance, Decommissioning, first sentence	The list of projects contributing to cumulative annual construction emissions has been updated in coordination with Kern County. This is updated in the revised Appendix H. Text of the first sentence should read, "The mitigated construction emissions anticipated to result from the *Avalon Wind Energy Project, Morgan Hills Wind Energy Project, Rosamond Solar by SGS,* and the Proposed Action were calculated (Table 4.2-11, Cumulative Annual Construction Emissions)."	The list of projects contributing to the cumulative annual emissions listed in the original Air Quality technical report (Appendix H of the DEIS) and DEIS is outdated. Sapphos updated the list of projects in coordination with Kern County and updated the technical report. A copy of the revised Air Quality Technical Report, Appendix H, is included with this comment matrix. The previously listed projects were either dropped from the list by Kern County or have been constructed, or would be constructed by the time Tylerhorse initiates construction. Therefore, they were removed from the list of contributors to cumulative annual construction emissions.
137	Air Resources	4.2-12	4.2.5, Construction, Operations, and Maintenance, Decommissioning, third sentence	Text should read: "Maximum cumulative impacts for ~~VOCs,~~ NOx and PM_{10} emissions resulting from construction of the proposed action…"	Section 2.7.1, third paragraph, and Table 2.7.1-1 of the revised Appendix H have been updated. The overall emissions have come down due to the removal of previously listed projects, but the maximum cumulative annual construction emissions still exceed the thresholds for NOx and PM10. ROG no longer exceeds thresholds.
138	Air Resources	4.2-13	Table 4.2-11	Please replace Table 4.2-11 with the revised Table 2.7.1-1 from the revised Appendix H, which deletes Catalina Renewable Energy Project, Antelope Valley Solar Development, and Rosamond Solar by First Solar, as they are scheduled to be fully operational prior to initiation of construction of the Tylerhorse project. David Firestone and Mon Wei Lin were removed from the list of potential projects by Kern County. The maximum cumulative annual construction emissions recalculated in Table 4.2-11 show that ROG and CO are now below the threshold.	The Catalina Renewable Energy Project, Antelope Valley Solar Development, and Rosamond Solar by First Solar are scheduled to be fully operational by the time when construction of Tylerhorse begins.
139	Air Resources	4.2-13	4.2.5, Construction, Operations and Maintenance, Decommissioning, paragraph below Table 4.2-11, first sentence	Text should read: "The mitigated operational emissions anticipated to result from the EKAPCD portion of the *Avalon Wind Energy Project, the* SCE TRTP Project, the MWEP, the PWEP, the Catalina Renewable Energy Project, the Alta-Oak Creek Mojave Project, the Rosamond Solar Project *by First Solar, the Rosamond Solar Project by SGS, the Antelope Valley Solar Development, the Morgan Hills Wind Energy Project,* and the TWP are reported below in Table 4.2-12."	The corresponding Table 4.2-12 should be replaced with the revised Table 2.7.1-2 from the revised Appendix H, which deletes David Firestone and adds Morgan Hills Wind Energy Project.
140	Air Resources	4.2-13	4.2.5, Construction, Operations and Maintenance, Decommissioning, paragraph below Table 4.2-11, second sentence	Text should read: "Cumulative impacts to ~~VOC~~*ROG,* ~~and~~ NOx*, CO, and SOx* emissions resulting from implementation of the proposed action and related projects would be expected to be below EKAPCD thresholds, even without considering fossil fuel-related emissions displaced by the proposed action."	Although the results did not change with the revised table, the text did not match either version of the table.
141	Air Resources	4.2-14	Table 4.2-12	Please replace Table 4.2-12 with the revised Table 2.7.1-2 from the revised Appendix H, which deletes David Firestone and adds Morgan Hills Wind Energy Project. Although the total emissions values have changed slightly, the impacts from cumulative annual operational emissions have not changed. The only emission exceeding threshold remains PM10, as before.	David Firestone is no longer listed by Kern County as a potential project.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
142	Air Resources	4.2-15	4.2.6, Mitigation Measure, Air-1	In Air-1, d), I., recommend deleting last sentence since watering of disturbed areas is already covered by the second sentence.	There appears to be a typo in the measure, which references watering of "distributed areas." It is assumed that this is a reference to "disturbed areas," which is already covered by the previous sentence.
143	Air Resources	4.2-19	4.2.7, Residual Impacts After Mitigation, Table 4.2-16	Please replace Table 4.2-16, with revised Alternative 2 analysis tables (Alternative 2 Mitigated Estimated Annual Regional Construction Emissions) prepared for and transmitted to ESA on April 9, 2014.	Table in DEIS does not reflect final data analysis transmitted to ESA on April 9, 2014.
144	Global Climate Change	4.3-1 through 5	Section 4.3	Pages should be numbered 4.3-1, 4.3-2, 4.3-3...	Global format
145	Global Climate Change	4.3-2	Quantitative Analysis of GHGs, second paragraph	Please revise the second paragraph as follows: "Annual GHG emissions ~~and potential savings~~ associated with operation of the Proposed Action were quantified using GHG emission factors recommended in CCAR General Reporting Protocol, version 3.1, dated January 2009. *Potential GHG, criteria pollutant, and water offsets from the operation of the proposed project were quantified by comparing the GHG and criteria pollutants and the water use to a natural gas–-fired, combined-cycle electricity generation facility such as the 500-MW Palomar Power Plant.* The Proposed Action was assumed to have a generating capacity of up to 60 MW. Assuming that 100 percent of the electricity produced by the Proposed Action would replace electricity that would otherwise have been generated from conventional energy sources currently used in California, the potential GHG savings from operation of the Proposed Action were calculated by quantifying the GHG emissions that otherwise would have been generated in a no-project scenario."	The July 2014 AQTR supplements the CCAR General Reporting Protocol with additional estimates to better define the project benefits. A comparison with the Palomar Power Plant was used to estimate GHG emissions offset from the embodied energy in water and from criteria pollutants that would otherwise have been have been generated by a fossil fuel-based electricity facility.
146	Global Climate Change	4.3-2	4.3.2, Discussion of Direct and Indirect Impacts, Construction and Operations and Maintenance, last paragraph	CO_{2e} metric tons per year need to be changed according to the updated Appendix H. Please revise as follows: "Operation of the Proposed Action would result in approximately 4,757 pounds per day of CO2 emissions, which is equivalent to 788 metric tons per year, which is equivalent to 2,*890* ~~900~~metric tons of CO_{2e} per year, as shown in Table 4.3-1. The proposed Action is expected to have a 30-year lifetime. It is anticipated that operation of the Proposed Action would result in approximately 86,*696* ~~700~~ metric tons of CO_{2e} over its lifetime."	Technical data correction. Section 2.6.5.2 of the revised Appendix H has been updated and is included with this comment matrix.

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147	Global Climate Change	4.3-2	4.3.2, Discussion of Direct and Indirect Impacts, Construction and Operations and Maintenance, page 2, last sentence	Please make the following corrections to the text to ensure consistency with the AQ Tech Report, which appears as Appendix H in the DEIS - "However, as a potential producer of renewable energy, the proposed action would also be expected to *offset 60,423 metric tons of CO_2 emissions per year by displacing fossil fuel-based electricity generation, while only resulting in 788 metric tons of CO_2 emissions from operations and 348 metric tons from construction (amortized over 30 years of operation), creating a net reduction in CO_2 emissions of 59,287 metric tons per year.* ~~prevent the emission of 60,423 metric tons of CO_2 per year, or 221,550 metric tons of CO_{2e} per year, that otherwise would be emitted as a result of electricity production from non-renewable sources in a no-project scenario~~. *If the GHG emissions offset from the embodied energy in water saved from the Tylerhorse Wind Project is added (632 metric tons of CO_2 emissions per year), the Tylerhorse Wind Project would offset 59,918 metric tons of CO_2 emissions per year.* Since the proposed action is expected to have a 30-year lifetime, the proposed action would be expected to *result in a net reduction of* ~~prevent~~ approximately *1,797,540* ~~6,646,500~~ metric tons of CO_2 ~~CO_{2e}~~ over a 30-year period. *Furthermore, the Tylerhorse Wind Project would offset criteria air pollutants that would otherwise be emitted by fossil-fuel based electricity generation, conservatively estimated at 5.5 metric tons per year of oxides of nitrogen (NOx), 2.3 metric tons per year of particulate matter 10 microns or less in size (PM10), 6.4 metric tons per year of carbon monoxide (CO), 1.8 metric tons per year of oxides of sulfur (SOx), and 1.7 metric tons per year of volatile organic compounds (VOC)."*	Subsequent to DEIS publishing, in July 2014, Sapphos updated the AQTR cumulative impacts analysis based on consultation with Kern County, and also added GHG emissions offset from the embodied energy in water saved, criteria air pollutants, and water use that would otherwise result from electricity production from a fossil fuel-based electricity generation facility. Because the CCAR General Reporting Protocol used in the original Appendix H does not provide a method for calculating PM, SOx and VOC, the July updates were made based on a comparison with the Palomar Power Plant. These updates were made to better define the project benefits. The suggested language adds the GHG emissions offset from the embodied energy in water saved and the criteria area pollutants offset, consistent with the July 2014 AQTR, and provides further details on project benefits.
148	Global Climate Change	4.3-3	4.3.2, Discussion of Direct and Indirect Impacts, Table 4.3-1	Please replace Table 4.3-1 with Table 2.6.5.2-1 from the revised Appendix H, which corrects the CO_{2e} Metric Tons / Year column.	Technical data correction, see revised attached Appendix H.
149	Global Climate Change	4.3-3	Alternative 2, first sentence	Revise as follows: "Alternative 2 would be similar to the Proposed Action; however under this alternative, ~~the overall size would be reduced by 94~~ *14.0 fewer acres of ground disturbing impacts would occur (consisting of 1.5 acres of permanent disturbance and 12.5 acres of temporary disturbance) and 3* fewer wind turbine generators would be constructed."	Quantify difference between Proposed Action and Alt 2.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
150	Cultural Resources	4.4-3	Between the second to last and last paragraph on page 4.4-3	Please insert language into this section regarding the use of pesticides in weed management as follows: "*Herbicide treatment considered as part of the implementation of the Weed Management Plan has the potential to impact cultural resources during construction, operation, or decommissioning. This would depend on the method of herbicide application and the pesticide used. Some BLM-approved herbicides can deteriorate cultural artifacts as a result of causing higher soil acidity, altering the surface of exposed artifacts such as bedrock mortars, and altering or obscuring the surfaces of organic materials. Surfactants can interfere with the Carbon 14 dating of a site (1991 Final Environmental Impact Statement Vegetation Treatment on BLM Lands in Thirteen Western States. BLM Wyoming State Office. Casper, Wyoming). Although no pesticide treatment is being proposed on or near known cultural resources, herbicide use would follow mitigation measures CR-1 and CR-2 to minimize residual impacts.* *Manual treatment of invasive plants also could cause harm to cultural resources; however, personnel conducting the treatments would stay away from known cultural resources, and would halt treatment procedures if unknown cultural resources are discovered. Accordingly, no adverse effects to cultural resources would occur from manual treatment.* *Weed management would result in long-term beneficial effects to cultural resources. This is due to the unknown potential for dust and soil erosion that may be resultant from an influx of non-native plant species. Further, the removal of invasive vegetation would further the restoration and maintenance of any historic and ethnographic cultural landscapes (U.S. Department of the Interior, National Park Service 2003 Invasive Exotic Plant Management Plan and Environmental Assessment. Rocky Mountain National Park, Colorado).* *In conclusion, weed management has the potential to have both beneficial and negative effects on cultural resources; however, effects would not be adverse due to the implementation of Mitigation Measures CR-1 and CR-2 during treatment of non-native and/or invasive plants*	The Weed Management Plan will not adversely affect cultural resources, but these impacts should be discussed.
151	Cultural Resources	4.4-4	Alternative 2 - Modified Proposed Action (37 WTGs)	Revise as follows: "Alternative 2 consists of a reduced acreage alternative to the Proposed Action. Construction would take place on *the* same site as Alternative 1, except the southwest 94-acre parcel would be eliminated from the project. *Under Alternative 2, 3 fewer wind turbine generators and their associated infrastructure would be constructed and 14.0 fewer acres of ground disturbing impacts (1.5 acres of permanent disturbance and 12.5 acres of temporary disturbance) would occur."*	Quantify difference between Proposed Action and Alt 2.
152	Cultural Resources	4.4-4	4.4.3, Geographic Extent/Context	Revise as follows: "The ~~APE~~ *DIZ* consists of approximately 354.1 acres (0.55 square miles) located within 3 block areas of a larger ~~ROW grant area~~ *archaeological APE* of approximately 1,207 acres (1.9 square miles)."	Same as comment on page 3.4-2, APE (1,207 acres) and DIZ (354.1 acres) need to be defined and differentiated
153	Environmental Justice	4.5-2	Alternative 2- Modified Proposed Action (37 WTGs)	Revise as follows: "Alternative 2 would eliminate the southwest 94-acre parcel from the Proposed Action, *resulting in the construction of 3 fewer WTGs and their associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts).* The difference..."	Quantify difference between Proposed Action and Alt 2.
154	Lands & Realty	4.6-2	2nd paragraph, line 3	Revise as follows: "…following construction of the TWP. *The grazing allotment holder will be responsible for maintaining the herd and monitoring for any potential cattle carcasses. Carcasses will be removed immediately, within 24 hours, of discovery by the grazing allotment holder.* Through the process of this DEIS/PA..."	abate any attraction to the project by avian scavengers

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155	Lands & Realty	4.6-2	3rd paragraph, line 4	Revise as follows: "Thus, BLM may decide to dispose of the TWP site even if the ROW is granted and the project is implemented. The *ROW grant would remain valid if the property were transferred and changes would be subject only to bilateral renegotiation requiring the ROW holder's consent"*	To clarify effect if any on the ROW should the property be transferred. http://www.ecfr.gov/cgi-bin/text-idx?SID=864978cfbc10eeaf30635e6f1d638d12&node=43:2.1.1.2.36.7.31.6&rgn=div8 "The BLM will provide reasonable notice to you if there is a proposal to transfer the land your grant encumbers out of Federal ownership. If you request, the BLM will negotiate new grant terms and conditions with you. This may include increasing the term of your grant to a perpetual grant or providing for an easement. These changes, if any, become effective prior to the time the land is transferred out of Federal ownership." 43 CFR 2807.15(b). "You and the new land owner may agree to negotiate new grant terms and conditions any time after the land encumbered by your grant is transferred out of Federal ownership." 43 CFR 2807.15(3)
156	Lands & Realty	4.6-2	4.6.2 Discussion of Direct and Indirect Impacts Alternative 1 - Proposed Action (40 WTGs) - Impacts to Land Use Plans, 2nd paragraph from the bottom of the page	Revise as follows: "...applicable ~~the~~ CDCA Plan"	Typo
157	Lands & Realty	4.6-2	last line under Alternative 2	Revise as follows: "However, with the reduction of the size of the Project site, *approximately 14.0 fewer acres would be subject to ground-disturbing impacts, consisting of 1.5 fewer permanently impacted acres and 12.5 fewer temporarily impacted acres.* ~~less land would be affected.~~"	Quantify difference between Proposed Action and Alt 2.
158	Lands & Realty	4.6-3	Alternative 4, 3rd line	Revise as follows: ", and the BLM would continue to manage the site consistent with the existing land use designation *of Unclassified* in the CDCA Plan."	identify the current designation here
159	Lands & Realty	4.6-3	Geographic Scope, 2nd paragraph	insert…"The potential for impacts to MUC-designated lands has recently increased *across BLM* due to the influx of applications for solar and wind energy facilities."	if this is a general statement by BLM and not site-specific, it should be clarified
160	Lands & Realty	4.6-3 to 4.6-4	Existing Cumulative Conditions, last sentence starting on 4.6-3	~~Potential cumulative impacts to lands and realty uses and land use planning surrounding the TWP site may result from the new structures and development activities that could further restrict access to surrounding land uses.~~	BLM parcels are land locked. TWP is not restricting access or proposing security fencing; private land is restricting access. The proponent can also work with adjacent private landowners who own or have easements across the surrounding private land and need to cross the BLM parcels to minimize impacts during construction and operation. Recommend deleting sentence.
161	Lands & Realty	4.6-4	Construction, Operation and Maintenance, Decommissioning	Revise as follows: "It is expected that some of the cumulative projects described in Table 4.1-1 may be under construction the same time as the TWP, which may result in limited access to BLM lands in Kern County and the surrounding area. As a result, there may be short-term impacts to lands and realty uses during construction of those cumulative projects related to the use of lands, and the Proposed Action could contribute to those possible short-term cumulative impacts. *However, there is no legal public access to the TWP BLM parcels as they currently exist because they are landlocked by private land parcels and no security fencing is proposed.* ~~However, i~~ In consideration of cumulative land use compatibility impacts, the implementation of renewable projects in southern California would occur mostly in undeveloped desert lands or areas of rural development, and would not create physical divisions of established residential communities. In addition, after construction, the TWP site would be restored to pre-project conditions and there would be no conflicts with applicable plans, policies, and regulations.	BLM parcels are land locked. TWP is not restricting access or proposing security fencing; private land is restricting access. The proponent can also work with adjacent private landowners who own or have easements across the surrounding private land and need to cross the BLM parcels to minimize impacts during construction and operation.

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162	Livestock & Grazing	4.7-2	Operation and Maintenance	Revise as follows: "During operation and maintenance the Proposed Action would not preclude livestock grazing on the site, or the Antelope Valley allotment as a whole. *The grazing allotment holder will be responsible for maintaining the herd and monitoring for any potential cattle carcasses. Carcasses will be removed immediately, within 24 hours, of discovery by the grazing allotment holder.* Direct disturbance..."	abate any attraction to the project by avian scavengers
163	Livestock & Grazing	4.7-3	last line under Alternative 2	Revise as follows: "The electrical collection system, access roads, and SCADA system associated with the eliminated WTGs would not be constructed in Alternative 2. *With the reduction in size of the Project site, approximately 14.0 fewer acres would be subject to ground-disturbing impacts, consisting of 1.5 fewer permanently impacted acres and 12.5 fewer temporarily impacted acres..* "	Quantify difference between Proposed Action and Alt 2.
164	Livestock & Grazing	4.7-5	4.7.3 Mitigation Measures, 1st bullet	Revise as follows: "Construction and decommissioning activities should be scheduled around the ephemeral growth season (typically spring months) to the ~~furthest~~ extent possible to minimize the potential for these activities to impact livestock grazing, should vegetative growth during this period be sufficient to permit livestock grazing. *However, because livestock grazing associated with the TWP is extremely limited, other factors, including economic factors such as equipment pricing and project financing will be the primary driver in construction schedule."*	Economic factors are an important driver in construction schedule and would need to be considered. It should be emphasized that this is a recommendation, not a mitigation measure.
165	Mineral Resources	4.8-1	Construction, 3rd and 4th paragraph	Revise as follows: "Appropriate sources of sand and gravel required for construction of the Proposed Action would be identified by a construction contractor and permitted through the BLM *or appropriate jurisdiction."*	Sand and gravel sources may be found on private land outside TWP.
166	Mineral Resources	4.8-1	Construction	Revise as follows: "In connection with the TWP ROW grant application, ~~BLM will segregate~~ *the* approximately 1,207 acres of public lands *under application was segregated* from appropriation, ~~for will segregate~~ ~~from appropriation~~ subject to valid existing rights under public land law including the Mining Law of 1872, as amended, for a period of two years beginning July 15, 2011 (excluding the Material Sales Acts). The BLM determined the segregation necessary to ensure the orderly administration of the public lands while it processes Heartland Winds' ROW application. *The BLM issued an extension to the segregation to protect the project interest in the land on XX."*	Heartland requests that the BLM grant an extension on the segregation.
167	Mineral Resources	4.8-1	Operation and Maintenance	Revise as follows: "As described above, the source(s) of gravel during construction would be identified by a construction contractor and permitted through the BLM *or appropriate jurisdiction.*	Sand and gravel sources may be found on private land outside TWP.
168	Mineral Resources	4.8-2	Alternative 2 - Modified Proposed Action (37 WTGs)	Revise as follows: "Alternative 2 would involve the same components as the Proposed Action, except with the elimination of the southwest 94-acre parcel from the Project, which would result in 3 fewer WTGs *and associated infrastructure* and *14.0* fewer acres of ground disturbance*, including 1.5 fewer acres of permanent impacts and 12.5 fewer acres of temporary impacts."*	Quantify difference between Proposed Action and Alt 2.
169	Noise	4.9-4	Alternative 2- Modified Proposed Action (37 WTGs)	Revise as follows: "Alternative 2 would be similar to the Proposed Action; however under this alternative, the overall size of the project would be reduced by 94 acres ~~and~~. *Three* fewer wind turbine generators, *and the associated infrastructure,* would be constructed *and 14.0 fewer acres, comprised of 1.5 acres of permanent impacts and 12.5 acres of temporary impacts, would be disturbed*. Because Alternative 2 would require the same amount of construction workforce and operational personnel as the proposed action, this alternative would generate ~~either~~ a similar amount of construction and operational noise at the nearest sensitive receptors, and impacts would be similar to the proposed action."	Quantify difference between Proposed Action and Alt 2. The word *either* should be deleted, or sentence should be revised to read correctly.
170	Noise	4.9-5	Geographic Extent/Context	Revise text as follows: "~~At distances greater than one mile, impulse noise may be briefly audible and steady construction and/or operational noise would generally dissipate such that the level of noise would blend in with background noise levels.~~ *Noise levels would be below the applicable numeric threshold."*	Recommend using numerical objective thresholds for impact analysis.

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171	Noise	4.9-6	4.9.4, Mitigation Measures, introductory sentence to mitigation measures	Sentence should read: "The Applicant proposes to implement the following measures to ensure that any potential noise impacts of *TWP* ~~the facility~~ are minimized during construction and operations."	Mention TWP rather than the more generic, "facility."
172	Paleontological Resources	4.10-1	4.10.2 Discussion of Direct and Indirect Impacts, first paragraph	Change second sentence to read: These activities are expected to permanently disturb ~~25~~ *24.3* acres, and soil moving associated with facility installations could potentially damage or destroy paleontological resources via breakage and crushing.	See Table 2-1. Permanent impacts are 2.0 acres turbine pads + 22.3 acres Access Roads = 24.3 acres.
173	Paleontological Resources	4.10-2	Construction	Add following language on weed management after the first paragraph on page 4.10-2: *Herbicide use has been analyzed by the BLM with respect to weed/invasive plant management and not been found to adversely affect paleontological resources (U.S. Department of Interior, Bureau of Land Management [BLM] 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. June. Available at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html).*	Clarification on impacts resultant from weed management
174	Paleontological Resources	4.10-3	Operations and Maintenance	Add following language on weed management after the last sentence: *Herbicide use has been analyzed by the BLM with respect to weed/invasive plant management and not been found to adversely affect paleontological resources (U.S. Department of Interior, Bureau of Land Management [BLM] 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. June. Available at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html).*	Clarification on impacts resultant from weed management
175	Paleontological Resources	4.10-3	Alternative 2 - Modified Proposed Action (37 WTGs)	Because Alternative 2 would eliminate the western-most parcel from the Project, *3 fewer WTGs and their associated infrastructure would be constructed, and* the ground disturbance from Alternative 2 would ~~be~~ *consist of approximately 1.5 fewer acres of permanent impacts and 12.5 fewer acres of temporary impacts (a total of 14.0 fewer impact acres)* ~~less~~ than that associated with the Proposed Action, and potential impacts to paleontological resources would be correspondingly reduced in magnitude.	Quantify difference between Proposed Action and Alt 2.
176	Paleontological Resources	4.10-6	Paleo-2	Add the following at the end of the a) section of the Paleo-2 Mitigation Measure: *The Proponent may conduct all ground-disturbing activities (scraping, grading, excavation, and trenching) in one sustained cycle at the beginning of construction, to the extent feasible, in order to concentrate monitoring activities by qualified paleontologists. Paleontological monitors could then operate on an on-call basis, as needed, for any further ground-disturbing activities later during construction.*	Clarification on construction scenario and paleo monitors.
177	Public Health and Safety	4.11-2	4.11.2, Aircraft Operations, 7th sentence	Revise text as follows: "The Proposed Action would comply with the requirement through implementation of Mitigation Measures PH-1 (see Section 4.11.~~6~~5) to minimize safety hazards during construction to commercial, military, or civilian air navigation."	Section 4 does not contain a subsection 11.6, so it is assumed authors meant the mitigation measure section, 4.11.5

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178	Public Health and Safety	4.11-4	2nd full paragraph on page, after "the target area."	Revise as follows: "...the target area. *Personnel treating invasive plants with herbicides would be properly trained prior to applying herbicides on site. This training would help ensure resource protection and the health and safety of personnel on the project site. Accordingly, effects to personnel would not be adverse. The use of herbicides could involve potential risk or the perception of risk to workers and members of the public engaging in activities in or near herbicide treatment areas. There are no risks associated with nearly all human exposures to BLM-approved herbicides at the typical or maximum application rate.* *Consumption of contaminated fish would present a moderate risk to the general public and a high risk to subsistence populations; however, no stock ponds, lakes, or reservoirs exist within the weed management areas on the Project site. The major concern for members of the general public involves the consumption of contaminated vegetation (fruit) over a period of several months, a scenario that is not likely to occur (U.S. Department of Interior, Bureau of Land Management [BLM] 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. June. Available at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html).* *To help minimize both environmental and personal risk,* ~~T~~ the Applicant or contractor applying herbicides would have all the appropriate State and local herbicide applicator licenses and comply with all State and local regulations regarding herbicide use. *The applicator should be familiar with all safety and environmental regulations, as well as be able to identify target plant species.* Mitigation Measure PH-4 would avoid potential impacts from herbicide use. *Manual treatment methods may require the use of equipment that could involve potential injuries; however, personnel would be trained to use equipment safely and would be supervised to ensure safety.* Adverse health effects to the public, maintenance personnel, wildlife, or sensitive vegetation would not occur."	The Weed Management Plan will not adversely affect public health and safety, but these impacts should be discussed.
179	Public Health and Safety	4.11-5	Emergency Response, 3rd paragraph, 2nd sentence	Revise as follows: "To ensure emergency access to and within the TWP site during construction, Mitigation Measure Ph-~~6~~*5* has been recommended."	Mitigation Measure PH-6 refers to Vector Control, not emergency access. This should be changed to PH-5.
180	Public Health and Safety	4.11-7	Enter as a new paragraph within Hazardous Materials section, as the last sentence directly before Emergency Response	Recommend addition of the following sentence: "*The operational impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction."*	The WMP will not adversely affect public health and safety, but these impacts should be discussed.
181	Public Health and Safety	4.11-7	Emergency Response, 1st sentence	Recommend revising text: The TWP site would be in a rural area. ~~with perimeter fencing and security gates that could physically interfere with emergency vehicle access or personnel evacuation from the Project site.~~ *The Applicant is not proposing perimeter fencing and if security fencing/gates are required, they would be installed in accordance with BLM requirements.*	See Section 2.2.4, Site Safety and Security, page 2-14. Proponent does not propose fencing. If required, security fencing would be installed in accordance with BLM requirements.
182	Public Health and Safety	4.11-7	Public Health	Recommend revising text: "Operations of the Proposed Action could potentially affect public health status of residents of rural Kern County. Vector-borne disease incidence *and* potential for Valley Fever~~, as well as potential issued related to electromagnetic fields (EMFs)~~ are potential issues of concern related to Project operations."	If included "potential issues related to EMFs" should be scientifically substantiated. Update text with latest research and clarify the low level of EMF associated with wind turbines. http://www.ehjournal.net/content/13/1/9 https://www.bpa.gov/Projects/Projects/I-5/2012documents/EMF-Final-Report-11-23-09.pdf Also, while there are no residences located on the BLM ROW (or within 200 ft. of TWP turbines or collector lines), there is not sufficient information to set health based limits in any case.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
183	Public Health and Safety	4.11-7	Electromagnetic Fields	Recommend revising text: Electromagnetic Fields. Electric voltage (electric field) and electric current (magnetic field) from transmission lines create EMFs. Currently, the State has not adopted any specific limits or regulation on EMF levels related to electric power facilities. *There is not sufficient information upon which to set health-based limits for exposure to magnetic fields.* ~~However, there are no~~ *few* ~~residences located within the vicinity of the Project as such; long-term exposure to EMFs is not expected to occur.~~	Update text with latest research and clarify the low level of EMF associated with wind turbines. http://www.ehjournal.net/content/13/1/9 https://www.bpa.gov/Projects/Projects/I-5/2012documents/EMF-Final-Report-11-23-09.pdf Also, while there are no residences located on the BLM ROW (or within 200 ft. of TWP turbines or collector lines), there is not sufficient information to set health based limits in any case.
184	Public Health and Safety	4.11-7	Shadow Flicker	Revise text as follows: "With the installation of WTGs, the TWP has the potential to result in a phenomenon known as "shadow flicker." Shadow flicker is the alternating change in light intensity that occurs when rotating WTG blades cast moving shadows on the ground or on structures. ~~Shadow flicker effects may have the potential to cause seizures in individuals prone to epilepsy. Flicker from turbines that interrupt or reflect sunlight at frequencies greater than three Hertz (equivalent to 180 rotations per minute) poses a potential risk of inducing photosensitive seizures (Harding et al., 2008). The rotor speed of WTGs identical to those associated with the TWP is between six and 14.8 rotations per minute, which is substantially slower than the slowest speed that has the potential to cause photosensitive epilepsy.~~ In addition, there are ~~no~~ *few* sensitive receptors (residences) in the vicinity of the TWP that *c*~~w~~ould be exposed to shadow flicker from the proposed WTGs. As a result of the extremely slow rotation speed of rotors and the low exposure of residents to any shadow flicker, the TWP is not considered to have the potential to result in impacts to individuals with photosensitive epilepsy.	The allegation is sometimes made that shadow flicker from wind turbines can cause epileptic seizures. This is not true—shadow flicker from wind turbines occurs much more slowly than the light "strobing" associated with seizures. The strobe rates generally necessary to cause seizures in people with photosensitive epilepsy are 5 to 30 flashes per second and large wind turbine blades cannot rotate this quickly. http://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures
185	Public Health and Safety	4.11-8	Enter as a new sentence within Hazardous Materials section	Recommend addition of the following sentence: "…appropriately permitted disposal facilities. *The decommissioning impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction and operation."*	The WMP will not adversely affect public health and safety, but these impacts should be discussed.
186	Public Health and Safety	4.11-9	Emergency Response, 1st sentence	Recommend revising text: As described under "Construction," the TWP site would be in a rural area ~~with perimeter fencing and security gates that could physically interfere with emergency vehicle access or personnel evacuation from the site.~~ The Applicant is not proposing perimeter fencing and if security fencing/gates are required, they would be installed in accordance with BLM requirements.	See Section 2.2.4, Site Safety and Security, page 2-14. Proponent does not propose fencing. If required, security fencing would be installed in accordance with BLM requirements.
187	Public Health and Safety	4.11-10	Alternative 2- Modified Proposed Action (37 WTGs), add new paragraph directly under Construction, but before Aircraft Operations.	Add the following description of Alternative differences between the Construction and Aircraft operations subheadings: "*Alternative 2 would eliminate the southwest 94-acre parcel from the Proposed Action, resulting in the construction of 3 fewer WTGs and their associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts).*	Quantify difference between Proposed Action and Alt 2.
188	Public Health and Safety	4.11-11	Public Health	Revise paragraph as follows: 'Potential impacts to public health during operation and maintenance of Alternative 2 would be the same as described under "Operation and Maintenance" for Alternative 1 ~~with the exception that by eliminating the northern section~~ *western-most parcel* ~~of the Alternative 1 site, the WTGs located closest to residential receptors would be removed.'~~	Alternative 2 involves the removal of southwestern section from Alternative 1, not the northern section. Also, there are potential sensitive receptors approximately 440 feet north of Section 24 and approximately 990 feet west of Section 28. Recommend BLM provide further information on closest sensitive receptor in the affected environment, including a figure in Section 3.6 Lands and Realty. Also, BLM should define what constitutes a dwelling in the BLM analysis, including the date at which point the dwelling should be on record.
189	Public Health and Safety	4.11-15	Construction, Operations and Maintenance, Decommissioning, 1st sentence, 2nd paragraph	Revise: Safety hazards to aircraft operations could occur during construction, ~~or~~ operation, *and decommissioning* of the TWP.	Sentence should include decommissioning phase of project.

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190	Public Health and Safety	4.11-16	Mitigation Measure PH-1	Revise text as follows: "PH-1: FAA Approval. ~~Prior to issuance of building permits, the~~ Applicant shall submit documentation to the BLM ~~and Kern County Planning Department~~ demonstrating a Determination of No Hazard to Air Navigation from the Federal Aviation Administration (FAA) of Form 7460-1 (Notice of Proposed Construction or Alteration). Documentation shall also be furnished to the BLM ~~and Kern County Planning Department~~ demonstrating that a copy of the approved form(s) has been provided to the United States Department of Defense. All Project components shall have lighting and marking required by the Federal Aviation Administration so not to create a hazard to air navigation. This mitigation measure shall apply to all phases of the Proposed Action (construction, operation and maintenance, and decommissioning) when there is the potential for impacts to aircraft operations."	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, Proponent is voluntarily developing a Memorandum of Understanding with Kern County to review building plans for TWP and coordinate on traffic and fire control, sales tax revenue and local hiring.
191	Public Health and Safety	4.11-16-7	Mitigation Measure PH-2	Recommend revising text: PH-2: Hazardous Materials Spills or Discovery. If, during grading or excavation work, the contractor observes visual or olfactory evidence of contamination or if soil contamination is otherwise suspected, work near the excavation site shall be terminated, the work area cordoned off, and appropriate health and safety procedures implemented for the location by the contractor's Health & Safety Officer. Samples shall be collected by an Occupational Safety and Health Administration-trained individual with a minimum of 40-hours hazardous material site worker training. Laboratory data from suspected contaminated material shall be reviewed by the contractor's Health and Safety Officer. If the sample testing determines that contamination is not present, work may proceed at the site. However, if contamination is detected above regulatory limits, the BLM ~~and the Kern County Public Health Department~~ shall be notified. All actions related to encountering unanticipated hazardous materials at the site shall be documented and submitted to the BLM for federal lands ~~and the Kern County Public Health Department for County lands.~~	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, Proponent is voluntarily developing a Memorandum of Understanding with Kern County to review building plans for TWP and coordinate on traffic and fire control, sales tax revenue and local hiring.
192	Public Health and Safety	4.11-17	Mitigation Measure PH-3	Recommend revising text: PH-3: Construction Blasting. If blasting is required, the Applicant shall contract with a blasting contractor with experience conducting blasting activities, licensed to use Class A explosives, and licensed as a contractor in the State of California. The blasting contractor shall prepare a blasting plan for the proposed blasting activities to prevent endangering worker safety. The blasting plan shall be submitted to the BLM for approval on federal lands*, in consultation with other agencies as applicable* . ~~and to the Kern County Department of Building and Safety for approval on County lands, in consultation with the Kern County Public Health Department, the Kern County Fire Department, and the applicable Air Pollution Control District(s).~~ The blasting plan shall: a. Describe procedures to be implemented to protect workers during blasting, such as using a signaling system to alert workers of an impending blast and using blasting mats to prevent or reduce the number of rock particles thrown into the air; b. Describe procedures for proper storage and transportation of explosive materials, including protecting explosives from wildfires; c. Prohibit blasting during extreme fire danger periods; and d. Comply with the U.S. Bureau of Mines and the U.S. Department of the Interior Office of Surface Mining Reclamation and Enforcement guidelines for minimizing damage to structures from blasting.	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, Proponent is voluntarily developing a Memorandum of Understanding with Kern County to review building plans for TWP and coordinate on traffic and fire control, sales tax revenue and local hiring.
193	Public Health and Safety	4.11-18	Mitigation Measure PH-5	No changes; but please note comment	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, Proponent is voluntarily developing a Memorandum of Understanding with the County.
194	Recreation	4.12-1	4.12.1 Methodology for Analysis	Please remove "s" after region: "were consulted to describe the Project region~~s~~ with regard to recreation"	Typo - extra letter

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195	Recreation	4.12-2	Alternative 2- Modified Proposed Action (37 WTGs)	Revise as follows: "This alternative would eliminate the western-most parcel from the Project, and would result in the installation *of* 3 fewer wind turbines *and associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts, including 12.5 acres of temporary impacts and 1.5 acres of permanent impacts.* ~~a~~ *A*s a result this alternative would *have* impacts similar to, but slightly reduced, when compared to the Proposed Action."	Quantify difference between Proposed Action and Alt 2, and add missing words.
196	Recreation	4.12-2	Alternative 3 - No Action Alternative	Please add the word "the" to this phrase: "consistent with *the* CDCA Plan."	Typo - missing word
197	Recreation	4.12-2	Geographic Extent/Context	Please add the suffix "ly" to approximate and add the word area: "includes the area in the vicinity of the proposed TWP site, an approximate*ly* 40-mile radius *area* encompassing Horse Canyon and Middle Knob ACEC…"	Typos - unclear phrasing
198	Recreation	4.12-4	Construction, Operation and Maintenance, Decommissioning	Please replace maintained with maintenance, add "a" in front of population, and replace comma before rather with a semicolon: "physical deterioration of regional recreational resources because operations and maint~~ain~~*enance* would not result in *a* population increase or long-term influx of workers**;** rather, the operation..."	Typos and unclear phrasing
199	Recreation and Visual Resources	4.12-4	Mitigation Measure REC-1	No changes; but please note comment in Justification column.	DEIS accurately states on page 4.12-1 that "The TWP site does not have public access nor does it contain any designated recreational resources such as OHV routes or camping grounds, so the construction, operation, maintenance, and decommissioning of the TWP would not directly disrupt any recreational resources onsite." With regard to the PCT, existing operating turbines are already visible along the PCT in this area, as described in comments on Sections 4.12, 4.15 and 4.18. The coordination required in Mitigation measure REC-1 will ensure impacts to recreation are avoided or minimized.
200	Social and Economic	4.13-1	Construction	Revise as follows: "As discussed in Chapter 2, construction of the TWP would require a peak workforce of approximately 75 workers, and employment over the *approximately four-month* duration of the construction period would be the equivalent of 50 full-time jobs. *However, construction could be delayed by weather or other unforeseen circumstances.*"	Clarify the duration of potential impacts/benefits.
201	Social and Economic	4.13-2	2nd full paragraph.	Recommend adding: Although the Community of Mojave and its immediate surroundings have low populations, large local construction workforces are generally available in the region because of the larger population centers of Bakersfield in Kern County, and of Lancaster and Palmdale in Los Angeles County*, and because of other projects constructed or being constructed in the area. The Proposed Action is an in-fill project surrounded by operating turbines.*	The TWP turbines would not be first turbines constructed in this area.
202	Social and Economic	4.13-3	Changes in Property Values, 1st paragraph	Recommend revising text to include a discussion of the location of the nearest residences to the proposed action site and existing turbines and the potential for impacts as a result of the stated proximity: The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) have expressed interest and concern regarding the potential impacts of electrical infrastructure projects on property value. Claims of diminished property value are based on reported concerns about hazards to human health and safety, and increased noise, traffic, and visual impacts associated with living in proximity to land uses such as power plants, freeways, high-voltage transmission lines, landfills, and hazardous waste sites.*The nearest sensitive receptors identified in the vicinity of the Proposed Action are a residence located approximately 440 feet north of Section 24 and a residence located approximately 990 feet west of Section 28, as shown on Figure 3.6-X. A residence is defined as an occupied dwelling on record with the tax assessor These residences are located X feet from existing operational turbines.*	Recommend BLM provide further information on closest sensitive receptor in the affected environment, including a figure in Section 3.6 Lands and Realty. Also, BLM should define what constitutes a dwelling in the BLM analysis, including the date at which point the dwelling should be on record. In this section, include a discussion of the location of the nearest residences to the proposed action site and the potential for impacts as a result of the stated proximity, including how potential residences are already located near existing operational turbines. This issue is discussed further on page 4.13-9 but it would be beneficial here too.

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203	Social and Economic	4.13-3	Changes in Property Values, after 2nd full paragraph	Add the following paragraph after the second full paragraph on this page: *"A 2013 Lawrence Berkeley National Laboratory study collected data from more than 50,000 home sales among 27 counties in nine states. These homes were within 10 miles of 67 different wind facilities, and 1,198 sales were within 1 mile of a turbine—many more than previous studies have collected. The data span the periods well before announcement of the wind facilities to well after their construction. The study used OLS and spatial-process difference-in-difference hedonic models to estimate the home-value impacts of the wind facilities; these models control for value factors existing before the wind facilities' announcements, the spatial dependence of unobserved factors effecting home values, and value changes over time. A set of robustness models adds confidence to the results. Regardless of model specification, the study found no statistical evidence that home values near turbines were affected in the post-construction or post-announcement/pre-construction periods. Previous research on potentially analogous disamenities (e.g., high-voltage transmission lines, roads) suggests that the property-value effect of wind turbines is likely to be small, on average, if it is present at all, potentially helping to explain why no evidence of an effect was found in the present research." http://eetd.lbl.gov/publications/a-spatial-hedonic-analysis-of-the-eff*	Update impact analysis with latest research. http://eetd.lbl.gov/people/ben-hoen
204	Social and Economic	4.13-4	Alternative 2- Modified Proposed Action (37 WTGs)	Revise as follows: "Alternative 2 reduces the size of the TWP by eliminating the western-most parcel from the Project, *resulting in the construction of 3 fewer WTGs and their associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts).*	Quantify difference between Proposed Action and Alt 2.
205	Social and Economic	4.13-4	Alternative 2 - Modified Proposed Action (37 WTGs), last 2 paragraphs	Revise text to discuss the reduction of proposed action social and economic benefits by reducing the size of the proposed action. Suggested text: "*With a reduction in the size of the proposed action by three (3) of the forty (40) WTGs, there would be a corresponding reduction of 5 to 8 percent in the beneficial socioeconomic operational effects of the proposed action, such as the production of clean, renewable energy; worker payroll; construction work; proposed action expenditures; and local economic stimulus during construction and operation activities* ."	Throughout the previous text for the preferred action there is discussion of the economic benefits of the proposed action. This section states that the social and economic impacts would be lessened by reducing the size of TWP. In actuality, based on the previous discussion, the social and economic benefits of the proposed action would be lessened.
206	Social and Economic	4.13-5	Alternative 3, last sentence	Revise text as follows: "The land on which the TWP is proposed would become available to other uses that are consistent with the BLM's CDCA Plan~~, including another renewable energy project."~~	Any additional renewable energy project would require a CDCA amendment, and would therefore not be consistent with the BLM's as-is CDCA plan.
207	Social and Economic	4.13-5	Alternative 5 - No Project; Suitable, 2nd paragraph from the bottom of the page	Revise text to discuss the reduction of project social and economic benefits by reducing the size of the proposed action. Suggested text: "The beneficial socioeconomic operational impacts such as worker payroll, proposed action expenditures, and local economic stimulus would no longer occur."	Throughout the previous text for the preferred action there is discussion of the economic benefits of the proposed action. This section states that the social and economic impacts would be lessened by reducing the size of TWP. In actuality, based on the previous discussion, the social and economic benefits of the proposed action would be eliminated.
208	Social and Economic	4.13-6	Geographic Extent/Context, 2nd paragraph from the top of the page	Suggested revision: "Additionally, as any socioeconomic ~~impacts~~ *benefits* generated by the TWP would be limited to occurring within the lifespan of the proposed action, cumulative socioeconomic ~~impacts~~ *benefits* would also occur only during the lifespan of the proposed action."	Throughout the previous text for the preferred action there is discussion of the economic benefits of the proposed action. This section states that the social and economic impacts would be lessened by reducing the size of TWP. In actuality, based on the previous discussion, the social and economic benefits of the proposed action would be eliminated.
209	Social and Economic	4.13-6	Reasonably Foreseeable Projects	Combine the two paragraphs in this section, there are currently fragments at the end of the first paragraph and beginning of the 2nd paragraph: "…, and the other actions/activities that the Lead…" AND "Agencies consider reasonably foreseeable."	Typo
210	Social and Economic	4.13-7	Table 4.13-1, Cumulative Project Labor Needs	Recommend including a column in Table 4.13-1 that lists project status and indicate whether projects are constructed, approved, or in the process of construction, consistent with other sections of the DEIS and the updated Air Quality Technical Report.	This would help differentiate between cumulative impacts from construction and cumulative impacts from operations. The reasonably foreseeable project list should be checked for all cumulative impact sections to exclude existing projects. The project lists in each cumulative impact section should only include the projects in the geographic scope for each resource area, and the lists should be checked for consistency with Tables 4.1-1 and 4.1-2.
211	Social and Economic	4.13-8	3rd full paragraph, 6th line	Revise text: "...it is expected that there will *be* adequate and suitable housing to meet any future construction worker temporary housing demand."	Typo

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212	Social and Economic	4.13-10	SOC-1	Revise text as follows: "**SOC-1: Workers Plan.** ~~As required by the Kern County Board of Supervisors, t~~*T*he Project Applicant will work with Kern County staff to determine how the receipt of sales and use taxes related to the construction of the Project will be maximized. This process *may* ~~shall~~ include, but is not necessarily limited to the Project Operator: obtaining a street address within the unincorporated portion of Kern County for acquisition, purchasing and billing purposes, registering this address with the State Board of Equalization, using this address for acquisition, purchasing and billing purposes associated with the proposed Project. The Project Operator shall allow the County to use this sales tax information publicly for reporting purposes. The Project operator shall encourage all contractors of the Project to hire ~~at least 25 percent of their~~ workers from the local ~~Kern County~~ communities. The Applicant shall provide the contractors a list of training programs that provide skilled wind workers and shall require the contractor to advertise locally for available jobs, notify the training programs of job availability, all in conjunction with normal hiring practices of the con-tractor. The Applicant shall submit a letter detailing the hiring efforts prior to commencement of construction."	Proposed Action is located entirely on BLM land. Recommend deleting condition or making these modifications. In the interest of maximizing local benefits, proponent volunteers to work with Kern County on maximizing local tax benefits as was done for the Manzana project on Kern County land. Proponent would also encourage contractors to hire workers from Kern and LA Counties. Proponent is not a public entity subject to the 25% rule, and Proposed Action is not under Kern County jurisdiction. Proponent is voluntarily developing a Memorandum of Understanding with the County to review building plans for TWP and coordinate on traffic and fire control, sales tax revenue and local hiring.
213	Social and Economic	4.13-10	2nd paragraph from the bottom of the page	Change "con-tractor" to "contractor"	Typo
214	Soil Resources	4.14-1	Construction	Construction activities that could potentially affect soil resources would include *implementation of the Weed Management Plan, as well as* excavation, grading, trenching, and soil compaction to prepare the existing site for installation of the TWP components.	The Weed Management Plan will not adversely affect soil resources, but these impacts should be mentioned upfront.
215	Soil Resources	4.14-2	New subsection, "Implementation of Weed Management Plan", immediately before Operation and Maintenance on 4.14-2	***Implementation of Weed Management Plan*** *The proposed action would be beneficial to soil by removing noxious weeds and other invasive vegetation that can impact soil function and reduce soil biodiversity. These weeds may alter soil nutrient availability for native species, alter soil makeup (e.g. soil fungi and bacteria), and slow the rate of natural plant succession (U.S. Department of Interior, Bureau of Land Management [BLM] 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. June. Available at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html). This can lead to reduced native plant establishment, and subsequently low native cover. Negative impacts to soils can also occur from invasive plant removal. Herbicide treatments can affect soil fertility and function, and harm soil organisms. Herbicide applications inevitably reach the soil level, either through intentional systemic treatments, or unintentional spills, overspray, or spray drift. In addition to direct transmission, transmission to soil may occur when a pesticide is transported through the plant from sprayed above-ground portions to roots, where it may be released into soil. Some pesticides also can remain active in plant tissue and can be released into the soil during plant decay and result in residual pesticide activity. Manual treatment methods could also disturb soil, resulting in soil erosion or loss of soil quality. However, on balance, the use of herbicides or manual methods to treat invasive weeds would provide an overall positive effect on ecosystem function and health, including soil health. Therefore, the proposed action would not result in adverse effects to soil.*	The Weed Management Plan will not adversely affect soil resources, but these impacts should be discussed. CA IM-2012-004.
216	Soil Resources	4.14-3	New paragraph after Landslides, before Decommissioning	*The operational impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction.*	The WMP will not adversely affect soil resources, but these impacts should be discussed.

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217	Soil Resources	4.14-4	Add sentence at the end of Decommissioning, directly before Alternative 2	*The decommissioning impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction and operation.*	The WMP will not adversely affect soil resources, but these impacts should be discussed.
218	Soil Resources	4.14-4	1st sentence under Alt 2	Revise text as follows: "Alternative 2 is conceptually similar to the Proposed Action (Alternative 1), only the southwest 94-acre parcel would be eliminated from project. Therefore, the overall disturbance to onsite soils would be reduced *by 14.0 fewer acres of ground-disturbance impacts, including 1.5 acres of permanent impacts and 12.5 acres of temporary impacts* compared to Alternative 1.~~, but~~ Alternative 2 would not otherwise alter the ground-disturbing activities required during construction that could result in impacts associated with soil erosion and loss of topsoil, unstable geologic units, expansive soils, ground shaking, or landslides."	Quantify difference between Proposed Action and Alt 2, and break single sentence into two sentences.
219	Soil Resources	4.14-6	Construction, Operations and Maintenance, Decommissioning.	Revise 1st sentence as follows: In general, no unavoidable adverse impacts to soil resources related to construction, *operations and maintenance,* or decommissioning of the TWP or an alternative would occur after implementation of BMPs and mitigation measures.	Operations and maintenance activities would not have unavoidable adverse impacts to soil
220	Special Designations	4.15-1	4.15.1 Impact Assessment Methodology	Recommend adding: "The analysis reviews the Project in relationship to the specific legislation and guidance which are required in the designation and management of Special Designations. These are: FLPMA, CDCA, Northern and Eastern Colorado Desert Coordinated Management Plan (NECO), the Wilderness Act of 1964, *the National Landscape Conservation System (NLCS)* and the National Back Country Byways Program." The National Landscape Conservation System (NLCS) is mentioned in 3.15, but not in this paragraph in Section 4.15. Also, recommend adding Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) and National Back Country Byways Program into Section 3.15 because they appear here in 4.15.	Some specific legislation and guidance included in Section 3.15 is missing from 4.15 and vice versa. Correct inconsistency or provide explanation for inconsistency.
221	Special Designations	4.15-1	2nd to last sentence under Alternative 1	Recommend revising text as follows: Additionally, the character and quality of view experienced by users would be *changed* ~~disturbed~~ by the introduction of ~~several industrial structures including construction equipment,~~ *additional* wind turbines*, roads and associated facilities and construction equipment during construction* ~~, and meteorological towers.~~ *Operational turbines located within approximately 550 feet of the BLM parcels on adjacent private land are already visible from PCT users in the area, as evidenced by KOP 3 and shown on Figure 3.12-1 and Figure X [insert ESA Figure from Public Meetings showing PCT in relation to existing environment (including existing turbines) and proposed TWP turbines].*	Suggest revising here and elsewhere in DEIS for consistency with Visibility Tech Report. Also recommend including a Figure in the FEIS (Figure X here) showing the location of operating turbines in proximity to the TWP and PCT.
222	Special Designations	4.15-2	Alternative 2-Modified Proposed Action (37 WTGs)	Revise as follows: "In comparison to the Proposed Action, Alternative 2 would consist of the construction of 37 WTGs, which is three WTGs less than the Proposed Action. *Alternative 2 would also result in a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts).* Alternative 2..."	Quantify difference between Proposed Action and Alt 2.
223	Special Designations	4.15-3	4.15.3 Cumulative Impacts, Geographic Extent/Context	Recommend providing explanation after following sentences: "Due to the presence of these specially designated areas within the general vicinity of the site and the TWP's potential contribution to cumulative impacts on these areas, the geographic extent of analysis is a 40-mile radius from the TWP site. Locations most likely to be affected within special designation areas would be included within this 14-mile radius."	It is unclear why a 40-mile radius was established for the analysis area and also why locations most likely to be affected are located within 14 miles; 14 miles seems like an arbitrary distance.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
224	Special Designations	4.15-5	Mitigation Measure SD-1	SD-1: Land acquisition along the PCT. The project Applicant shall provide funds for acquisition of land along the PCT corridor. Funds will be used by the project Applicant, or transferred to the BLM or a third party, to acquire property of equal value along the trail corridor. Priority will be given to acquisition within the southern Sierra Nevada/Tehachapi portion of the trail. If properties are not available for acquisition, funds may be used for restoration projects of equal value along the trail corridor that will improve visual integrity. The project Applicant shall provide funds for acquisition within *18 months* ~~one year~~ of issuance of the Notice to Proceed from the BLM.	Proponent requests additional time; based on proponent's experience on other projects, setting up a fund with a third party like NFWF can time due to administrative considerations.
225	Special Designations	4.15-5	Mitigation Measure SD-1	Land acquisition is based on the concepts developed in the Draft Pacific Crest National Scenic Trail Best Management Practices to Mitigate Scenery Impacts from Conflicting Land Uses (USFS, 2012). Under these Best Management Practices, the mitigation ratio for land acquisition *will be* ~~is~~ calculated *based on impacts* by using the distance of the project from the PCT, the distance along the trail that the project is visible to trail users, and the contrast created by the project to the characteristic scenery. Under the preferred alternative, the project creates a *weak to* moderate ~~to high~~ contrast to the characteristic scenery.	The referenced plan is a Draft Plan that has not yet been adopted to our knowledge. According to the Visibility Technical Report, all findings at all three KOPs are Weak to Moderate degree of contrast. The Proposed Action is an infill project located within operating wind projects; turbines are already visible along the PCT in this area. There are existing visual intrusions on the TWP parcels. Furthermore, TWP would not introduce significant additional visual contrast to this area of the PCT. PCT users looking towards the two largest TWP parcels located approximately 1 and 2 miles to the northeast of the PCT would see existing operating turbines in the foreground and TWP turbines in the background, which would not create a moderate or strong visual contrast, therefore mitigation ratios for these parcels should be lower than for the parcel immediately adjacent to the PCT and may not be necessary. On the western-most TWP parcel that borders the PCT, users would see TWP turbines in the foreground only to the west of the trail and existing operating Manzana Wind and Pacific Wind Energy Project turbines to the north, east, and south of the trail, including one existing operating turbine approximately 550 feet from the PCT on the east side of the trail.
226	Special Designations	4.15-5	4.15.5 Residual Impacts after Mitigation	Recommend the following revision: "Under the Proposed Action, 1,207 acres of land managed by the BLM would be visible from KOP 3 *(see Figure 3.18-1)* ."	Figure 3.18-1 should be referenced, as this statement is directly related to the content of this figure.
227	Transportation and Public Access	4.16-4	Table 4.16-1, Trip Generation - Construction Phase	Values in table should match what is in Table 1 on page 7 of the Traffic Study by Ruettgers and Schuler April 2011 (modified in December 2011).	Numbers in the DEIS table do not match Traffic Tech Report.
228	Transportation and Public Access	4.16-7	Alternative 2-Modified Proposed Action (37 WTGs)	Add sentence directly below Alternative 2 heading, but above Public Access heading: "*Alternative 2 would be similar to the Proposed Action; however under this alternative the overall size of the Project would be reduced by 94 acres and 3 fewer wind turbine generators and their associated infrastructure would be emplaced. Further, Alternative 2 would also result in a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts)."*	Quantify difference between Proposed Action and Alt 2.
229	Transportation and Public Access	4.16-7	Transportation	Revise as follows: "~~Alternative 2 would be similar to the Proposed Action; however under this alternative the overall size of the Project would be reduced by 94 acres and fewer wind turbine generators would be emplaced.~~ Because Alternative 2…"	This sentence should be deleted here, revised and moved up to the beginning of the Alternative 2 discussion, to give an overall quantification of the difference between the Proposed Action and Alt 2 (see comment above with proposed language change).
230	Transportation and Public Access	4.16-11	Mitigation Measure Trans-1	Revise text as follows: "TRANS-1: Prior to construction, the Applicant would: a. Submit engineering drawings of access road design for the review and approval *as applicable.* ~~of the Kern County Roads Department.~~ b. Obtain an encroachment permit from the Kern County Roads Department for applicable roads in the Kern County road maintenance system. c. Enter into a secured agreement *with applicable agencies* ~~Kern County~~ to ensure that any County roads that are demonstrably damaged by TWP-related activities are promptly repaired and, if necessary, paved, slurry-sealed, or reconstructed per requirements of the State or ~~Kern~~ County."	Proposed Action is located entirely on BLM land and is not under County jurisdiction. Proponent and contractors would coordinate with the County and State agencies as applicable (i.e. transporting to and from the site). Proponent is voluntarily developing a Memorandum of Understanding with Kern County to review building plans for TWP and coordinate on traffic and fire control, sales tax revenue and local hiring. For ex, Heartland will work with the County on a Construction Traffic Control Plan, and coordinate with the County on transporting to and from the site along 170th Street West via Rosamond Boulevard, the most prudent and expeditious route for the project.
231	Transportation and Public Access	4.16-11	Mitigation Measure Trans-2	Revise Text as follows: "TRANS-2: Prior to construction, the Applicant would: a. Obtain all applicable *approvals or* permits from *BLM,* Caltrans, Kern County, *as applicable,* and any other applicable agencies prior to construction pertaining to vehicle sizes, weights, roadway encroachment, and travel routes and adhere to any conditions in these permits."	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, proponent and contractors would coordinate with the County and State agencies as applicable (i.e. transporting to and from the site). Proponent is voluntarily developing a Memorandum of Understanding with Kern County.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
232	Transportation and Public Access	4.16-12	Mitigation Measure Trans-3	Revise Text as follows:" TRANS-3: Prior to construction, the Applicant would a) Develop a Coordinated Transportation Management Plan and work with *the BLM and* Kern County *as applicable* to prepare and implement a transportation management plan for roadways adjacent to and directly affected by the planned TWP facilities, and to address the transportation impact of the multiple overlapping construction projects within the vicinity of the TWP in the region. The transportation management plan shall include, but not be limited to, the following requirements:"	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, proponent and contractors would coordinate with the County and State agencies as applicable (i.e. transporting to and from the site). Proponent is voluntarily developing a Memorandum of Understanding with Kern County.
233	Vegetation	4.17-2	First paragraph on page	The Proposed Action is within the boundaries of the West *Mojave* Plan (WEMO),	Word omission.
234	Vegetation	4.17-2	Natural Communities section title	Change "Natural Communities" subsection title to "Vegetation Communities"	Title change recommended for consistency with the subsection titles used to describe Alternative 2. "Vegetation Communities" is used for Alternative 2 (page 2.17-05).
235					
236	Vegetation	4.17-4	State Jurisdictional Areas - 2nd Paragraph	"Direct impacts *could* include filling of jurisdictional streambed areas to create road crossings or to construct underground collector lines. Examples of indirect impacts to jurisdictional resources are stream bank erosion and stream sedimentation. These jurisdictional areas provide beneficial hydrological functions and services typical of low to moderate disturbance desert scrub systems. These functions include, but are not limited to, groundwater recharge, flood peak attenuation, floodwater storage, sediment trapping and transport, nutrient trapping, and wildlife habitat. The functions that these jurisdictional areas provide would not be impaired by construction and operation of the TWP *as the proposed action has been designed to avoid CDFW-jurisdictional areas* ."	This paragraph is confusing. It suggests that the impacts described might occur, but the previous paragraph states that these areas will be avoided. Recommend inserting the italicized text to further clarify that these are examples of impacts that could occur but that won't occur due to the avoidance of CDFW jurisdictional areas.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
237	Vegetation	4.17-4	Construction – After Special Status Plants Section	Add a Section titled "*Non-Native and Invasive Weeds*" In this section include the following language: "*A Weed Management Plan (Mitigation measure VEG-1c) has been developed in order to limit and prevent the spread of non-native and invasive weeds within the project area. Implementation of the Weed Management Plan would result in minimal impacts to vegetation resources during construction. Potential impacts to vegetation resources may include impacts to non-target plant species through the use of herbicides as well as through unintentional removal during manual and mechanical weed management methods. Impacts to vegetation resources resulting from manual and mechanical weed management techniques will be avoided and minimized through the utilization of a licensed herbicide applicator and proper training of the administering personnel to identify and avoid non-target plant species. Risks to vegetation resources resulting from herbicide use may include spray-drift, inadvertent application on non-target species, over-application of chemical treatments, and herbicide spills. These potential impacts would be minimized and avoided through the use of a licensed herbicide applicator knowledgeable of proper herbicide application methods that would not include aerial application, as well as through proper training of personnel to avoid over-application and non-targeted application of the herbicide and immediately clean up any herbicide spill. Through these precautions associated with the Mitigation measure VEG-1c, impacts to vegetation resources resulting from the implementation of the Weed Management Plan will be minimal.*"	The applicant submitted a Weed Management Plan (WMP), as an element of the Plan of Development; therefore, the EIS should acknowledge this element of the proposed action and provide a summary of the anticipated effects of the WMP. Insert the suggested language in the appropriate section.
238					
239	Vegetation	4.17-5	Construction	Add a paragraph in the following location, between Construction and Vegetation Communities subheadings under Alternative 2-Modified Proposed Action (37 WTGs): "*Alternative 2 reduces the size of the TWP by eliminating the western-most parcel from the Project, resulting in the construction of 3 fewer WTGs and their associated infrastructure, as well as a 13.7 acre reduction in vegetation-disturbing impacts (12.3 fewer acres of temporary impacts and 1.4 fewer acres of permanent impacts).*"	Quantify difference between Proposed Action and Alt 2 up front in the beginning of the section. The different in vegetation-disturbing impacts between Alt 1 and Alt 2 is slightly smaller than overall ground-disturbing impacts for other resources, because of the "disturbed" classification within plant communities on the project. "Disturbed" areas are devoid of vegetation, therefore they are not considered areas of impact to vegetation, or to wildlife resources.
240	Vegetation	4.17-5	Vegetation Communities	Revise as follows: "The total area *of natural vegetation communities* estimated to be impacted by Alternative 2 (including *temporary impacts* ~~short term disturbance~~) is less than the proposed action. Anticipated impacts under Alternative 2 include ~~158.5~~ *155.0* acres of temporary and ~~22.9~~ *22.2* acres of permanent disturbance within the five vegetation communities ~~and land cover types~~ that occur in the proposed action area....The nature of these impacts are similar to the proposed action, but Alternative 2 would decrease impacts to vegetation communities by approximately ~~9.5~~ *13.7* acres as compared to the proposed action."	Clarification and shift to present acres that do NOT include those areas considered "disturbed," because they are not a vegetation community. The change makes this section consistent with how the information is presented for Alternative 1 on page 4.17-05. Use of the term "disturbance" instead of impacts is confusing given that the areas considered "disturbed" are not a natural vegetation community. Corrected acres presented here are for natural vegetation communities only (areas mapped as "disturbed" during plant community surveys are not included). Readers can now directly compare the acres of vegetation impacts between Alternatives 1 and 2. As a general note, throughout this matrix, impacts to vegetation, and thus to vegetation resources and wildlife resources chapters within this DEIS, are slightly less than overall project impacts, due to the fact that some land cover within the project has been classified as "disturbed". Thus impacts to vegetation differ by 13.7 acres between Alternative 1 and Alternative 2, but overall ground-disturbing impacts differ by 14.0 acres between Alternative 1 and Alternative.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
241	Vegetation	4.17-5	Sensitive Natural Communities	Joshua Tree Woodland is the only sensitive natural community that would be affected under Alternative 2, with approximately 1.7 acres that would be permanently impacted and 15.1 acres that would be temporarily impacted, *for a total of 16.8 acres . This is the same amount of impact as Alternative 1, as there is no Joshua Tree Woodland located in the southwestern most parcel.*	Further clarification that impacts to Sensitive Natural Communities are the same under both build alternatives.
242	Vegetation	4.17-8	List at bottom of page	Revise text as follows: 1. MWEP (5,820-acres); 2. PWEP (8,300 -acres); ~~3. Pacific Wind Infill Project (1,325 acres);~~ and 3) Catalina Renewable Energy Project (6,739-acres)	Clarify that the Pacific Wind Infill Project (PWIP) is part of PWEP, and therefore does not create its own cumulative impacts.
243	Vegetation	4.17-9	Natural Communities	"Only a fraction of the Joshua tree woodland habitat in the proposed action area would be affected (16.8 acres of ~~96~~ *98* acres)"	See Comment on page 3.17-2, above (Comment No. 43)
244	Vegetation	4.17-9	Natural Communities	"Additionally, the implementation of Mitigation Measures VEG-1a, VEG-1b, VEG-1c, VEG-2, VEG-3, WIL-1c, A~~l~~*ir* -1, and WA-9 would minimize, avoid, and compensate for the Project's individual and cumulative impacts to sensitive vegetation resources."	AI-1 is cited here, but this is not a mitigation measure name in the DEIS. It is assumed that the authors meant AIR-1, this should be corrected for clarity.
245	Vegetation	4.17-10	VEG-1a	The content of the first two paragraphs of VEG-1a is essentially the same language as parts 2. and 3. of VEG-3.	These two measures should be revised so that they are not redundant
246	Visual Resources	4.18-1	4.18.1 Impact Assessment Methodology	Please replace "is" with "were" and "its" with "their": "The Proposed Action and alternatives ~~is~~ *were* analyzed for ~~its~~*their* effects on visual resources"	Typos - verb tense and noun/pronoun confusion
247	Visual Resources	4.18-1	4.18.1 Impact Assessment Methodology	Please replace "is" with "was": "The Proposed Action ~~is~~*was* evaluated for conformance"	Typo - verb tense confusion
248	Visual Resources	4.18-1	4.18.1 Impact Assessment Methodology	Please replace "mitigating" with "mitigation": "The overall VRM goal is to minimize visual impacts, and mitigat~~ing~~*on* measures should be prepared…"	Typo
249	Visual Resources	4.18-1	4.18.1 Impact Assessment Methodology	Please replace "is" with "was": "The Proposed Action ~~is~~*was* analyzed for adverse effects due to lighting and glare"	Typo - verb tense confusion
250	Visual Resources	4.18-2	Selection of Key Observation Points	Please replace "city" with "community": "would not be visible from a large portion of the ~~city~~*community* of Rosamond"	Typo - Rosamond is a community, not a city
251	Visual Resources	4.18-4	Affected Viewers	Please replace "city" with "community": "and the ~~City~~*community* of Rosamond"	Typo - Rosamond is a community, not a city
252	Visual Resources	4.18-7	First sentence of 1st full paragraph	Recommend revising text: The largest ~~most severe~~ visual contrast, however, would occur from the PCT, whose course extends between the proposed WTGs.	Because existing operating turbines are already visible along the PCT in this area, and the visual contrast for all Key Observation Points has been classified as "weak to moderate," the use of the word "severe" overestimates the impacts. For example, on page 4.18-11, DEIS says "However, the primary reason that the impact is moderate (as opposed to strong/major) is because the existing cumulative conditions are of a landscape heavily modified by existing wind energy development." Suggest revising the language here and elsewhere in DEIS to make it consistency with the Visibility Tech Report. Also recommend including a Figure in the FEIS showing the location of operating turbines in proximity to the TWP and PCT.
253	Visual Resources	4.18-8	Glint, glare, and shadow flicker	Please remove extra "a" in are: "and during the winter season when sun angles are~~a~~ low"	Typo - says "area" instead of are
254	Visual Resources	4.18-9	Decommissioning Impacts	Please add the word "and" and replace "deconstruction" with "decommissioning": "...work site fencing *and* removal of buried structures and equipment. Visual de~~construction~~*commissioning* impacts of heavy equipment…"	Typos - missing word and incorrect word used
255	Visual Resources	4.18-9	4.18.3 Alternative 2 - Modified Proposed Action (37 WTGs)	Please replace "than" with "in comparison to": "Selection of this alternative would result in decreased impacts ~~than~~ *in comparison* to the Proposed Action."	Typo - phrasing
256	Visual Resources	4.18-9	4.18.3 Alternative 2 - Modified Proposed Action (37 WTGs)	Revise as follows: "This alternative would eliminate the western-most parcel from the Project, and would result in *the installation of* three fewer wind turbines *and associated infrastructure* , *as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts)."*	Quantify difference between Proposed Action and Alt 2.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
257	Visual Resources	4.18-10	4.18.6 Alternative 5 - No Project; Suitable	Please change "were" to "was" and add "none" : "If this alternative w~~ere~~*as* selected, *none* of the anticipated visual resources impacts of the Proposed Action would occur"	Typos - verb agreement and missing "none"
258	Visual Resources	4.18-12	Mitigation Measure VIS-1	No changes; but please note comment in Justification column.	VIS-1 requirement for a 150 feet setback from the PCT easement is consistent with Kern County WE zoning ordinance as described on page 3.22-30 and the measures implemented at the adjacent Manzana and Pacific Wind projects. Note that, for VIS-1 (11) the authorized officer for the recreation areas of the PCT may desire something other than signage along the trail given the presence of existing signage within the surrounding MEWP project.
259	Visual Resources	4.18-13	1st sentence	Please add "areas" and remove "are in" after the phrase and/or: "Applicant shall identify construction laydown areas using already disturbed *areas* and/or ~~are in~~ locations of low visual sensitivity"	Typos and missing words.
260	Visual Resources	4.18-14	#11	"and the winds of Teh*a* chapi Pass"	Typo - Tehachapi spelled wrong
261	Visual Resources	4.18-15	#14	"14. ~~c.~~ The Applicant…"	Typo - remove "c"
262	Visual Resources	4.18-15	VIS-4: Evaluate and Implement PCT Route Enhancement	Please remove duplicate "Applicant": "Forest Service, the Applicant~~Applicant~~ shall provide funds"	Typo
263	Visual Resources	4.18-15	VIS-4	Revise text as follows: "*As described in SD-1,* land acquisition will be based on the concepts developed in the Draft Pacific Crest National Scenic Trail Best Management Practices to Mitigate Scenery Impacts from Conflicting Land Uses (USFS, BLM June 2012). Under these Best Management Practices (BMP), the mitigation ratio for land acquisition ~~is~~ *will be* calculated *based on impacts* by using the distance of the project from the PCT, the distance along the trail that the project is visible to trail users, and the contrast created by the project to the characteristic scenery. Under the preferred alternative, the project is immediately adjacent to the trail at its closest point (foreground distance zone), is visible to trail users for approximately 21.5 miles (foreground-background distance zones), and creates a *weak to* moderate ~~to high~~ contrast to the characteristic scenery. Using this scenario, the ratio for land acquisition would be *varied based on the contrast created by the project to the characteristic scenery, which differs depending on the parcel under consideration, particularly in regard to the density of existing wind energy turbines in the vicinity of the TWP and the PCT* ~~1:1. Thus, the acres to be acquired off-site for mitigation to impacts to 1,207 acres would be 1207 acres.~~	See justification under SD-1 comment. According to the Visibility Technical Report, all findings at all three KOPs are Weak to Moderate degree of contrast. Like was done between the DEIS and FEIS for Alta East, the Final EIS should include a graduated approach to mitigation ratios, based on the distance between the PCT and each individual TWP parcel (which ranges between 0 feet and 2 miles), and the presence of existing visual disturbance in the form of existing operating wind energy turbines. Given the disparity in distance and visual contrast between the PCT and each of the three parcels, applying a 1:1 mitigation ratio, as is currently prescribed in VIS-4, does not appear to be commensurate with actual impacts.
264	Water Resources	4.19-4	Flooding	Revise as follows: "As discussed in Section 3.19, the entire Project area ~~has been mapped for FEMA flood hazards~~ *is designated as Flood Zone "C" (areas of minimal flooding and no standing water)* , and no portion of the TWP area is located within a 100-year flood Zone "A".	More accurate description of flood hazard, and to be consistent with the tech report
265	Water Resources	4.19-5	Groundwater Supply and Levels	Prior to the second to last sentence of the paragraph, please insert: "...of groundwater levels at source wells. *Furthermore, because wind power requires no cooling water, it reduces water use for electricity generation by offsetting the annual water use requirements of non-renewable power plants that require large amounts of water for cooling. By displacing fossil-fueled generation, the Tylerhorse Wind Project would offset annual water use of approximately 49.7 million gallons per year after accounting for its own water use (using a modern, gas-fired plant as a comparison), based on a 60 MW wind project operating with a 35% net capacity factor.* There would be no fire suppression tank onsite..."	The suggested language adds the water use savings consistent with the updated July 2014 AQTR, and provides further details on project benefits.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
266	Water Resources	4.19-5	Alternative 2-Modified Proposed Action (37 WTGs)	Revise as follows: "Implementation of Alternative 2 would result in a slightly reduced Project footprint, *including the construction of 3 fewer WTGs and their associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts),* in comparison to the Proposed Action. Specifically, Alternative 2 would result in temporary disturbance of ~~159~~ *158.6* acres (rather than ~~171~~ *171.1* acres for the Proposed Action), and permanent disturbance of ~~23~~ *22.8* acres (rather than ~~24~~ *24.3* acres) for the wind turbine component of the Project."	Quantify difference between Proposed Action and Alt 2, and give acreage to one decimal place, to remain consistent with other locations where these acreages are used.
267	Water Resources	4.19-8	WATER-1: Implementation of a SWPPP	Replace measure with following text: "*Prior to Notice to Proceed from the BLM, the Proponent shall submit evidence to the BLM that the following agencies have been contacted to inquire about the necessity of permits from that Agency:* *1. U.S. Army Corps of Engineers: Clean Water Act Section 404 permit;* *2. Lahontan Regional Water Quality Control Board: Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges associated with construction activities, Stormwater Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs) for stormwater management, a Clean Water Act Section 401 certification, and/or Waste Discharge Requirement permit(s).* *Where a permit is required, the Proponent shall provide a copy of all the conditions required by that agency to BLM, as applicable. The Proponent shall maintain and make available on site at all times an approved copy of all required permits and conditions.*	Source for DEIS language unclear. Measures will be determined by the appropriate permitting agencies.
268	Water Resources	4.19-8	WATER-1: Implementation of a SWPPP	Revise bullets 1., 4., and 5. of the BMPs as follows: 1.~~ If grading occurs during rainy season (October 15 to April 15), s~~*S*torm runoff from the construction area shall be regulated…"; 4. No disturbed surfaces may be left without erosion control measures in place. ~~during the rainy season (October 15 to April 15).;~~ 5. Erosion protection shall be provided on all cut-and-fill slopes, as relevant to the TWP, and shall be initiated as soon as possible after completion of grading ~~and prior to the onset of rainy season (October 15 to April 15)~~."	Policy Update: the RWQCB no longer differentiates between non-rainy season and rainy season requirements, therefore the rainy season disclaimer should be removed.
269	Water Resources	4.19-10	Mitigation Measure Water-2	Delete MM Water-2 because it is covered by MM Water-3. Drainage plan is part of the NPDES General Permit.	Source for DEIS language unclear. Measures will be determined by the appropriate permitting agencies.
270	Water Resources	4.19-13	Mitigation Measure Water-4	Insert language from Water- 4 into Water-3. Drainage plan is part of the NPDES General Permit.	Source for DEIS language unclear. Measures will be determined by the appropriate permitting agencies.
271	Wildland Fire Ecology	4.20-2	4th paragraph	Revise as follows: "Fuel modification is *a* fundamental component of fire risk reduction."	Typo, missing an "a" between is and fundamental.
272	Wildland Fire Ecology	4.20-4	Operation and Maintenance, 2nd paragraph	Recommend the following revision: "Wind turbines can be the source of wildfire ignitions due to collection line failure, turbine malfunction or mechanical failure, and lightening~~- and bird-related incidents.~~"	Remove "bird related incidents". Avian collision on wind turbines do not cause fire.
273	Wildland Fire Ecology	4.20-4	Operation and Maintenance, 2nd paragraph	Recommend the following revision: "In addition, pad-mounted transformers can ~~explode~~ *malfunction* and result in a wildfire ignition."	Pad mounted transformers malfunction, not explode.
274	Wildland Fire Ecology	4.20-4	Operation and Maintenance, end of 2nd paragraph	Recommend adding the following sentence after "…originating on the site at individual turbines or other facilities. *Tylerhorse full time employees would also assist in early detection of any wildfires in the area, whether the fire is caused by the wind farm, or other man-made or natural causes, to facilitate an early response time by the fire agencies."*	Suggest adding this sentence to further describe protective measures during operation and maintenance.
275	Wildland Fire Ecology	4.20-5	Alternative 2-Modified Proposed Action (37 WTGs)	Add sentence between Alternative 2-Modified Proposed Action (37 WTGs) heading and Construction subheading: "*Implementation of Alternative 2 would result in a slightly reduced Project footprint, including the construction of 3 fewer WTGs and their associated infrastructure, as well as a 14.0 acre reduction in ground-disturbing impacts (12.5 fewer acres of temporary impacts and 1.5 fewer acres of permanent impacts)."*	Quantify difference between Proposed Action and Alt 2 up front in the beginning of the section.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
276	Wildland Fire Ecology	4.20-6 and 4.20-7	Bottom of page 4.20-6 and top of page 4.20-7	Projects not within 1-mile should be removed and Pacific Wind included: The following are the existing wind energy systems, as presented in Table 4.1-1 (Section 4.1) of this DEIS/PA: 1. Manzana Wind Energy Project *2. Pacific Wind Energy Project* ~~2. Alta- Oak Creek-Mojave Wind Project~~ ~~3. Coram Brodie Wind~~ ~~4. Pine Tree Wind Development Project~~ ~~5. North Sky River Wind Energy Facility~~	The geographic extent for cumulative impacts is within 1-mile and all omitted projects fall outside of 1-mile. The existing project list in each cumulative impact section should only include the projects in the geographic scope for each resource area, and the lists should be checked for consistency with Tables 4.1-1 and 4.1-2.
277	Wildland Fire Ecology	4.20-7	End of second paragraph	Projects that are existing and/or that are not within 1-mile should be removed. The reasonably foreseeable projects within the cumulative geographic and temporal context of the TWP for wildland fire ecology impacts are: ~~1. 5,820-acre MWEP,~~ ~~2. 8,300-acre PWEP,~~ ~~3. 1,325-acre Pacific Wind Infill Project,~~ 4. 6,739-acre Catalina Renewable Energy Project; and ~~5. Southern California Edison Tehachapi Renewable Transmission (SCE TRTP) Project.~~	Reasonable foreseeable projects should not be the same as existing projects, and projects outside of the geographic scope (1-mile) should not be considered. The reasonably foreseeable project list should be checked for all cumulative impact sections to exclude existing projects. The project lists in each cumulative impact section should only include the projects in the geographic scope for each resource area, and the lists should be checked for consistency with Tables 4.1-1 and 4.1-2.
278	Wildland Fire Ecology	4.20-8	Mitigation Measure WF-1 through WF-3	No changes; but please note comment	Proposed Action is located entirely on BLM land and is not under County jurisdiction. However, coordination is wise and proponent plans to coordinate with State and County fire officials. Proponent is voluntarily developing a Memorandum of Understanding with Kern County.
279	Wildlife Resources	4.21-1	4.21 Wildlife Resources	Recommend the following revision: "This section analyzes potential impacts to wildlife resources from the construction, ~~and~~ operation, *and decommissioning* of the Tylerhorse Wind Project (TWP)."	The impacts cover construction, operation AND decommissioning. Added for clarity
280	Wildlife Resources	4.21-1	4.21 Wildlife Resources	Recommend the following revision: "As discussed in Chapter 3.22, focused wildlife surveys were conducted for: desert tortoise (Gopherus agassizii), burrowing owl (Athene cunicularia), golden eagle (Aquila crysaetos) *and other raptor* nests ~~and raptors, and~~ *Mohave ground squirrel (Xerospermophilus mohavensis), bats, and* special-status mice."	Directed MGS surveys, as well as acoustic bat surveys, should be included within this list.
281	Wildlife Resources	4.21-1	4.21 Wildlife Resources	Recommend the following revision: "Avian surveys additionally included avian point counts, mist-netting, *and diurnal* and nocturnal migration surveys."	Extensive diurnal surveys were completed on neighboring projects and are summarized within the DEIS. These surveys should also be mentioned here.
282	Wildlife Resources	4.21-2	Construction - 2nd to last sentence	Insert the following language between the last and second to last sentence in this paragraph: "... and 5) habitat fragmentation. *In addition, the implementation of the Weed Management Plan (Mitigation measure VEG-1c) may result in minimal impacts to wildlife resources. Potential impacts to wildlife resources may include unintentional direct application of herbicides to wildlife, direct and indirect consumption of herbicides by wildlife, and inadvertent disruption of wildlife during mechanical and manual weed management methods. Impacts to wildlife resources resulting from direct application of herbicides and manual and mechanical weed management techniques will be avoided and minimized through the use of a licensed herbicide applicator and the proper training of personnel to avoid wildlife during the administration of these methods. Impacts to wildlife resources resulting from direct and indirect consumption of herbicides would be minimized and avoided through the selection of herbicides that pose a low risk to wildlife upon consumption. Through these precautions associated with the Mitigation measure VEG-1c, impacts to wildlife resources resulting from the implementation of the Weed Management Plan will be minimal.* The timing, duration..."	The applicant submitted a Weed Management Plan (WMP), as an element of the Plan of Development; therefore, the EIS should acknowledge this element of the project and provide a summary of the anticipated effects of the WMP.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
283	Wildlife Resources	4.21-2	Habitat Loss for Common Wildlife - 2nd Paragraph, 9th line	With successful revegetation permanent habitat loss under the proposed action would be reduced from approximately ~~190.0~~ *190.9* acres to 23.6 acres.	Typo
284	Wildlife Resources	4.21-4	Golden Eagle	Add citations for the primary survey reports for 2004 and 2013.	See similar comment for page 3.22-15
285	Wildlife Resources	4.21-4	Golden Eagle	Please revise as follows: "Surveys to identify active and historic golden eagle nests were performed in 2010 ~~and~~ 2011, *and 2013,* covering all suitable nesting habitat within 10 miles of the TWP site (see Section 3.22)."	Add in that 2013 aerial golden eagle surveys were conducted.
286	Wildlife Resources	4.21-4	Golden Eagle, 2nd paragraph	Recommend revising text: In 2004, *a golden eagle pair was observed* ~~an active eagle nest was detected~~ by Bloom Biological, Inc., approximately 4.3 miles west of the northwestern corner of the Project area (Sapphos, 2011a). ~~This nest represents the nearest historic golden eagle nest in the near-Project vicinity.~~ No ~~additional~~ nests were identified within 10 miles of the Project Area during aerial surveys performed in 2010, ~~and~~ 2011, *and 2013* (described in Section 3.22 and Appendix C-1*; Appendix C-4*). *After the DEIS was published, Bloom Biological discovered an active golden eagle nest containing two young chicks in the Tehachapi Mountains on May 15, 2014 while conducting an aerial raptor nesting survey for the Manzana Wind Plant in Kern County, California. The tree nest, two young, and two adults were located 4.73 miles (7.62 kilometers) north-northwest from the most west of the three parcels comprising the Tylerhorse Wind Project (insert reference to technical memorandum summarizing the location which was provided to the BLM).*	See comment for page 3.22-15. Clarify that Bloom Biological's 2004 observation was of a pair, outside the nesting season, and that it was assumed that a nest existed nearby. A summary of Bloom Biological's observations is provided in the BBCS (Appendix C-4 of this EIS, page C.4-54). After the DEIS was published, Bloom Biological discovered an active golden eagle nest containing two young chicks in the Tehachapi Mountains on May 15, 2014 while conducting an aerial raptor nesting survey for the Manzana Wind Plant in Kern County, California. The tree nest, two young, and two adults were located 4.73 miles (7.62 kilometers) north-northwest from the most west of the three parcels comprising the Tylerhorse Wind Project. Bloom prepared a technical memorandum summarizing the location which was provided to the BLM.
287	Wildlife Resources	4.21-4	Golden Eagle, 2nd paragraph	Revise as follows: "No additional nests were identified within 10 miles of the Project Area during aerial surveys performed in 2010 ~~and~~ 2011, *and 2013* (described in Section 3.22 and Appendix C-1 and *Appendix C-4*)."	Add description of the results of the 2013 aerial raptor surveys, which found no existing or potential nest sites at this location, and Bloom 2014 survey. See previous comment. A summary of the 2013 surveys is provided in the BBCS (Appendix C-4 of this EIS, pages C.4-54 through page C.4-64). After the DEIS was published, Bloom Biological discovered an active golden eagle nest containing two young chicks in the Tehachapi Mountains on May 15, 2014 while conducting an aerial raptor nesting survey for the Manzana Wind Plant in Kern County, California. The tree nest, two young, and two adults were located 4.73 miles (7.62 kilometers) north-northwest from the most west of the three parcels comprising the Tylerhorse Wind Project. Bloom prepared a technical memorandum summarizing the location which was provided to the BLM.
288	Wildlife Resources	4.21-6	California condor section	Recommend updating FEIS with latest condor flock locations from USFWS GPS data.	Latest biological information.
289	Wildlife Resources	4.21-6	Swainson's Hawk, Ferruginous Hawk, American Peregrine Falcon…	Recommend the following revision: "Each of these species was observed in the Project area *either as a result of* ~~in 2005 during the~~ *the 2004-2005 Manzana* spring and fall migration *surveys* and*/or the 2011-2012 TWP avian* ~~subsequent~~ surveys (Sapphos, 2011a; 2013)."	Clarify where and when these species were observed.
290	Wildlife Resources	4.21-7	Loggerhead shrike and Le Conte's Thrasher	Loggerhead shrike (Lanius ludovicianus) and Le Conte's thrasher (Toxostoma lecontei) are breeding residents in the Project area. *Le Conte's thrasher* ~~and were~~ *was* observed in low numbers during the spring and summer, *while Loggerhead shrike were observed throughout the year.*	Loggerhead shrikes have been observed in the Project area all seasons of the year, this should be reflected.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
291	Wildlife Resources	4.21-7	Mohave Ground Squirrel	Insert and remove the following language: "The TWP site is within the western edge of the Mohave ground squirrel's range, though no records exist within 15 miles of the proposed action area (CDFW, 2013) (see Section 3.21). The BRTR cites that trapping studies performed for the Manzana Project were negative. *Focused trapping studies performed within the proposed action area in 2012 were negative for Mohave ground squirrel (Appendix C-2)* .~~Focused Mohave ground squirrel surveys were not performed within the Project area; however, t~~*T*he habitat assessment described in the BRTR *and the trapping results described in Addendum 1 to the BRTR* concluded that this species is absent from the proposed action area (Sapphos, 2011a, *2013*). Based on these findings, no impacts to Mohave ground squirrel are anticipated from the proposed action."	Mohave Ground Squirrel surveys were in fact conducted in the proposed action area. Details from these surveys can be found in Addendum-1 to the BRTR (Appendix C-2). Update this section and all other relevant sections to reflect this. Ensure the proper citation is listed here and within the References section.
292	Wildlife Resources	4.21-8	Above Special Status Bats	Create a new section titled: *"Townsend's Big-eared Bat"* In that section include the following language: *"The TWP site is within the range of the Townsend's big-eared bat, a recently accepted candidate for state-listing, though no records exist within 15 miles of the proposed action area (CDFW, 2013). Focused bat surveys performed within the proposed action area were negative for Townsend's big-eared bat and the species was not considered to be potentially present within the proposed action area. Based on these findings, no impacts to Townsend's big-eared bat are anticipated from the proposed action."*	Include specific discussion of Townsend's big-eared bat as it has recently been considered a candidate for state listing
293	Wildlife Resources	4.21-10	Directly before Desert Tortoise	*The operational impacts associated with implementation of the Weed Management Plan would be similar as those expected to occur during construction.*	The WMP will not adversely affect wildlife resources during operation, but these impacts should be discussed.
294	Wildlife Resources	4.21-10	Last paragraph on the page	Add number of observation-minutes inputted into the eagle fatality model.	Additional detail would be helpful for readers. Specifying the number of observation-minute that were used in the model helps indicate the robustness of the model results.
295	Wildlife Resources	4.21-11	Last sentence of 1st complete paragraph.	Revise text: Should an eagle be killed without the proposed action having a BGEPA permit, proposed action operations will be modified to ensure that additional eagles are not taken (WIL-1k3~~1p~~: Minimize Eagle Mortality).	Typo on mitigation measure numbers. Also, see comment on page 4.21-49: MM WIL-1k2 is just one measure that could result from 1k3. Also, WIL-1k3 and WIL-1p are repetitive and could be combined for clarity. Finally, should the Applicant obtain a BGEPA take permit, the terms and conditions of that permit will supersede and override these measures.
296	Wildlife Resources	4.21-14	Last sentence of first paragraph on page	Please add newer data on bird fatality rates, in a more appropriate location: "Collisions may occur with resident birds foraging and flying within the Project area or with migrant birds seasonally moving through the area. *Loss et al.'s 2013 analysis of mortality data calculations for a range of projects in North America derived an average of 5.25 birds/turbine/year (95-percent CI of 3.15 to 7.35) and 4.12 birds/MW/year (95-percent CI of 2.47 to 5.76). When broken into region, California was above the continent-wide average, with an average of 7.85 birds/turbine/year (95-percent CI of 4.05 to 11.65) and 18.76 birds/MW/year (95-percent CI of 9.68 to 27.84) (Loss 2013).* However, because overall avian use of the Project area is lower compared to many areas in southern California where avian species concentrate at wetlands, oases, or along ridgelines where avian species are known to migrate in moderate to high numbers, risk to migrating, breeding, or wintering passerine birds is expected to be relatively low at the Project area."	Recommend including more recent data than that summarized in 2002 (see comment below). Citation should be: Loss, S., Will, T., and Marra, P. 2013. "Estimates of Bird Collision Mortality at Wind Facilities in the Contiguous United States." Biological Conservation, 168:201–209.
297	Wildlife Resources	4.21-14	Last sentence of third paragraph	"~~The overall national average for passerine fatalities at wind projects has been approximately 2.2 birds per turbine per year (Erickson et al., 2002).~~"	Recommend removing this sentence, as the 2.2 birds per turbine per year number from the Erickson et al. 2002 report actually includes all birds, not just passerines (as stated), and there are more recent reports summarizing national averages (see comment above).

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
298	Wildlife Resources	4.21-15	1st sentence of first full paragraph	Revise text as follows: "~~Based on the mortality estimates from the other wind farms studied, the midrange expected for passerine mortality would be approximately 1.2 to 1.8 birds per turbine per year. To put this into context, a~~An in-depth review of avian mortalities associated with collisions with human structures (roads, power lines, communication towers, buildings, and windows) suggests that about 0.01 to 0.02 percent of all avian mortalities are associated with wind turbines (Erickson et al., 2002).	Stating 1.2 to 1.8 passerines/turbine/yr. here seems redundant, given that on page 4.21-14 a citable estimate of mortality for birds is already given.
299	Wildlife Resources	4.21-16	Above Special Status Bats	Create a new section titled: *"Townsend's Big-eared Bat"* In that section include the following language: *"The Townsend's big-eared bat was recently accepted as a candidate for threatened listing pursuant to the California Endangered Species Act. The TWP site is within the range of this species, though no records exist within 15 miles of the proposed action area (CDFW, 2013). Focused bat surveys performed within the proposed action area were negative for Townsend's big-eared bat and the species was not considered to be potentially present within the proposed action area. Based on these findings, no impacts to Townsend's big-eared bat are anticipated during the operation phase of the proposed action."*	Include specific discussion of Townsend's big-eared bat as it has recently been considered a candidate for state listing
300	Wildlife Resources	4.21-19	1st sentence under Alt 2 Construction and O&M	Recommend revising text: "Construction-related impacts to wildlife resources associated with Alternative 2 would be similar in type as those described above for Alternative 1, but the magnitude would be reduced *by the removal of 3 turbines and associated infrastructure and 13.7 fewer acres of vegetation-removing ground disturbance (12.3 acres of temporary disturbance and 1.4 acres of permanent disturbance)* ~~in proportion to the reduction in Project size for Alternative 2~~.	Quantify difference between Proposed Action and Alt 2.
301	Wildlife Resources	4.21-22	List at top of page	Revise text as follows: 1. 5,820-acre Manzana Wind Energy Project;; 2. 8,300 -acre Pacific Wind Energy Project; ~~3. 1,325-acre Pacific Wind Infill Project ;~~ and 3) 6,739-acre Catalina Renewable Energy Project	Clarify that the Pacific Wind Infill Project (PWIP) is part of PWEP, and therefore does not create its own cumulative impacts.
302	Wildlife Resources	4.21-27 to 4.21-28	Numbered list	4. Golden Eagle Conservation Plan ~~(Project Proponent submitted a Draft Eagle Conservation Plan to agencies for review on March 23, 2011~~ *The currently submitted BBCS is not an Eagle Conservation Plan (ECP) developed strictly in accordance with each of the recommendations of the USFWS's Eagle Conservation Plan Guidance (ECP Guidance); however, it addresses potential risks to golden eagles and presents avoidance and conservation measures aimed to reduce golden eagle take to the "no-net-loss" standard required by the Final Take Permit Regulations under 50 CFR 22.26 and 22.27.* ~~)~~ 5. Bird and Bat Conservation Strategy (~~Project Proponent~~ *A Draft Bird and Bat Conservation Strategy was originally* submitted ~~a Draft Bird and Bat Conservation Strategy~~ to agencies for review on *December 27* ~~April 28,~~ 2011, *with a revised version submitted to agencies on September 19, 2013*).	Proponent has not yet submitted a standalone ECP to agencies for review. However, the September 2013 BBCS includes eagle conservation plan components on pages 2-12, 3-7 through 3-16, 4-24 through 4-31, and 5-1 through 5-17.

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No.	Section/Appendix	Page	Location	Draft EIS Text Revision	Justification
303	Wildlife Resources	4.21-28	WIL-1a: Compliance Monitoring by the Designated Biologist	The Designated Biologist shall have the authority to ensure compliance with all measures set forth in the Biological Opinion ~~and 2081 take authorization~~ and with all mitigation measures included herein, and will be the primary agency contact for the implementation of these measures. The Designated Biologist will have the authority and responsibility to halt any proposed action activities that are in violation of the terms of the Biological Opinion~~, 2081 take authorization,~~ or proposed action mitigation measures. A list of responsibilities of the Designated Biologist is summarized below. 1. Notify the BLM's Authorized Officer and USFWS at least 14 calendar days before initiating ground-disturbing activities. 2. Immediately notify the BLM's Authorized Officer in writing if the Project Proponent does not comply with any of the mitigation measures or terms of the Biological Opinion ~~and/or the 2081 take authorization~~ including, but not limited to, any actual or anticipated failure to implement such measures within the periods specified. 3. Conduct compliance inspections daily during on-going construction as clearing, grubbing, and grading are completed, and submit a monthly compliance report to BLM's Authorized Officer until construction is complete.	There is no mention in the rest of the DEIS of obtaining a 2081 permit, and therefore this language should not be included within the mitigation measure.
304	Wildlife Resources	4.21-32	WIL-1e: Bats section	Recommend revising text: "If the bat biologist determines, in consultation with and with the approval of BLM, that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required. However, if there are no alternative roost sites used by the maternity colony, provision of substitute roosting bat habitat is required. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to demolition of roosts is required.".....".If an active maternity roost is located in an area to be impacted by the proposed action, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to 1 March) or after young are flying (i.e., after 31 July) using the exclusion techniques described above."	These mitigation measures are unclear. If a maternity roost is found and alternate maternity roosts are available, is no action required or is exclusion of the colony from the roost prior to demolition required? Additionally, the last paragraph states "using the exclusion techniques described above" but the exclusion techniques are not described above. Language in existing TWP MM is identical to that of MM 4.21-3 (6) in the adopted Alta East Mitigation Measures, except that the TWP measure is missing subsections a) and b) which describe exclusion techniques. Suggest including this language from the Alta East FEIS, found on page 3-35 of the Adopted Mitigation Measure document found here: http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/ridgecrest/alta_east_wind.Par.83438.File.dat/AEWP_ROD_App3_AdoptedMM.pdf
305	Wildlife Resources	4.21-33	WIL-1g(1 and 3): Burrowing Owl Protection Measures	Recommend revising text: 1) Unless otherwise authorized by BLM and CDFW, no disturbance shall occur within 160 feet (50 meters) of occupied burrows during the non-breeding season (September 1 through January 31) or within *250* ~~650~~ feet (*76* ~~500~~ meters) during the breeding season (February 1 through August 31)...3) Unless otherwise authorized by BLM, a *250* ~~650~~-foot buffer, within which no activity will be permissible, will be maintained between Project activities and nesting burrowing owls during the nesting season.	The DEIS text uses a 650-ft buffer around occupied burrowing owl burrows during the nesting season (February 1 through August 31). This is significantly larger than the 250-ft buffer approved for the Alta East project in January 2013. Revise text for consistency or provide justification for difference.
306	Wildlife Resources	4.21-34	WIL-1g(5): Burrowing Owl Protection Measures	Recommend revising text: Land disturbed within the buffers of occupied burrowing owl burrows, as outlined in WIL-1g (1) Impacts to active burrowing owl territories shall be mitigated at a 1:1 ratio through a combination of off-site habitat compensation and/or off-site restoration of disturbed habitat capable of supporting this species.	Clarification of definition of impacts. Proponent intends to avoid active burrowing owl territories.
307	Wildlife Resources	4.21-34	Mitigation Measures WIL-1h, WIL-1i, and WIL-1j	Replace condor-focused mitigation measures with the following, or add this caveat at the beginning of each of the three measures: "*The Applicant will conform to the terms and conditions of the approved Biological Opinion, the conditions of which will supersede MM WIL-1h through WIL-1j.*"	The condor mitigation included in the DEIS were proposed by the applicant, and are being modified and adjusted based on consultation with the BLM and FWS. The terms and conditions of the BO will supersede and override these measures.

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308	Wildlife Resources	4.21-46	WIL1k1: Golden Eagle Conservation Plan	Recommend revising text: WIL-1k1: Golden Eagle Conservation Plan. The Project Proponent shall develop and implement a Golden Eagle Conservation Plan (GECP) to address Project impacts to golden eagles. The Project Proponent shall submit the GECP to the BLM ~~and USFWS~~ for review and approval prior to initiation of Project construction. The GECP shall be prepared in accordance with the Eagle Conservation Plan Guidance (USFWS, 2013 [Module 1– Land-based Wind Energy, Appendix C]). The GECP shall include a description of the golden eagle studies completed for the Project; a risk analysis; advanced conservation practices to be implemented during operation, including a description of the adaptive management strategy for the Project and compensatory mitigation; and post-construction monitoring and reporting procedures for golden eagles.	USFWS approval is governed by the BGEPA take permit process. Should the Applicant obtain a BGEPA take permit, the terms and conditions of that permit will supersede and override these measures.
309	Wildlife Resources	4.21-47	WIL-1l: Bird and Bat Conservation Strategy	Recommend revising text: "WIL-1l: Bird and Bat Conservation Strategy. The Project Proponent shall develop a BBCS to address Project impacts to special-status avian and bat species. The Project Proponent shall submit the BBCS to the BLM ~~and USFWS~~ for review and *BLM* approval prior to initiation of Project construction. The BBCS shall be prepared in accordance with the guidance provided by the USFWS (2013). The BBCS shall describe Project design features and advanced conservation practices to be used to minimize the risk of collision pre-construction, during construction, and during operation and maintenance. The plan shall include monitoring, adaptive management, and reporting procedures. The post-construction monitoring methods shall be based on the California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (CEC and CDFG, 2007). The draft BBCS prepared by the Project Proponent is provided in Appendix ~~C-2~~ *C-4*, and subject to *BLM* ~~agency~~ approval. The BBCS shall include, but not be limited to, the following minimization measures:"	The proponent welcomes USFWS comments on the BBCS to assist in the BLM's approval of the BBCS. However, the proponent is not aware of any regulatory mechanism for the USFWS to approve the BBCS.
310	Wildlife Resources	4.21-47 through 4.21-49	WIL-1k2, 1k3 and 1p	Recommend revising text: ~~WIL-1k2: Night Operations. If a golden eagle is injured or killed due to the construction, operation, or maintenance of this Project and the Applicant/grant holder does not possess a current eagle take permit, the Project shall move to the failsafe of night operations only to ensure that no further eagle mortalities or injuries occur. If the Applicant/grant holder applies for and receives an eagle take permit, the conditions of that permit override this measure.~~ WIL-1k3: Minimize Eagle Mortality. If a golden eagle is taken by the Project, and the Project proponent has not obtained an eagle take permit from USFWS prior to the taking, the BLM will require the ROW holder to implement limitations or restrictions of operations on the entire Project or specific facilities, by season or time of day as appropriate, or other adaptive management measures deemed necessary, in coordination with the USFWS, to avoid further unauthorized take of eagles. ~~WIL-1p: Minimize Eagle Mortality. If a golden eagle is taken by the Project, and the Project proponent has not obtained an eagle take permit from FWS prior to the taking, the BLM will require the ROW holder to implement limitations or restrictions of operations on the entire Project or specific facilities, by season or time of day as appropriate, or other adaptive management measures deemed necessary, in coordination with the FWS, to avoid further unauthorized take of eagles. These restrictions would be replaced by the terms and conditions of a~~ A BGEPA take permit, should the Applicant obtain one, *will supersede and override this measure.* BLM retains its authority to suspend, terminate, or modify the Project's ROW authorization in accordance with 43 CFR 2807.16 and 2807.17.	MM WIL-1k2 is just one measure that could result from 1k3. Also, WIL-1k3 and WIL-1p are repetitive and could be combined for clarity. Finally, should the Applicant obtain a BGEPA take permit, the terms and conditions of that permit will supersede and override these measures.
311	Wildlife Resources	4.21-49	Mitigation Measure WIL-1n	Formatting between 4. and 6. of this measure is off (one indented and one is not), and 6. should be changed to 5.	Formatting correction.

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312	Wildlife Resources	4.21-49	Mitigation Measure WIL-1n	Please revise as follows: In addition to Mortality Monitoring described above, starting in year 1 of Project operation and continuing for the life of the Project, annual Post-Construction Mortality Monitoring for golden eagle shall be conducted by the Project proponent, in conjunction with other monitoring, and submitted to the Kern County Planning and Community Development Department, the Bureau of Land Management, the United States Fish and Wildlife Service, and the California Department of Fish and Game. *A BGEPA take permit, should the Applicant obtain one, will supersede and override this measure.*	Should the Applicant obtain a BGEPA take permit, the terms and conditions of that permit will supersede and override these measures.
313	Wildlife Resources	4.21-50	Mitigation Measure WIL-3b	Revise as follows: "Similar to the requirements for WIL-1c, a Worker Environmental Awareness Program shall be implemented during the ~~construction and~~ operation *and maintenance* phase of the Project…"	Clarify the stage, as WIL-1c covers WEAP during the construction phase.
314	Wildlife Resources	4.21-50	WIL-2b	Delete condition or add "If required": ~~**WIL-2b Fencing Designs that Facilitate Wildlife Movement**. All fences installed on the Project site will be a maximum of four (4) feet in height, wire strand, with a smooth bottom wire at least eighteen (18) inches from the ground to facilitate wildlife movement during operation of the Project.~~	Proponent does not propose fencing. If required, security fencing would be installed in accordance with BLM requirements. There is no legal public access to BLM parcels as they currently exist because they are landlocked by private land parcels. BLM parcels are land locked. The proponent can also work with adjacent private landowners who own or have easements across the surrounding private land and need to cross the BLM parcels to minimize impacts during construction and operation. To avoid possible injuries to pronghorn antelope, if fencing was required, the fence design would consist of security fencing with a smooth bottom strand wire (i.e., with no barbs) located 18 inches above the ground.
315	Chapter 5: Consultation, Coordination, and Public Involvement	5-1	5.1 Interrelationships	Recommend the following revision: "Section 211 of EPAct 05 ~~sets for the sense of Congress~~ *states* that the Secretary of the Interior should seek to have approved a minimum of 10,000 megawatts of renewable energy generative capacity on public lands by 2015."	Change phrasing to make it more reader-friendly.
316	Chapter 5: Consultation, Coordination, and Public Involvement	5-2	California Department of Fish and Game	Recommend the following revision: "An analysis was undertaken to determine the presence or absence (within the project area) of areas potentially requiring negotiation of a Streambed Alteration Agreement with the CDFW pursuant to Section 1600 of the State Fish and Game Code. ~~No~~ Water features *potentially* subject to CDFG jurisdiction were identified in the analysis*, and the Project was subsequently designed to avoid all drainages and will not impact any areas potentially subject to the jurisdiction of CDFG under Section 1600.* Therefore, it has been determined that the TWP is designed such that no potential CDFG jurisdictional drainages would be affected by the Proposed Action or alternatives."	It is incorrect to state that no water features subject to CDFG determination were identified. Drainages potentially subject to CDFG were identified, but through project design, impacts to these areas were avoided. Language from "State Jurisdictional Areas" on page 3.17-5 was used to flesh out this section.
317	Chapter 5: Consultation, Coordination, and Public Involvement	5-6	Enforcement and Adaptive Management	One sentence repeated twice in same paragraph. Remove sentence the second time it appears: "…adaptive management model. ~~Put another way, adaptive management is a system of management practices based on clearly identified outcomes, monitoring to determine if management actions are meeting outcomes, and, if not, facilitating management changes that will best ensure that outcomes are met or to re-evaluate the outcomes.~~ Adaptive management..."	Second to last sentence in paragraph is largely identical to second sentence in paragraph. Remove the second to last sentence to provide a more concise paragraph.
318	References	N/A	3.10 Paleontological Resources and 4.10 Paleontological Resources	Please correct the reference title to: *Sapphos Environmental, Inc. 2011. Preliminary Information for the Tylerhorse Wind Energy Project, Kern County, California.*	Correct document title
319	Appendices	A-30	Figure 3.13-1	Recommend removal of Figure 3.13-1 from the mention in the TOC and physical removal from the Appendix. It is not referenced anywhere in the DEIS and is a duplicate of Figure 3.15-1.	Confusing to have two of the exact same figures, especially as Figure 3.13-1 is never referenced in the document.
320	Appendices	F-1	Appendix F, Paleontological Resources Assessment	The Blythe Solar Project (Riverside County) Paleo Report is attached (SWCA 2009). This has no bearing on the Tylerhorse project and should be removed in the final version of the DEIS.	Inclusion of another project's paleontological report.

TYLERHORSE WIND ENERGY PROJECT

Air Quality Impact Technical Report

Prepared for:

Heartland Wind LLC
1125 NW Couch Street, Suite 700
Portland, Oregon 97209

Prepared by:

Sapphos Environmental, Inc.
430 North Halstead Street
Pasadena, California 91107

July 2014

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SECTION ES
EXECUTIVE SUMMARY

This Air Quality Impact Technical Report undertaken in support of the proposed Tylerhorse Wind Energy Project (proposed project) concluded that a potentially significant impact to air quality would occur as a result of construction of the proposed project; however, beneficial impacts to air quality and greenhouse gas (GHG) emissions would be expected to result due to implementation of the proposed project. This technical report addresses a proposed project property of approximately 1,207 acres located in the south-central portion of the unincorporated area of Kern County, California. The proposed project property is bordered by the Tehachapi Mountains to the northwest and is approximately 13 miles south of the City of Tehachapi, Kern County, and approximately 15 miles northwest of the unincorporated community of Rosamond, California. The proposed project property is located within the Eastern Kern Air Pollution Control District (EKAPCD) portion of the Mojave Desert Air Basin (MDAB).

This report was prepared to address air quality issues identified as requiring further analysis to define significance levels of air quality impacts pursuant to the National Environmental Policy Act (NEPA). Development of the proposed project would entail the development of up to 60 megawatts (MW) of wind power. Construction of the proposed project would last approximately 4 months.

The main conclusions of this report are as follows:

- Construction of the proposed project would generate short-term emissions of criteria pollutants. Particulates would be generated from excavation and site grading, and exhaust emissions would be generated from construction equipment and vehicular trips to and from the proposed project property. The daily and annual emissions of volatile organic compounds (VOCs) and the annual emissions of nitrogen oxides (NO_x) associated with the proposed project's construction activities are anticipated to be below the EKAPCD construction emission thresholds of significance and, as such, would be expected to result in a less than significant impact to air quality during construction. However, the daily emissions of NO_x contributed by the proposed project's construction activities are anticipated to be above the EKAPCD thresholds of significance and, as such, would be expected to result in a potentially significant impact to air quality, even with implementation of mitigation measures. With implementation of mitigation measures, impacts related to annual NO_x emissions during construction would be reduced to below the EKAPCD annual threshold of significance.

- Operation of the proposed project would result in emissions of criteria pollutants due to maintenance activities and vehicular trips to and from the proposed project property. The emissions of VOCs, NO_x, and PM_{10} associated with the proposed project's operational activities are anticipated to be below the EKAPCD daily thresholds of significance, and, as such, would be expected to result in a less than significant impact to air quality during operation of the proposed project.

- The annual unmitigated estimated nonattainment air pollutant emissions are below the de minimis levels set forth by in the General Conformity Rule, and therefore the proposed project would not be expected to be subject to a conformity determination.

- Air quality impacts to sensitive receptors as a result of construction and operation of the proposed project would be expected to be below the level of significance.

- Carbon monoxide concentrations generated by vehicle trips during operation of the proposed project at sensitive receptors in the vicinity of the proposed project would be expected to be below the level of significance.

- Toxic air contaminant emissions associated with construction and operation of the proposed project at sensitive receptors in the proposed project property would be expected to be below the level of significance.

- Odor impacts associated with the proposed project would be expected to be below the level of significance.

- The proposed project would be consistent with the Kern County 1993 Air Quality Attainment Plan.

- The proposed project's construction and operational phases would not be expected to result in inconsistency with federal, state, or regional regulations on GHG emissions, and the proposed project's cumulative impact on global climate change would be expected to be below the level of significance. Operation of the proposed project as a producer of renewable energy would be expected to reduce GHG emissions by displacing fossil fuel energy sources.

- Implementation of mitigation measures Air-1 and Air-2 is recommended to reduce annual fugitive dust emissions to below the level of significance.

- Implementation of mitigation measure Air-2 is recommended to reduce annual NO_x emissions to below the level of significance.

- Air quality impacts related to annual NO_x and PM_{10} emissions during construction would result in a potentially significant cumulative impacts when considering the proposed project in conjunction with related past, present, or reasonably foreseeable, probable future projects.

In conclusion, the proposed project would not be subject to a conformity determination. Construction-related air quality impacts would be reduced to below the level of significance through the implementation of mitigation measures, with the exception of mitigated daily NO_x emissions and cumulative annual impacts related to NO_x and PM_{10} emissions; these impacts would be reduced to the maximum extent possible through mitigation but would remain significant unavoidable impacts. Direct operational impacts would be below the level of significance. In addition, the proposed project's production of renewable energy would create long-term benefits on reducing GHG emissions through use of renewable energy source during operation of the proposed project.

SECTION 1.0
INTRODUCTION

1.1 PURPOSE AND SCOPE

This Air Quality Impact Technical Report was undertaken by Sapphos Environmental, Inc. for Heartland Wind LLC (Heartland), a wholly owned subsidiary of Iberdrola Renewables, LLC, in support of the proposed Tylerhorse Wind Energy Project (proposed project). This report evaluates potential air quality impacts associated with the proposed project, proposes measures to mitigate any potentially significant impacts to air quality caused by implementation of the proposed project, and documents the findings of the levels of significance after mitigation, where recommended. The Air Quality Impact Technical Report focuses on all phases (that is, construction, operation, and maintenance) of the proposed project, as well as the proposed project's potential cumulative impacts and impacts related to greenhouse gas (GHG) emissions.

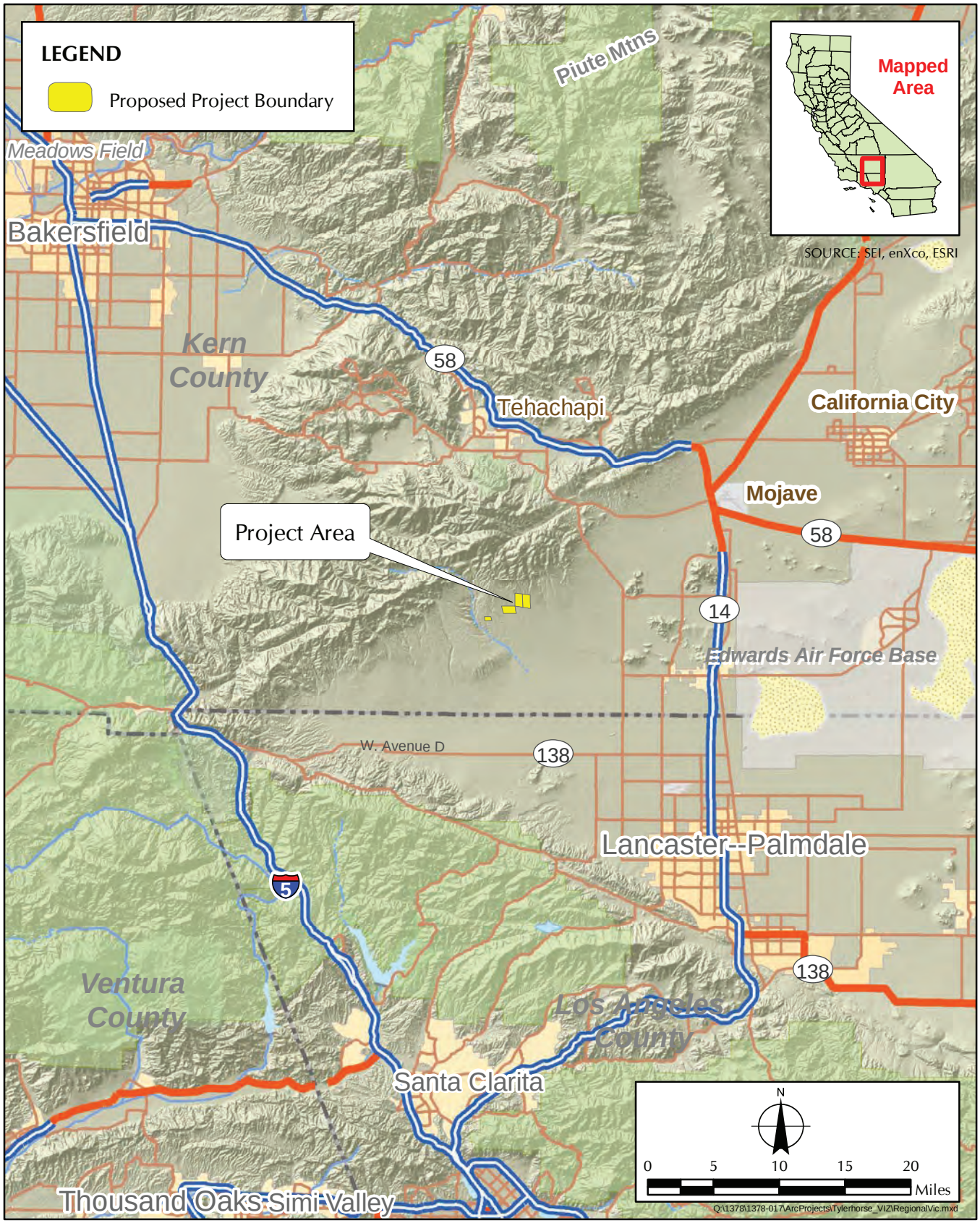
1.2 PROJECT LOCATION

The proposed project property consists of three separate parcels that total approximately 1,207 acres (slightly less than 2 square miles) of Bureau of Land Management (BLM)–administered land located in the southern portion of the unincorporated area of Kern County (Figure 1.2-1, *Regional Vicinity Map*). The proposed project is located approximately 15 miles west of California State Highway 14 (Antelope Valley Freeway), 12.5 miles south of California State Highway 58 (Blue State Memorial Highway), and 8 miles north of State Route 138 (West Avenue D) in southern Kern County, California. The proposed project property is bordered by the Tehachapi Mountains to the northwest and is approximately 13 miles south of the City of Tehachapi, Kern County, and approximately 15 miles northwest of the unincorporated community of Rosamond, California (Figure 1.2-2, *Local Vicinity Map*). Edwards Air Force Base is located approximately 29 miles east of the proposed project property.

The proposed project is generally accessed from the corner of Rosamond Boulevard and north along 170th Street West, then along access roads entitled for the adjacent Manzana (formerly PdV) Wind Energy Project (Manzana Project), Pacific Wind Energy Project (Pacific Wind Project), and Catalina Renewable Energy Project (Catalina Project), separate projects previously approved by the Kern County Board of Supervisors. While existing roads would be used to the greatest extent possible, new unpaved roads would be constructed to serve as access roads across the proposed project property to access wind turbine generators (WTGs) located within the proposed project property.

Topography

The proposed project property is within the U.S. Geological Survey (USGS) 7.5-minute series, Tylerhorse Canyon, California, topographic quadrangle (Figure 1.2-3, *Topographic Map with USGS 7.5-Minute Quadrangle Index*). The proposed project property ranges in elevation from 3,480 feet to 3,960 feet above mean sea level at the southeastern parcel and northwestern parcel of the project property boundaries.



IBERDROLA RENEWABLES

FIGURE 1.2-1

Regional Vicinity Map

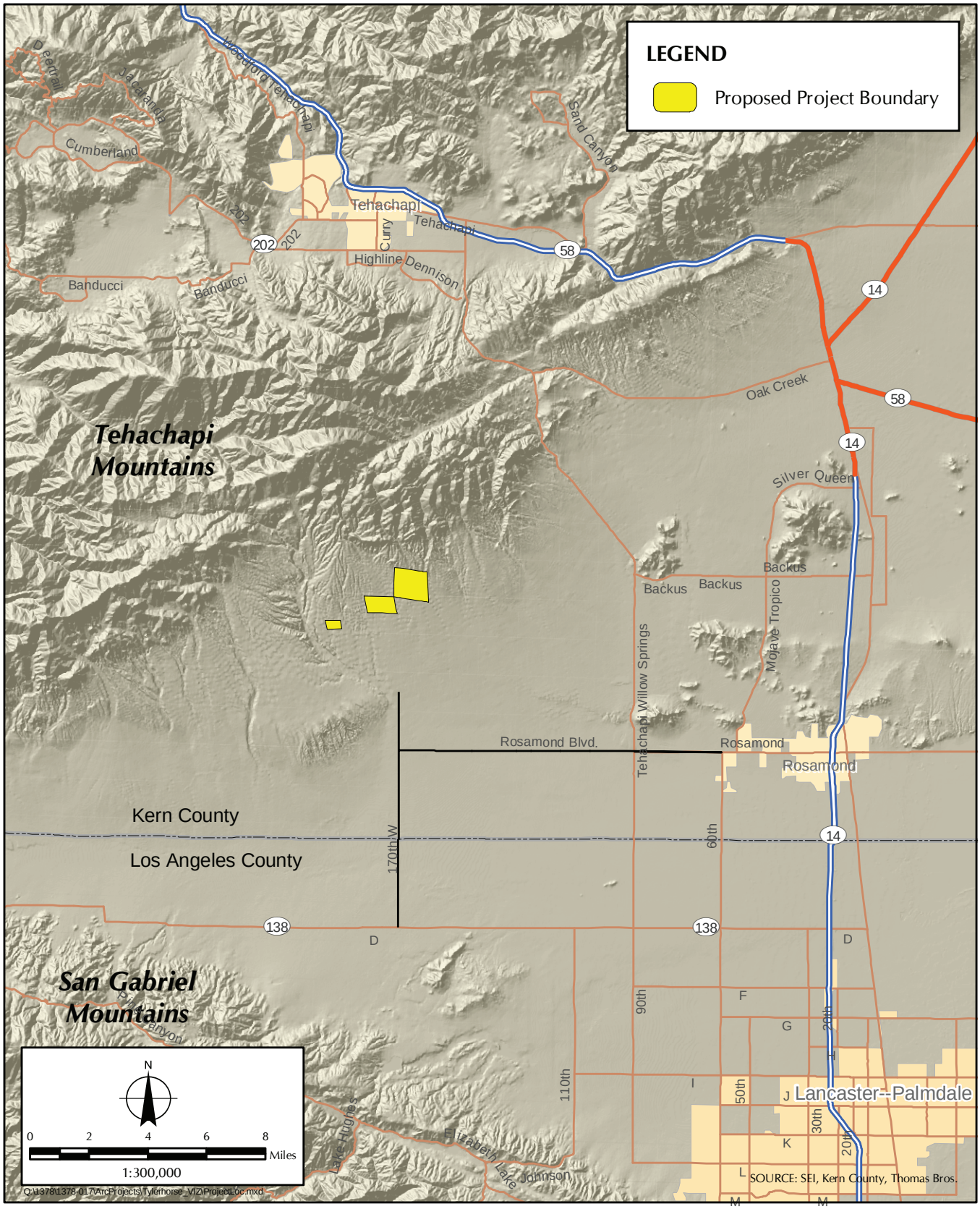


FIGURE 1.2-2

Local Vicinity Map

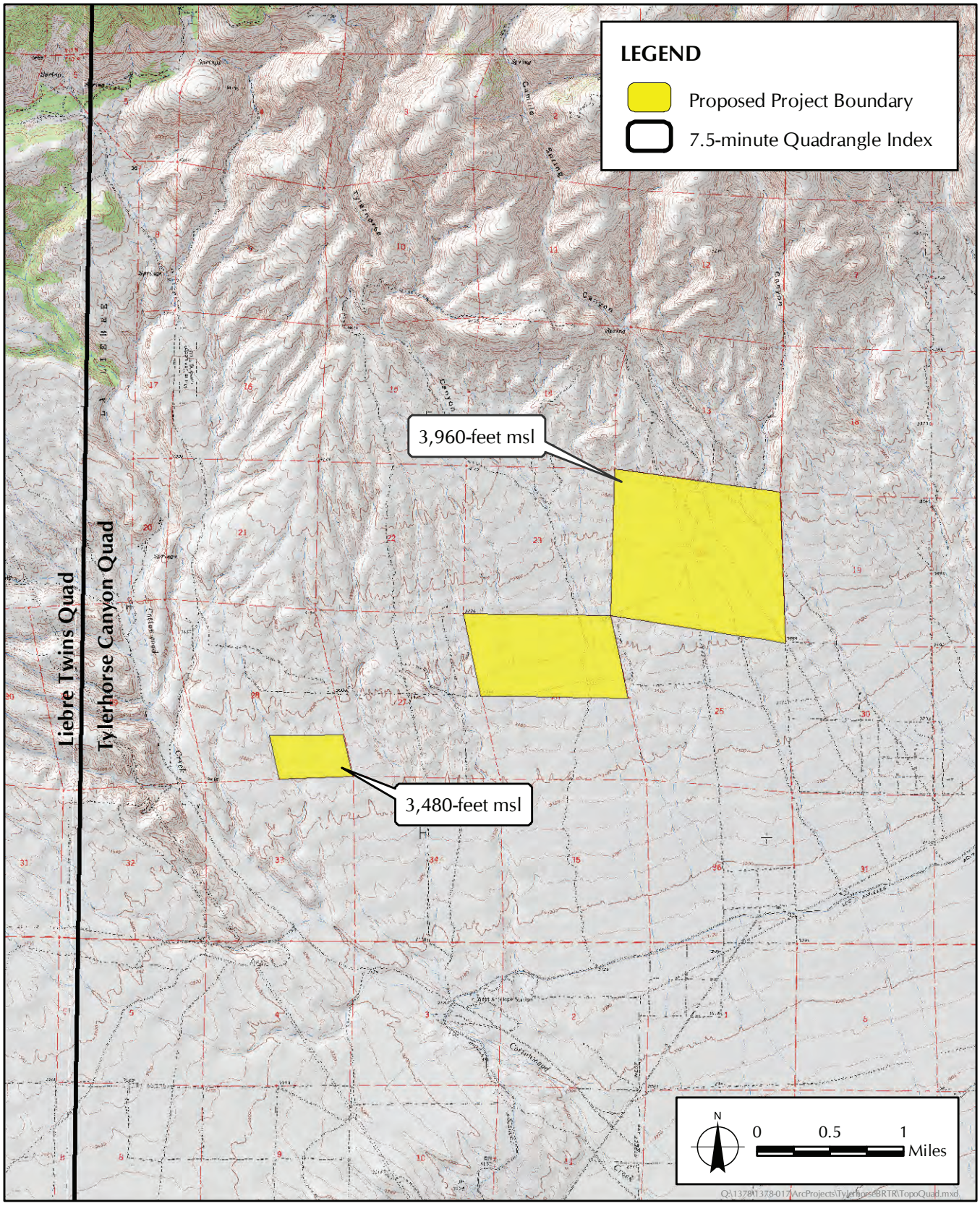


FIGURE 1.2-3

Topographic Map with USGS 7.5-minute Quadrangle Index

*Please note impact acreages for Plant Communities may vary slightly from the ground disturbance impacts due to rounding

*Please note impact acreages for Plant Communities may vary slightly from the ground disturbance impacts due to rounding

Public Comment Card

Tylerhorse Wind Project DEIS/PA

Commentor Name: Karen Dyer Date: 7-11-14

Agency/Organization Affiliation:

Address: 7045 140th St W Rosamond, CA 93560

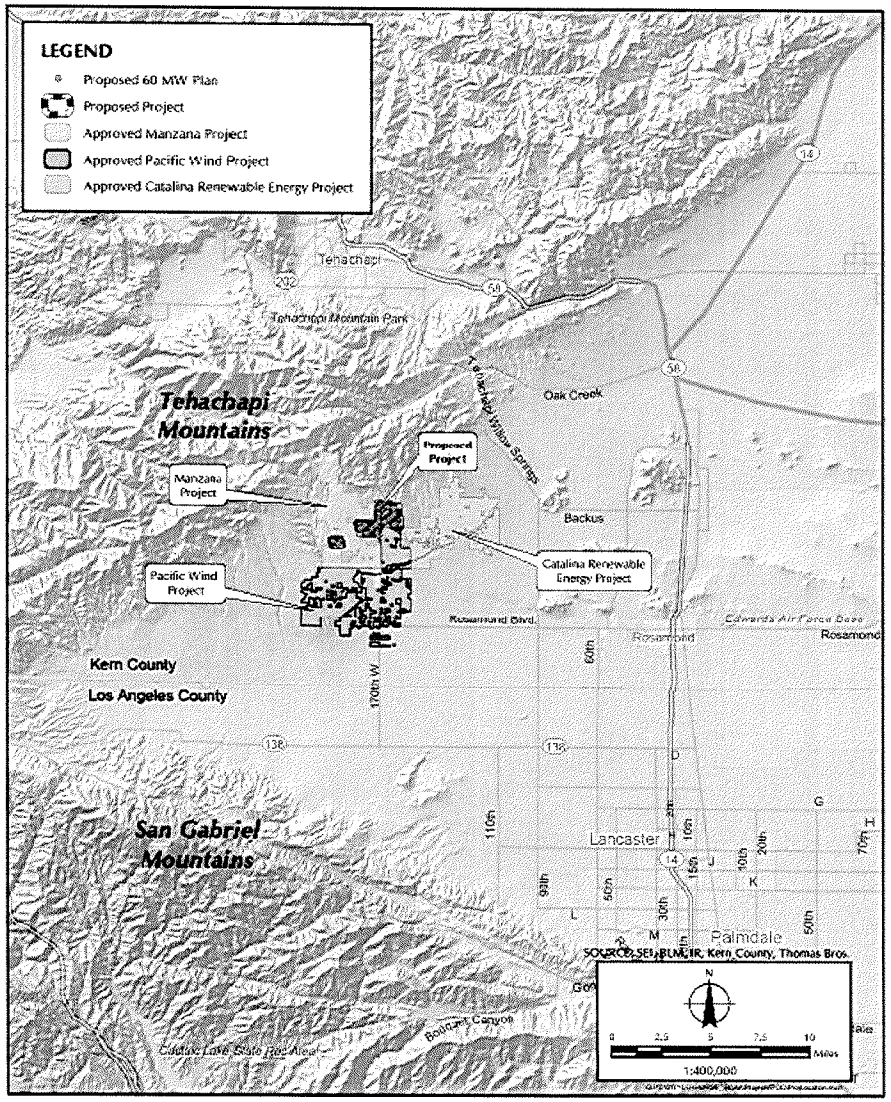
Comment: my property borders section 24 we have maintained the road thro section 24 for 38 years. This is our only access. This is our home, we have lived there for 38 years. we need to keep our access

By submitting a scoping comment you will receive a copy of the FEIS/PA. Please indicate the format you would prefer:

☐ Compact Disk (CD) or ☐ Hardcopy

Tylerhorse Infill Project

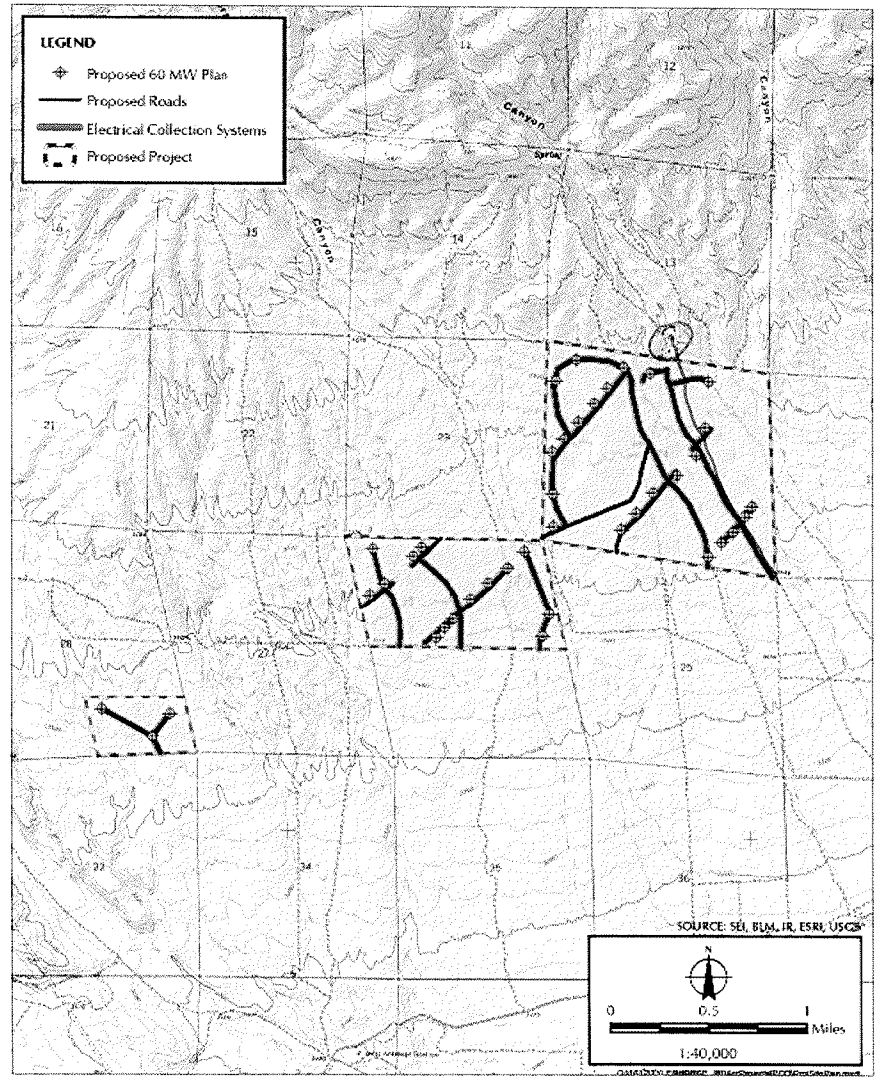
IBERDROLA RENEWABLES



SOURCE: Heartland Wind, 2014.

Tylerhorse Wind Project PA/DEIS . 211185

Figure 2-1
Project Location



SOURCE: Heartland Wind, 2014.

Tylerhorse Wind Project PA/DEIS . 211185

Figure 2-2
Conceptual Layout

Cristina Gispert

From: Perry, Cedric <cperry@blm.gov>
Sent: Wednesday, July 16, 2014 10:21 AM
To: Cristina Gispert
Subject: Fwd: Tylerhorse wind project

Tylerhorse Comment.

Cedric C. Perry

Project Manager

Bureau of Land Management (BLM)

22835 Calle San Juan De Los Lagos

Moreno Valley, Ca. 92553

Office # 951-697-5388

Cell Ph # 951-208-5794

---------- Forwarded message ----------
From: **Karen Dyer** <dyermountain@me.com>
Date: Wed, Jul 16, 2014 at 5:58 AM
Subject: Tylerhorse wind project
To: "cperry@blm.gov" <cperry@blm.gov>

Sent from my iPad
Karen Dyer

7045 140th street west
Rosamond, CA 93560
805 338 5277

Location

Township 10 north
Range 15 west

W1/2 of SE1/4 of section 13

I attended the public meeting at Hummel Hall on July 11. I voiced my concerns and wrote comments, but I don't think I voiced them all.
We have lived at this location for 38 years and used the access road thru section 24. Our property borders on the north of section 24 and it is our only access to our home.

More of my concerns:

The noise will be unbearable
The northern most wind turbines are too close to our property and our home.
The lights too bright-flicker affect
Ice flying off the turbine blades
The dust this project will produce
We need this access to get to work
We were not notified of this project, or any studies done.

Thank you for hearing my concerns.

Karen Dyer

PLANNING AND COMMUNITY
DEVELOPMENT DEPARTMENT

Lorelei H. Oviatt, AICP, Director
2700 "M" STREET, SUITE 100
BAKERSFIELD, CA 93301-2323
Phone: (661) 862-8600
FAX: (661) 862-8601 TTY Relay 1-800-735-2929
E-Mail: planning@co.kern.ca.us
Web Address: www.co.kern.ca.us/planning

DEVELOPMENT SERVICES AGENCY

Administrative Operations
Engineering, Surveying and Permit Services
Planning and Community Development
Roads

July 25, 2014

Bureau of Land Management, Ridgecrest Field Office
Attn: Cedric Perry, Project Manager
300 S. Ridgecrest Road
Ridgecrest, CA 93555

RE: Local Agency Review - Tylerhorse Wind Project, Draft Environmental Impact Statement & Draft Plan Amendment (APN: 476-030-11, 476-052-01, -02, 476-061-09) CACA 053958

Dear Mr. Perry:

These comments are provided for the record in addition to the comments previously provided (attached). Kern County remains concerned regarding the unmitigated impacts on county services and the potential threat to our existing wind resource area on private land completely surrounding this site. The current wind industry provides over $40 million a year in property taxes to the Kern County general government, special districts, and school districts. The Fire department has fought, as recently as two years ago, grassland fires into the turbine areas and is fully trained and prepared with appropriate equipment. The request for contribution to the fire equipment or foam needed is consistent with the NEPA requirements that impacts public safety services such as fire and sheriff be addressed and mitigated. Staff continues to request the requirement be imposed by the BLM for the applicant to fund appropriate firefighting equipment as specified in the previous letter.

The BLM maintains no roads in the area. Rosamond Blvd and 170th Street are fully constructed county maintained roads and under the full jurisdiction of the Kern County Board of Supervisors. They do not cross BLM land and are not right of ways granted by the BLM. Therefore, all the impacts of this BLM project will be on county roads from construction impacts to transporting the turbines to the site. Kern County has extensive experience with the transport impacts to county roads and it can be extensive in damaging from the heavy weight of the transport. Further, the slow speed required to transport has traffic flow impacts on county roads. The proposed mitigation is required to ensure that county roads are restored to appropriate levels of construction by the applicant after transport and construction activities. Staff also notes that Rosamond Blvd is the appropriate road as the level of residential development past 60th street is scattered. Avenue A which has been suggested has a very high level of residential development and only half of the road is controlled by Kern County with the other half being under the jurisdiction of Los Angeles County. Kern County would not be supportive of using Avenue A for transport of turbines.

The other mitigation measures for Sales tax and encouraging local hire are self-explanatory and we request they have been imposed on the project. In addition, please be advised that the County is reevaluating our previously submitted comments regarding the use and construction of a biological observation tower to be located on private land. We are currently evaluating potential locations for such tower, should it be the BLM's determination to require this measure.

The county is in discussions with the applicant for processing of the building permits. Although the county has no jurisdiction over the BLM land, the construction of 500-foot wind turbines is significantly different from any other construction. Hiring a contractor to process the permits and do the inspections is not acceptable to the county. Our Building Department is experienced with such permitting and to date we have had no structural failures or other issues with any of our wind projects. We remain concerned that any mistakes that occur outside our own Building Inspection Department and permitting process would reflect on our other companies and wind resource area.

We remain interested in resolving these issues and supporting this wind project in Kern County.

Sincerely,

Lorelei H. Oviatt

Lorelei H. Oviatt, AICP, Director
Kern County Planning and Community Development Department

cc: Clerk of the Board
County Counsel
County Administration Office
Kern County Engineering, Surveying, and Permit Services Department
Congressman Kevin McCarthy
BLM Desert District Advisory Council

PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

Lorelei H. Oviatt, AICP, Director
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E-Mail: planning@co.kern.ca.us
Web Address: www.co.kern.ca.us/planning

DEVELOPMENT SERVICES AGENCY

Engineering, Surveying and Permit Services
Planning and Community Development
Roads

June 23, 2014

FILE: General Correspondence
Map 216

Bureau of Land Management, Ridgecrest Field Office
Attn: Cedric Perry, Project Manager
300 S. Ridgecrest Road
Ridgecrest, CA 93555

RE: Local Agency Review – Tylerhorse Wind Project, Draft Environmental Impact Statement & Draft Plan Amendment (APN: 476-030-11, 476-052-01, -02, 476-061-09) CACA 053958

Dear Mr. Perry:

Kern County is in receipt of the notice from the United States Department of the Interior, Bureau of Land Management, dated April 2014, requesting Agency participation in the review of the above-noted application. Kern County appreciates this opportunity to participate in the review of this project. The project appears to be located within Kern County, California, therefore, this Department has reviewed the project as a Local Agency (CEQA Guidelines Section 15368) and offers the comments noted below.

PROJECT OVERVIEW

The proposed project is for Heartland Wind, LLC to construct and operate 40 Wind Turbine Generators (WTGs) over 1,207 acres of BLM-administered land, generating approximately 60-megawatts (MW) of electricity, for delivery to the Whirlwind Substation through either the Manzana Wind Energy Project or Pacific Wind Energy Project. Work is scheduled to temporarily disturb 171.1 acres over four months, with permanent disturbance of 24.3 acres.

COMMENTS ON ENVINRMENTAL DOCUMENT

As noted above, the Kern County Planning and Community Development Department, as a Cooperating/Local Agency (NEPA Regulations 1501.6, CEQA Guidelines Section 15368) has reviewed the above project due to its location within Kern County, California. Based on a review of the project, Staff offers the following comments:

1. Page 3.18-10 of the EIS states that the Kern County Zoning Ordinance allows for WTGs 600-feet in height. Please be advised that, per Figure 19.08.160, within the Zoning Ordinance, all structures over 500 feet require adherence to the appropriate Military Review Requirements; which limit turbine height to a maximum of 500-feet or less.

2. Mitigation Measure **Air-2(d)** states to "*Require all off-road diesel engines with a rated output of greater than 50 horsepower to, at a minimum, meet the Tier 32 California Emissions Standards for Off-Road Compression Ignition Engines, or. If reasonably available, Tier 23 engines with diesel particulate filters and lean-NOX catalysts (or, or equivalent control devices)., will be employed onsite Heartland Wind, LLC shall provide verification that the construction fleet meets the requirements as identified as part of this mitigation measure.*" Kern County believes that "Tier 32" and "Tier 23" should read "Tier 2" and "Tier 3", respectively.

3. There is a requirement for a Traffic Management Plan, a Waste Management Plan, and a Hazardous Materials Management Plan, but no requirement for consultation or approval by Kern County Roads Department, Kern County Waste Management Department, or Kern County Environmental Health Services Department, respectively.

4. Section 3.16 (Transportation and Public Access) states that local access to the project site by construction traffic will be from State Route 14, to Rosamond Boulevard, to 170th Street West. Since the project will use Kern County Road networks, it is recommended that Mitigation Measures be added to address this issue as follows:

   "Prior to the issuance of construction or building permits, the project proponent shall provide evidence of compliance with the following to the Kern County Planning and Community Development Department:

   1. *Submit a Traffic Control Plan to the California Department of Transportation (Caltrans) District 6 and the Kern County Roads Department and obtain any necessary encroachment or other permits for the work within the State and/or County road right-of-way or use of oversized/overweight vehicles that will utilize County-maintained roads, which may require California Highway Patrol or a pilot car escort. Copies of the approved traffic plan and issued permits shall be submitted to the Kern County Planning and Community Development Department.*
   2. *Prepare the Construction Traffic Control Plan in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook. The plan must include, but not be limited to, the following issues:*
      a. *Timing deliveries of heavy equipment and building materials;*
      b. *Directing construction traffic with a flag person;*
      c. *Placing temporary signing, lighting, and traffic control devices if required, including, but not limited to, appropriate signage along access routes to indicate the presence of heavy vehicles and construction traffic;*
      d. *Ensuring access for emergency vehicles to the project sites;*
      e. *Temporarily closing travel lanes or delaying traffic during materials delivery, transmission line stringing activities, or any other utility connections;*
      f. *Maintaining access to adjacent property;*
      g. *Specifying both construction-related vehicle travel and oversize load haul routes, minimizing construction traffic during the AM and PM peak hour, distributing construction traffic flow across alternative routes to access the project sites, and avoiding residential neighborhoods to the maximum extent feasible; and*
      h. *Identifying vehicle safety procedures for entering and exiting site access roads.*
   3. *Enter into a secured agreement with Kern County to ensure that any County roads that are demonstrably damaged by project-related activities are promptly repaired and, if necessary, paved, slurry-sealed, or reconstructed as per requirements of the State and or Kern County.*
   4. *Submit documentation that identifies the roads to be used during construction. The project proponent shall be responsible for repairing any damage to non-County maintained roads that may result from construction activities. The project proponent shall submit to the Kern County Roads Department and the Kern County Planning and Community Development Department a preconstruction video log and inspection of roadway conditions for those roads used during construction.*
   5. *Subsequent to completion of construction, submit a post-construction video log and inspection report to the County. This information shall be submitted in DVD format. The County, in consultation with the project proponent's engineer, shall determine the extent of remediation required, if any."*

5. Since fire services are provided by Kern County personnel, it is recommended that Mitigation Measure **WF-2** be revised to allow for the following additional options to the currently required automatic fire extinguishing system:

   "Option 2: If an Industrial Mini Pumper has already been purchased for the project site, the Fire Department shall consult with the County Administrative Office (CAO) to determine if there are any outstanding reimbursement requirements associated with that purchase. If the Industrial Mini Pumper has not yet been fully reimbursed by the County, then the project proponent shall pay their proportionate share of $88,000.00 to the Planning and Community Development Department for the purpose of reimbursement of the pumper.

   Option 3: If an Industrial Mini Pumper has already been purchased and reimbursed by the County, the purchase of other fire extinguishing equipment shall occur in an alternative manner that has been mutually agreed upon by the project proponent and Kern County, not to exceed $75,000.00."

6. Mitigation Measures **WIL-1i** and **WIL-1j** have requirements for full-time human observers to be stationed on the project site for potential California Condor impacts. Kern County does not support the use of any observation towers constructed on private lands for observation purposes. Additionally, please be advised, that in conversations with the Kern County Building Department, observation towers will require building permits and will be subject American with Disabilities Act (ADA) requirements. Kern County has previously imposed and is supportive of ongoing efforts in process by the wind industry to electronically monitor California Condor activity within the region and develop procedures to turn off specific wind turbine generators if any California Condors venture into potentially dangerous areas.

7. Since public services are provided by Kern County personnel and jobs will be generated within Kern County, it is recommended that the following MMs be added:

   Prior to the issuance of building permits for the project, the Project Operator shall comply with the following:

   a. *The project proponent shall work with County staff to determine how the receipt of sales and use taxes related to the construction of the project will be maximized. This process shall include, but is not necessarily limited to: the Project Operator obtaining a street address within the unincorporated portion of Kern County for acquisition, purchasing and billing purposes, registering this address with the State Board of Equalization, using this address for acquisition, purchasing and billing purposes associated with the proposed project. The Project Operator shall allow the County to use this sales tax information publicly for reporting purposes.*

   b. *The project proponent shall encourage all contractors for the project to hire at least 25 percent of their workers from the local Kern County communities. The project operator shall provide to the contractors a list of training programs that provide skilled solar workers and shall require the contractor to advertise locally for available jobs, notify the training programs of job availability, all in conjunction with normal hiring practices of the contractor. The project operator shall submit a letter detailing the hiring efforts, prior to commencement of construction."*

Should you have any questions regarding this Department's comments on this project, please feel free to contact Craig M. Murphy of my Staff at (661) 862-8739 or by email at murphyc@co.kern.ca.us.

Sincerely,

(FOR)

Lorelei Oviatt, AICP, Director
Kern County Planning and Community Development Department

Public Comment Card

Tylerhorse Wind Project DEIS/PA

Commentor Name: LARRY THURE Date: July 18, 2014

Agency/Organization Affiliation: RESADENT

Address: 3410 CAMDEN ST ROSAMOND CA

Comment: Less night lights on windmills. Some of the power produce be used by Rosamond. Union contractor erect the windmills.

By submitting a scoping comment you will receive a copy of the FEIS/PA. Please indicate the format you would prefer:

☐ Compact Disk (CD) or ☐ Hardcopy

PACIFIC CREST TRAIL
ASSOCIATION

Southern California Regional Office
42-335 Washington St., Ste. F #169 ● Palm Desert, CA 92211
(760) 977-8684 ● AKass@pcta.org

July 16, 2014

Mr. Cedrick Perry
Project Manager-Tylerhorse Wind Project
Bureau of Land Management
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553

Dear Mr. Perry:
I am submitting comments on the Draft Environmental Impact Statement (DEIS) and Draft Plan Amendment (DPA) for the Tylerhorse Wind Project. These comments are specific to the planning and management of the Pacific Crest National Scenic Trail (PCT).

I am writing on behalf of the Pacific Crest Trail Association (PCTA). Our 9,000-member organization is the primary private partner with the United States Forest Service, Bureau of Land Management, National Park Service, and California State Parks in the management and protection of the Pacific Crest National Scenic Trail (PCNST) from Mexico to Canada. Last year alone, programs organized under PCTA's leadership provided 115,000 hours of volunteer labor to manage the PCNST on the ground and we have participated in dozens of planning processes from the national to the local level in that time.

The PCT was designated by Congress as a national scenic trail in 1968. The U. S. Forest Service is the lead agency for the trail and for many years The USFS, BLM, NPS, PCTA and others, have worked collaboratively on the management of the PCT as it traverses the magic of the American West on its way from Mexico to Canada. The nature and purpose of the PCT is to provide high-quality, scenic, primitive hiking and horseback-riding experiences, and to conserve natural, scenic, historic, and cultural resources along the PCT corridor.

The DEIS and DPA does not appear to address compliance with nor does it even reference BLM Manual Policy Direction 6250 and 6280 for National Scenic and Historic Trails and the direction to safeguard the nature and purposes of National Trails to provide for maximum compatible outdoor recreation potential, and protection, conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural qualities of the areas and associated settings through which such trails may pass, as well as the primary use or uses of the trail.

1. **The design of this project does not use strategies to avoid impacts to the PCT recreation and scenic experience.**

a. Need to define design strategies and mitigation that will reduce illegal motorized use on the PCT and adjacent private lands. This is a significant issue in this project area. Additional roads in parcels 476-061-09, 476-052-02, and 476-052-01 will further fragment this area and have the potential to increase illegal activities. The cumulative impact analysis does not sufficiently address the reasonably foreseeable connected actions of additional road construction on private lands and additional motorized trespass on both private lands and the PCT. Further, the BLM, Kern County Sheriff's Department, Sequoia National Forest, USFS Region 5 office, California State BLM office and the PCTA have devoted many resources to decrease the illegal activities in this area. Adding more roads will effectively negate progress that has been made in that area.
b. The most western parcel labeled 476-030-11 in Figure 3.12-1 should be removed from consideration from development. The 3 towers proposed are within the primary trail corridor (1/2 mile of centerline) will have a significant adverse impact to the nature and purpose of the PCT. Since the proposed action (40 wind turbine generations) is within the primary trail corridor, the finding that the PCT will have "no direct effects" on Table ES-1 is incorrect.

2. **The Visual Impact Analysis does not accurately summarize the adverse impacts to the PCT.** Manual 2680, Chapter 3.1 indicates the BLM shall:
   a. Conduct an inventory in accordance with FLPMA Section 201 and the NTSA, National Trail Policy, resource program policy, Federal Trail Data Standards, related national geospatial standards and routine inventory standards.
   b. Use the inventory to make informed decisions regarding proposed uses within National Trail areas, to identify opportunities to safeguard the nature and purposes of the National Trails and to allocate the resources, qualities, values, and associated settings and the primary use or uses of the trail during land use planning (NTSA and FLPMA).
   c. Use the inventory to establish a National Trail Management Corridor through the land use planning process.
   d. Conduct inventory within the National Trail viewshed to identify the area of potential adverse impact for proposed actions, until such time as a National Trail Management Corridor is established.

Key Observation Point (KOP 3) is 1.1 miles from the PCT, while the Proposed Action has wind turbines planned within the primary trail corridor and foreground. It appears that the inventory was not completed to the necessary BLM national standards. As such, at a minimum, several KOP should be analyzed for the PCT including one from the PCT and adjacent to the most western parcel 476-030-11. At best, a complete inventory should be completed prior to a ROD. I concur with the analysis that "Views from the PCT, which passes alongside the Project boundary in a northerly direction, would be very prominent and in the foreground distance zone" and that "Users of the PCT are highly sensitive to visual changes because expectations for scenery and natural views are high." (p. 4.18-5)

The additional KOP would have a "Strong" finding for form, line, color, and texture for the

western parcel.

The impacts on the western parcel are discussed in on pages 4.18-7 and 4.18-8. The surrounding wind energy development has been on private land – not federal - and to degrade the experience within the primary trail corridor should be evaluated as "Strong" not "Moderate" as suggested.

3. **The DEIS does not disclose whether the proposed developments would substantially interfere with the nature and purposes of the PCT.** The slower pace of equestrian and foot travel means that the time spent viewing the proposed project from the trail would likely be prolonged, which significantly degrades the natural experience that recreationists demand of their journey on a National Scenic Trail. Because of this, mitigation measures both on-site and off-site must occur.

4. **Need for improved coordination with the PCTA as the primary National Trail partner organization, upon receipt of proposed actions that may adversely impact the PCT.** MS-6280 5.3 directs the Protocol for Proposed Actions which May Adversely Impact Designated National Trails. Specifically in subpart C "For projects that may adversely impact the National Trail, the National Trail Administrator, the BLM State Office National Trail lead, or leads; and a primary National Trail partner organization representative will be invited to attend pre-authorization or pre-application meetings." To my knowledge, this was not done.

5. **The Preferred Action eliminates the first legal camping area in a 21 mile length of the PCT.** The northern most Angeles National Forest Land (public land) is located at approximately PCT mile 516.5 and the project site (the next parcel of public land) sits at approximately mile 537.5 for a distance of approximately 21 trail miles. If wind turbines are placed on this first legal camping land in 21 miles of trail, hikers will be forced to hike an additional 4-5 miles to reach the boundary of the next block of BLM land. In this terrain, it's inappropriate to make hikers and equestrians to travel a minimum of 25 miles between legal camping.

Please contact Anitra Kass, Southern California Regional Representative, at 760-977-8684 or akass@pcta.org with further questions.

Thanks and Happy Trails,

Anitra I. Kass
Southern California Regional Representative
Pacific Crest Trail Association

July 11, 2014

Tylerhorse Wind Project Public Comments
c/o Cedric Perry, Project Manager
California Desert District
Attn: Tylerhorse Wind Project
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553

MAILED VIA USPS
EMAIL: blm_ca_tylerhorse_wind_project@blm.gov

RE: Tylerhorse Wind Project, Draft Plan Amendment, Environmental Impact Statement
April 2014
CACA # 053958
Publication Index #: BLM/CA/PL-2014+1793; NEPA Tracking Number: DOI-BLM-CA-CAD000-2014-0001-EIS
United States Department of the Interior Bureau of Land Management, Ridgecrest Field Office, Ridgecrest, California

Dear California Desert District Staff,

Thank your for the courtesy to welcome the public's participation in the decision process of approving or denying BLM land to be used for the Tylerhorse Wind Project, constructed by Heartland Wind LLC a subsidiary of Iberdrola USA.

The purpose for this correspondence is to comment in **OPPOSITION** to the Bureau of Land Management granting a right-of-way to the applicant. I am a taxpayer and investor in renewable energy who is paying a portion of the 30% in government subsidies, cash grants, tax reductions, property tax reduction as unimproved land and public land use for energy companies to construct wind driven energy.

GENERAL OPINION

At ground zero of the industrial wind energy as well as industrial solar energy invasion in the Tehachapi Pass, I represent myself as an individual and many other residents who have become intolerant of the feeble excuses that the wildlife, native land, prehistoric Indian historical treasures and artifacts must be sacrificed for clean energy. The wind energy industry with the blessing of BLM, Kern County Planning Agency & Supervisors, State of California, Department of the Interior, Congress and President has robbed many thousands of residents of the community of our ability to fully enjoy our properties and have been robbed of the night sky, shooting stars, constellations, Milky Way and satellites orbiting the earth.

Against the sky turbines appear puny, and visibly no match for nature when it unleashes. The prototype quality of existing models require constant maintenance, blade skins peel off and blades are seen frequently that have fallen off their hubs. Two Texas wind farms have shut down prematurely because winter storms destroyed the turbines. The touted Tehachapi Pass turbines are so intermittent and seasonal that a subsidized multi-billion dollar 2-tier pumped storage plant called Bison Peak is making it's way through the federal government toward approval to balance the grid.

Not a single turbine manufacturer can figure out how to design turbines with protective grills over the blades or design models that prevent the extinction of every bird and bat wherever they are installed. Their propellers give off intense sound that travels for miles in the mountains (sound of train on tracks, tsunami coming over a hill, jet engines, pulsing pressure waves that go through the body and intensify at structures,) that penetrate through windows and ventilation in homes, produce shadow flicker, pressure waves that cause health problems, erratic blood pressure and low frequency sound forcing homeowners out of their homes. The entire night sky is compromised from Rosamond to Jawbone Canyon, replaced with magenta to orange glow rising high into the night sky caused by the many hundreds of 2 tiered blinking red FAA lights and white turbine strobes where the wind farms are operational, visible for 70 miles.

Orange glow from my yard, facing the Pacific Crest Trail at Cameron Canyon Road and 58 Freeway.

The Draft Tylerhorse EIS is loaded with documentation, profusely justifying that this area is targeted for what is a disproportionate share of these projects, and being pushed forward by energy companies and politicians who contend such development is needed to disrupt disastrous effects of global warming. Yet, the Bureau of Land Management recently auctioned off land slated for hydraulic fracturing, including BLM public land near Bunkerville, NV, the scene of the Cliven Bundy standoff. BLM has dirty hands in promoting this filthy fracking technology on one hand and promoting "clean energy technology" on the other. By promoting these technologies through land auctions and partnering with wind developers, oil and gas companies BLM, a government agency holds equal responsibility for contributing to the 6th great extinction of plants and animals in the making, caused by intense human pressure on our planet, the crown jewel of our galaxy, the Milky Way.

COMMENTS ADDRESSING TYLERHORSE WIND FARM EIS

1) ALTERNATIVES.
Page 5 of EIS - ABSTRACT, Paragraph 2.

Please note my selection of Alternative 4 - No issuance of a right-of-way grant with CDCA Plan Amendment to identify the area as Unsuitable for wind energy development.

2) DRAFT EIS INCLUDES A DRAFT PLAN TO AMEND THE CALIFORNIA DESERT CONSERVATION ACT AND GRANT IBERDROLA TO CONSTRUCT THIS WIND FARM.

I oppose changing the California Conservation Area for this vendor or any applicant. My opinion of Iberdrola is that this company has gained infamy for their poor stewardship of the land and Indian holy land as is evidenced by their deplorable reputation at the Tule Wind Project. They are active participants that hold responsibility for creating an ecological disaster in San Diego County. The Bureau of Land Management has allied their agency with a company that should be banned from conducting business within the wind energy industry.

The surrounding land neighboring the Tylerhorse site is saturated with wind turbines on a mixture of public and private lands:

Catalina Renewable Energy Project (134 turbines)
Pacific Wind Project (250 turbines)
Pacific Wind Infill (250 turbines)
Manzana Wind Energy (126 turbines)
Morgan Hills Wind Energy Project (76 turbines) approved and pending construction.
Tylerhorse Wind Project(40 turbines) Proposed.

TOTAL: 876 wind turbines

3) CALIFORNIA CONDORS.

Proposed Tylerhorse Project is located 2.2 miles from the primary California condor critical habitat. Condors span great distances to forage, said to be 150 miles in any direction. There is a claim within the Tylerhorse EIS that condors have not been sighted over the airspace of the 1200 acres (1.875 sq mile) boundary of this project. Tylerhorse Wind Project has no valid proof to make this statement as being fact.

Table 3.22-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA.

Iberdrola claims negative mitigation requirements even though their bordering neighbors, namely Catalina, Pacific Wind, Pacific Wind Infill and Manzana each recognize the existence and active risk that California condors will fly within the boundaries of their respective wind farms. Each of these

neighbors have written mitigation clauses. Tylerhorse Wind Farm is cutting corners by denying their responsibility to assure this raptor colony isn't forced to extinction. I request that if the Bureau of Land Management plans to approve this project, that it is contingent on Iberdrola preparing written mitigation measures commensurate with other wind farms, including radar detection equipment.

A search of Volume 1 of 2 of the Tylerhorse DEIS document revealed 238 hits on the word "condor" making references and excuses why the California condor will come to no harm and that none have been proven to have collided with turbines to date. The fact is that none have been recorded because until recently, only about 50% of the condors were fitted with GPS equipment. It is, in fact, unknown if California condors have flown over the Tylerhorse Wind Project, landed and foraged on the land, collided with turbine blades or transmission lines. A California condor fitted with GPS equipment is documented to have flown over a neighboring wind farm, Manzana Wind Farm, within the last year.

In many Kern County Environmental Impact Reports applicants committed to install tracking systems prior to permitting. The sole purpose is to detect condors from a distance of 16 miles away and slow the blade rotation or brake them.

KERN COUNTY APPROVED WIND FARMS AND LIST OF CALIFORNIA CONDOR MITIGATION AND FUNDING CLAUSES IN ENVIRONMENTAL IMPACT REPORTS.

The following is a breakdown of approved Environmental Impact Reports within Kern County and applicants granted approval to construct and operate wind farms with their summarized written mitigation commitments related to California condors.

Four (4) wind energy companies committed to installing Monitoring Systems to detect Condors. Approximately 81 units.
Total California Condor Recovery Program financial commitments to date is $2,898,531.
Total amount paid to the California Condor Recovery Program to date is $763,000.

1. Addison Wind Project. $188,100 (6 units) + Endowment $163,200 + Condor Monitoring System.
2. Alta East Wind Project. $188,100 (6 units) + Endowment $163,200 + Condor Monitoring System.
3. Alta Infill II Wind Energy Project. $188,100 (6 units) + Endowment $163,200.
4. Alta-Oak Creek Mojave Project. $80,000 for Units + Endowment $32,000.
5. Avalon Wind Energy Project. $188,100 (6 units) + Endowment $163,200 + Condor Monitoring System.
6. Catalina Renewable Energy Projects. $188,100 (6 units) + Endowment $163,200.
7. Rising Tree Wind Energy Projects. $188,100 (6 units) + Endowment $163,200 + Condor Monitoring System.
8. Lower West Wind Energy Project. 6 units $4150 each + $1081 Endowment.
9. Morgan Hills Wind Energy Project. $188,100 (6 units) + Endowment $163,200.
10. North Sky River Wind Energy Project and Jawbone Wind Energy Project.
11. $188,100 (6 units) + Endowment $163,200.
12. Manzana/Pacific Wind Energy. $45,000 + Endowment $32,000.
13. Pacific Wind Infill, June 2010.

Six telemetry units shall be funded for every hundred turbines (i.e., approximately 9 units or $45,000 based on 320) plus an "endowment" of $32,000 to be used for tracking data over an eight-year period. The total funding to be provided shall not exceed $77,000.

14. DRAFT Tehachapi Uplands Multiple Species Habitat Conservation Plan Documents – 2012. $156,000 will be provided to purchase GPS transmitters prior to the issuance of any grading permits affecting suitable condor foraging or roosting habitat, and then $26,000 will be provided to assist in funding operations, maintenance, and/or replacement every year afterward for a total of 10 years.

Alta East Wind Farm has installed a system that went live in 2014. This system is intended to detect condors only, NOT Golden eagles, Bald eagles, song birds or bats that are equally prone to colliding with blades. In other words, if the bird species isn't nearly extinct, they are assessed to be fair game to slaughter for the next 20 years. I don't find it acceptable or ethical of the Bureau of Land Management to approve Iberdrola to be given the right to slaughter wildlife on public lands to the point of near extinction.

Photo 1. View of a maize of wind turbines at hub height, approximately 365 feet above tower pads that lends perspective on the true hazards to raptors, songbirds and bats as well as massive destruction to the environment.

Multiple use/activity/land is used extensively in the aforementioned EIS to drill in the point to BLM that the land has potential multiple uses. Photo 1 fully denotes destruction on a grand scale that will occur during Iberdrola's use of the land and the airspace of the typical wind farm. Over time all of the scrub seen in the photo will be gone leaving deep ruts down the hillsides caused by herbicide/pesticide use to remove brush due to the high threat of lightening strikes of these tall structures and erosion, similar to the massive erosion of the hillsides east of the City of Tehachapi, CA.

4) HUMAN CALIFORNIA CONDOR SPOTTERS.

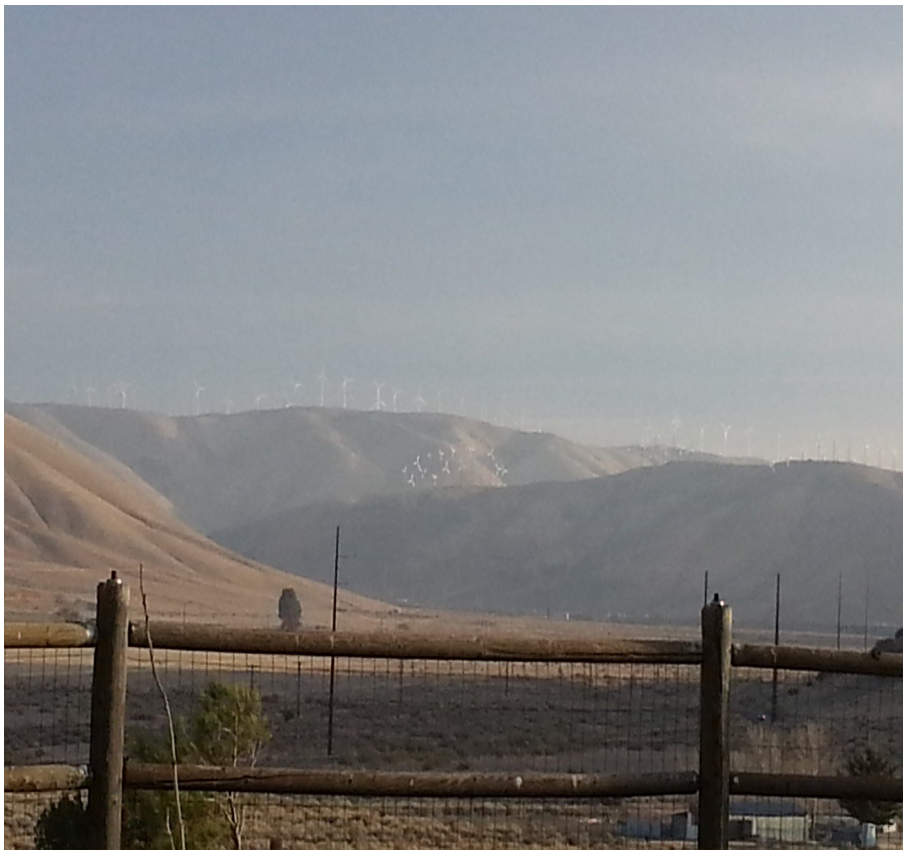
During the meeting in June 2014 at the Mojave Veterans Hall, it was stated that human spotters will be employed as California Condor spotters. They will be posted from dawn until dusk watching so that their 40 turbines can be slowed down if California a condor(s) are sighted. This approach is ludicrous. Apparently no research was conducted to verify the air quality and seasonal atmospheric conditions of the location. Field glasses and the eyes have severe limitations. Smog from Bakersfield and Lehigh Cement Plant Southwest on Tehachapi Blvd, fog, rain, snow and facing the sun will impair the ability to sight birds. See photos of typical conditions in the greater Tehachapi area, and encountered at the proposed Tylerhorse wind development plan.

Quote from a resident living near the proposed Tylerhorse Wind Farm:
As for birds:
I don't believe you will ever see bird spotters full time. As I recall after reading various EIR's, in the supporting figures and attachments, the avian people do it only so many hours per day, random days. And they only do it during times of year you would expect to see migrating condor, not year round. Guess they figure they go somewhere else in the winter?

After watching the bird people up here for Alta 1and the Morgan Hills project, they were definitely part time bird observers. Sometimes they'd go to the project location, 20 minutes later I'd see them go back out. They have to drive past our driveway to get up there. They were never up every day of the week, all year long. It was a seasonal thing and random. They sit in various spots observing with binoculars. Drove up behind one guy one day, doors open on his vehicle, feet hanging out the window opening, sleeping. I have no idea what he wrote on his reports noting which birds he saw that day. Had I known then, what I know now, I'd have been writing down every vehicle I saw, time in, time out, who they were, etc. It can come in handy down the road.
- Name withheld.

The following photos show why using spotters is useless in curtailing raptor deaths. The conditions are caused by smog rising up the hill from Bakersfield, Lehigh Cement Plant, particulate from scraping the desert floor from installation of energy equipment, that continues to blow into the atmosphere for years.

Smog. Greater Tehachapi area.



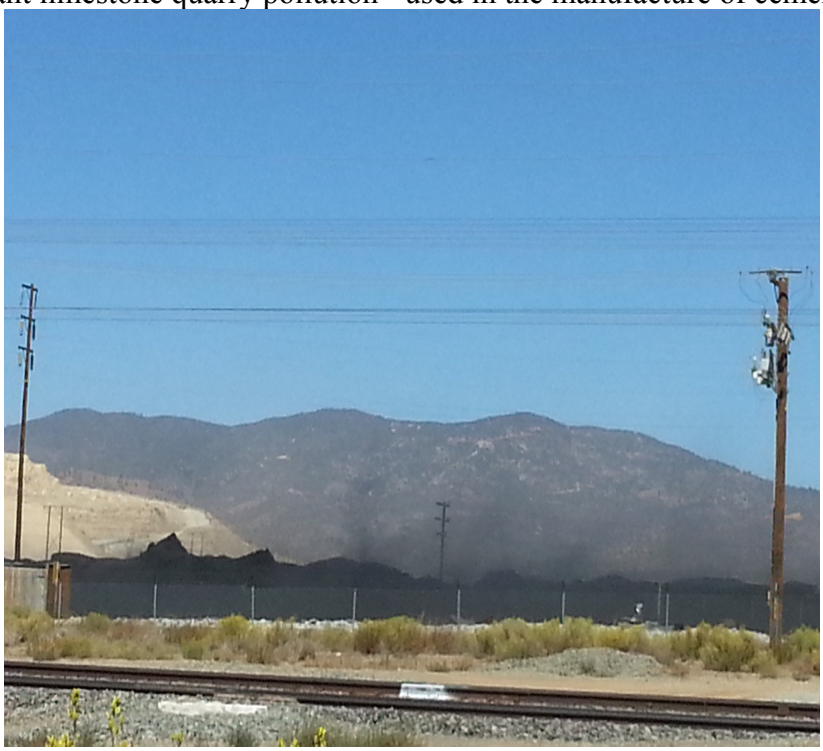
Smog. Greater Tehachapi area.

Smog. Greater Tehachapi area.

Fog. Greater Tehachapi area.

Atmospheric conditions greater Tehachapi area.

Lehigh Cement Plant limestone quarry pollution - used in the manufacture of cement for turbine pads.

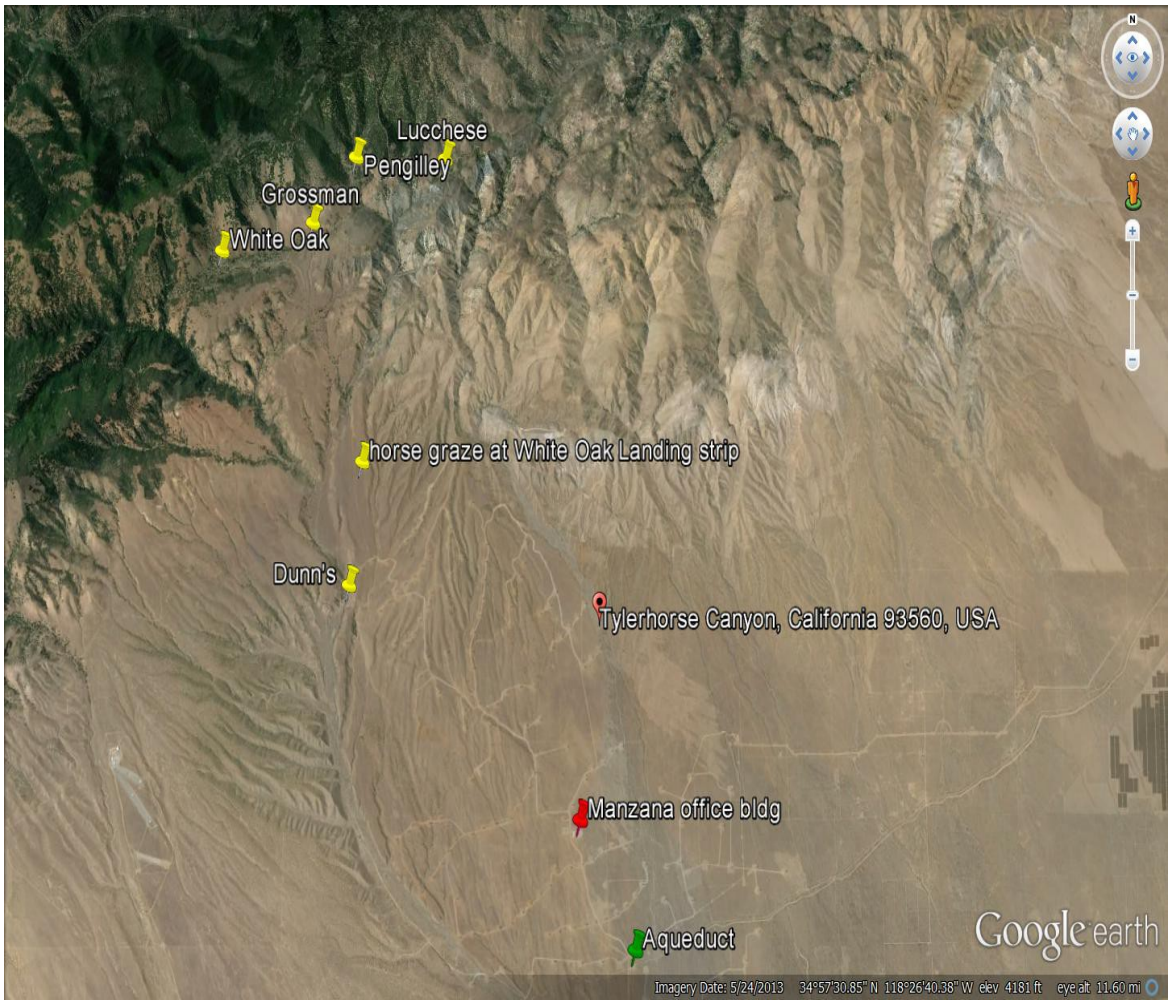


Lehigh Cement Plant coal dust pollution - used in the manufacture of cement for turbine pads.

5) WILD HORSE POPULATION ADJACENT TO TYLERHORSE WIND PROJECT.

There is a longstanding herd of wild horses in the area said to be on private land. Thus, these animals are NOT under the jurisdiction of the Bureau of Land Management to collect and destroy. However, this was not known to the applicant due to the lack of sufficient research by the Tylerhorse Wind Farm team.

I will mention that any attempt by the Bureau of Land Management to remove the horses will be met with unprecedented resistance to their removal by the community.



6) FUTURE THREATS TO CALIFORNIA CONDORS IN VIOLATION OF THE ENDANGERED SPECIES ACT.

Planned wind energy projects and housing developments are planned that will have cumulative effects on safe foraging locations for California condors. The California condors are steadily being squeeze out of their critical foraging areas by the U.S. Federal Government, Department of the Interior, Bureau of Land Management, the wind energy industry and the Tejon Ranch to make money and ignoring the inevitable extinction of a critically endangered species, in violation of the Endangered Species Act.

a. 4 Wind Energy Projects, 14 freeway near Ridgecrest, CA.
http://www.mojavedesertblog.com/2014/01/four-mojave-wind-projects-begin-early.html

SATURDAY, JANUARY 4, 2014

Four Mojave Wind Projects Begin Early Environmental Review

At least four separate wind projects in the Mojave Desert are in the early stages of environmental review, according to the Bureau of Land Management's (BLM) land records database, and would industrialize over 76 square miles of intact desert and ridgeline if they receive final approval. Energy companies are interested in several other swaths of the Mojave, but are only evaluating the strength of wind resources or have not taken significant steps toward environmental review.

Laurel Mountain Wind

L.H. Renewables, LLC, A Redlands-based corporate entity registered to a post office box, has submitted a plan of development for the Laurel Mountain wind project, which would involve installing as many as 130 wind turbines on nearly 40 square miles of intact desert west of Ridgecrest. The company has been testing wind resources in the area for years, and as of early November the BLM initiated environmental review under the National Environmental Policy Act.

[Click on image to expand] The area in red depicts the approximate outlines of the proposed Laurel Mountain Wind project, located west of Ridgecrest, and north of the Red Rock Canyon State Park. The company proposes installing nearly 130 turbines in the area.

The Laurel Mountain wind project would be built in between the El Paso Mountains Wilderness area, and the Kiavah Wilderness; some of the project's proposed right of way overlaps with the Jawbone/Butterbredt Area of Critical Environmental Concern. Much of the project's footprint would impact habitat identified as biologically important by agencies developing the Desert Renewable Energy Conservation Plan, in part because of the presence of Mohave ground squirrel and desert tortoise.

North Peak Wind

E On Climate Renewables remains interested in developing the North Peak Wind project, overlapping with the Juniper Flats recreation area prized by residents of the Victor Valley. I previously wrote about this project in March; since then, the company in December submitted a plan of development and the fees necessary to begin the environmental review process. The company also reduced the size of the proposed project from over 23 square miles to 16 square miles.

[Click on image to expand] The red area depicts the approximate footprint of the North Peak Wind energy project, and does not include recent modifications reportedly made to the footprint that reduce the project area from 23 to 16 square miles.

This project would new and wider dirt roads into a higher elevation area of pinyon juniper habitat between the San Bernardino National Forest, and the lower elevation creosote scrub habitat.

Silurian Valley Wind

BLM in early December approved the plan of development for Iberdrola's Silurian Valleywind project, which would industrialize over 10 square miles of intact desert habitat between Baker and Shoshone on the scenic route 127, suggesting the scoping period may begin soon. The company also plans to build a large solar facility south of the wind project, although the company has not submitted any additional information on the project in recent months, according to BLM records.

[Click on image to expand] The Google Earth image above shows Phoenix Wind and Aurora Solar LLC plans for a wind and solar facility in the pristine Silurian Valley, north of Baker, and south of Death Valley National Park along the scenic route 127.

The Silurian Valley wind project was previously stalled because of Department of Defense concerns that the project's tall turbines and spinning turbine blades would interfere with military testing and training. It is not clear if

these impacts have been mitigated. The projects would overlap with areas designated by the BLM as having some of the highest visual resource inventory ratings in the Mojave, and much of the Silurian Valley is identified in the Solar Energy Development program as priority desert tortoise connectivity habitat.

Table Mountain Wind

The Table Mountain wind project is back, this time proposed by Acciona Energy. The right-of-way, located southwest of Las Vegas, and in the southeastern corner of the Sandy Valley, has changed hands at least twice since 2009 as companies evaluated wind resources in the area. According to BLM records, Acciona filed a plan of development for the nearly 11 square mile project in November proposing up to 50 wind turbines in the area.

b. City of Vernon Wind Energy Project 18000 to 23,000 acres.
http://www.cityofvernon.org/images/rfis/facts-re-wind-energy-project.pdf
Executive Summary
• The Fee and Solar Land is well-positioned for renewable power generation in the Jawbone area near Los Angeles. Located in one of the most attractive power markets in the US Limited remaining privately owned land available for renewable development in the region
• Strong market for renewable Power Purchase Agreements ("PPAs"), especially in California
• Vernon is open to considering different development structures with its ultimate goal of maximizing value.
• Vernon would be pleased to meet with interested parties to explore this opportunity further

c. Addison Wind Project.
http://www.co.kern.ca.us/planning/pdfs/notices/addison_energy_nop.pdf
North of Oak Creek Road and 1 mile south of Rosewood Blvd.

d. Tejon Ranch planned 12,000 home development.
http://tejonranch.com/news/tejon-ranch-proposes-12000-unit-project-at-foot-of-grapevine/
http://tejonranch.com/wp-content/uploads/TBC_-TRC-proposes-12000-homes_11.06.13.pdf

Tejon Ranch proposes 12,000-unit project at foot of Grapevine **November 6th, 2013**

BY JOHN COX Californian staff writer jcox@bakersfield.com

Tejon Ranch Co. has launched plans to build 12,000 homes, condos and apartment units at the foot of the Grapevine as part of a phased, master-planned community that would house what the company expects will be a large influx of industrial and retail workers in coming years.

f. Approved and in progress is the Tejon Ranch upscale housing development.
The ranch's owner, Tejon Ranch Company, has already built an energy plant and an industrial warehouse complex, and is now planning three additional developments that would seriously compromise the land's ecological integrity. Tejon Mountain Village would convert 28,500 pristine acres of crucial condor habitat in Kern County into a sprawling resort. The Centennial Project, proposed for north Los Angeles County, would pave more than 11,000 acres of grasslands, woodlands, scrublands and wildflower fields, replacing them with 23,000 homes and 14 million square feet of commercial development. Finally, the Tejon East Industrial Complex would destroy 1,100 acres that comprise a key wildlife linkage along the San Joaquin Valley floor, including habitat for the threatened San Joaquin kit

fox. Tejon Ranch has released a draft “environmental impact report” for Tejon Mountain Village.

7) PAGE A-46 CLEARING OF ALL BRUSH.
I specifically addressed the use of pesticides and herbicides at the meeting I attended. The Existing Visual Setting is void of any greenery that can only be the work of bulldozers and/or heavy herbicide spraying. Herbicides are non-specific and poisons wildlife and reptiles. This is unacceptable for a wind developer to destroy the entire habitats that were resident on the land. The Tylerhorse representative claims they will not level the area. However, it is probable they will sell their wind farm at some point like others have, Oak Creek is an example who sold to Berkshire Hathaway. What assurance is there that the next company will leave more than a shrub every 50 feet?

Figure 2-12.
The entire area around the pad and transformer appear to be completely void of brush as well. Figure 2-8 is also completely cleared.

8) <u>DEATHS CAUSED BY WIND FARM CONSTRUCTION WORKER.</u>

From the perspective of wind farm applicants including Iberdrola Renewables it's all about getting the equipment operational. One of the most tragic accidents was caused by a wind farm worker, who was working on a Sunday at 5:30 pm. He destroyed the lives of an innocent family.

This represents merely 1 tragedy that found it's way into the news due to the recklessness of wind farm construction workers.

UPDATED: Child killed, AVC president critically injured in traffic crash

*By **K. Enriqu** • April 8, 2013*

The collision happened in the intersection of Backus Road and Tehachapi Willow Springs Road. The impact caused both vehicles to travel into a dirt field, where the dump truck overturned.

Dr. Jackie L. Fisher, Sr.

MOJAVE – Antelope Valley College President **Dr. Jackie Fisher** suffered major injuries and his grandson was killed late Sunday afternoon after their vehicle collided with a dump truck that ran a stop sign, authorities said.

The incident happened around 5:30 p.m. Sunday in the intersection of Backus Road and Tehachapi Willow Springs Road, according to a California Highway Patrol report.

Fisher, his wife **Carla Fisher**, a 10-year-old girl and a 6-year-old boy were riding in a 2007 Lexus sedan traveling southbound on Tehachapi Willow Springs Road, approaching the intersection of Backus Road, the CHP report states.

A 1989 white Kenworth dump truck going westbound on Backus Road failed to stop for a posted stop sign, crossed into the intersection and collided with the Fishers' vehicle, the CHP

report states.

The impact caused both vehicles to careen into a dirt field, where the dump truck overturned. The truck's driver, 58-year-old **Barry Queen** of Littlerock, suffered moderate injuries and was transported to Antelope Valley Hospital for treatment.

Jackie Fisher, 62, had to be extricated from his vehicle and was airlifted to Antelope Valley Hospital with major injuries. He is currently in the hospital's intensive care unit, according to a statement by the college.

Passenger Carla Fisher, 58, suffered major injuries and was transported to Antelope Valley Hospital by ambulance, the CHP report states.

A 6-year-old boy riding in the back seat died as a result of the collision, the CHP report states. A 10-year-old girl, also in the back seat, suffered minor injuries and was transported via ambulance to Antelope Valley Hospital. Both were the Fishers' grandchildren, according to media reports.

The Fishers had been returning from a trip to Bakersfield at the time of the collision, according to a statement from the college. Their family members have requested prayer, the statement said.

"On behalf of the Board of Trustees, we extend our hopes and prayers to Jackie and his family for a quick recovery," said board President Michael R. Adams.

In closing, thank you for your time and respect for my comments.

Penny Melko

21848 Ferncuko Street
Tehachapi, CA 93561

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Lahontan Regional Water Quality Control Board

July 17, 2014

File: Environmental Doc Review
Kern County

Cedric Perry, Project Manager
U.S. Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
Email: cperry@blm.gov

COMMENTS ON THE DRAFT PLAN AMENDMENT TO THE CALIFORNIA DESERT CONSERVATION AREA PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE TYLERHORSE WIND PROJECT, KERN COUNTY, STATE CLEARINGHOUSE NUMBER 2014044002

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received the Draft Plan Amendment (PA) and Draft Environmental Impact Statement (EIS) for the above-referenced project (Project) on April 24, 2014. The Draft PA/EIS was prepared by Bureau of Land Management (BLM) and submitted in compliance with provisions under the National Environmental Protection Act (NEPA) and is necessary for the BLM to consider issuance of a right-of-way grant for the construction and operation of a utility-scale wind energy facility on public lands. Water Board staff, acting as a responsible agency, are providing these comments to specify the scope and content of the environmental information germane to our statutory responsibilities pursuant to CEQA Guidelines, California Code of Regulations, title 14, section 15096. In summary, based on our review of the Draft PA/EIS we request that: (1) the final environmental document complies with and satisfies the requirements of both NEPA and CEQA; (2) as almost 24 wind energy projects either exist or are planned for this portion of Kern County, the cumulative impacts of these projects on water quality and hydrology over time must be evaluated; (3) all temporary impact areas are restored in accordance with an approved Restoration Monitoring Plan, and that best management practices that effectively treat post-construction storm water runoff be incorporated as part of the Project's design. We request that the following comments be considered in the preparation of the final environmental document.

Project Description

The Project is a wind energy development that would generate up to 60 megawatts of electricity. The Project site totals 1,207 acres of BLM-administered (public) lands located north and east of Rosamond Boulevard and 170th Street West in unincorporated Kern County near Rosamond. Project components include construction of up to 40 wind turbine generators, permanent and temporary access roads, above-ground and under-ground power collection systems, and fiber optic communications. The Project is located

adjacent to the existing Manzana Wind Energy, Pacific Wind Energy, and Catalina Renewable Energy projects, and will share other ancillary features (i.e. operations and maintenance buildings and existing access roads) with the Manzana Wind Energy and Pacific Wind Energy projects.

Authority

All groundwater and surface waters are considered waters of the State. Surface waters include streams, lakes, ponds, and wetlands, and may be ephemeral, intermittent, or perennial. All waters of the State are protected under California law. State law assigns responsibility for protection of water quality in the Lahontan Region to the Lahontan Water Board. Some waters of the State are also waters of the U.S. The Federal Clean Water Act (CWA) provides additional protection for those waters of the State that are also waters of the U.S.

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains policies that the Water Board uses with other laws and regulations to protect the quality of waters of the State within the Lahontan Region. The Basin Plan sets forth water quality standards for surface water and groundwater of the Region, which include designated beneficial uses as well as narrative and numerical objectives which must be maintained or attained to protect those uses. The Basin Plan can be accessed via the Water Board's web site at http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

Specific Comments

Our comments on the Project are outlined below.

1. We anticipate that the State Water Resources Control Board or the Lahontan Water Board (collectively referred to as the Water Boards) may need to issue discretionary permits for implementation of the Project. As such, we request that the environmental document prepared for the Project comply with and satisfy the requirements of both NEPA and CEQA. The Water Boards cannot take a discretionary action or issue a permit until CEQA has been satisfied.

2. Nearly two dozen wind energy projects either exist or are planned for the Kern County portion of the Antelope Valley. The cumulative impacts of these projects on water quality and hydrology overtime must be fully evaluated in the environmental document. We urge BLM to provide a thorough analysis of cumulative impacts in the environmental document. The analysis should consider the point impacts of all alternative energy projects planned and constructed within the watershed and evaluate, at minimum, the potential impacts to groundwater recharge due to increased impervious surface and compacted soils, changes in the hydrology to the respective watershed(s) and potential flooding implications, and habitat connectivity. The cumulative impacts analysis should identify both regional and project-specific mitigation measures that, when implemented, will reduce potential impacts to a less than significant level.

3. Section 1.3 – The Lahontan Water Board has jurisdiction over waters of the State that may be present on or beneath the Project site. The Water Boards statutory responsibilities and authorities are defined by the Porter-Cologne Water Quality Control Act, though the limits of our jurisdiction often overlap with the jurisdiction of the California Department of Fish and Wildlife. We request that you include the following language in Section 1.3 and other pertinent sections of the Draft PA/EIS.

   The Lahontan Regional Water Quality Control Board (RWQCB) has jurisdiction over all "waters of the State," defined as any surface water or groundwater, including saline waters, within the boundaries of the state, under the Porter-Cologne Water Quality Control Act (a state statute). To ensure that California's isolated waters are protected, the State Water Resources Control Board and the Lahontan RWQCB issue dredge and fill Waste Discharge Requirements (WDRs) that regulate discharges to "isolated" waters of the State.

4. The final PA/EIS should require that all temporary impacts be restored (recontoured and revegetated) to match pre-Project conditions. A Restoration Monitoring Plan must be prepared that requires monitoring for some period of time (usually no less than 3 years), outlines a schedule with performance measures to be met in order for the restoration to be deemed successful, and contains adaptive management criteria in the event performance measures are not being met.

5. The upper six inches of topsoil should be retained and used as a final cover over temporary impact areas. This topsoil contains the native seed bank and soil microbes necessary to help re-establish vegetation post-construction.

6. Post-construction storm water management must be considered a significant component of the Project. To minimize erosion and siltation onsite and downstream of the Project, the Project proponent should consider design alternatives such that: natural drainage paths remain unaltered; runoff from developed areas is managed as close to the source as possible; and utilize vegetated and landscape areas to dissipate and filter runoff. In addition, vegetated and landscape areas designed to manage storm water runoff are dually beneficial in that they also maximize groundwater recharge potential.

7. Surface waters support a variety of beneficial uses including municipal and agricultural uses, groundwater and fresh water recharge, habitat, flood attenuation, and water quality enhancement. To ensure that no net loss of function and value will occur as a result of Project implementation, we request that wind turbines and other site facilities be microsited outside stream channels and floodplain areas and, where feasible, at-grade road crossings be constructed rather than culverted crossings. Culverted road crossings must be designed to pass storm flows without impoundment upstream, with sufficient energy

dissipation provided at the outlet to reduce flow velocities to pre-Project conditions, and to allow for habitat connectivity across/beneath the roadway.

8. All rock slope protection placed within stream channels and floodplain areas should be ungrouted and the minimum amount necessary to provide scour protection per a California licensed and storm water qualified engineer's recommended design storm event.

9. Construction staging areas must be sited in upland areas outside stream channels and other surface waters on or around the Project site. Buffer areas should be identified and exclusion fencing used to protect the water resource and prevent unauthorized vehicles or equipment from entering or otherwise disturbing the stream channel. Construction equipment should use existing roadways to the extent feasible.

10. Vegetation clearing should be kept to a minimum. Where feasible, existing vegetation should be mowed so that after construction the vegetation could more easily recover and help mitigate for potential storm water impacts.

11. Obtaining a permit and conducting monitoring does not constitute adequate mitigation. Development and implementation of acceptable mitigation is required. The environmental document must specifically describe the BMPs and other measures used to mitigate Project impacts.

Permitting Requirements

A number of activities associated with the proposed Project appear to have the potential to impact waters of the State and, therefore, may require permits issued by either the State Water Resources Control Board (State Water Board) or Lahontan Water Board. The required permits may include:

12. Land disturbance of more than 1 acre may require a CWA, section 402(p) stormwater permit, including a National Pollutant Discharge Elimination System (NPDES) General Construction Stormwater Permit, Water Quality Order (WQO) 2009-0009-DWQ, obtained from the State Water Board, or an individual stormwater permit obtained from the Lahontan Water Board;

13. Water diversion and/or dewatering activities may be subject to discharge and monitoring requirements under either NPDES General Permit, Limited Threat Discharges to Surface Waters, Board Order R6T-2008-0023, or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality, WQO-2003-0003, both issued by the Lahontan Water Board; and

14. Streambed alteration and/or discharge of fill material to a surface water may require a CWA, section 401 water quality certification for impacts to federal waters (waters of the U.S.), or dredge and fill waste discharge requirements for impacts to non-federal waters, both issued by the Lahontan Water Board.

Please be advised of the permits that may be required for the proposed Project, as outlined above. Should Project implementation result in activities that will trigger these permitting actions, the Project proponent must consult with Water Board staff. Information regarding these permits, including application forms, can be downloaded from our web site at http://www.waterboards.ca.gov/lahontan/.

Thank you for the opportunity to comment on the Draft PA/EIS. If you have any questions regarding this letter, please contact me at (760) 241-7376 (jan.zimmerman@waterboards.ca.gov) or Patrice Copeland, Senior Engineering Geologist, at (760) 241-7404 (patrice.copeland@waterboards.ca.gov).

Jan M. Zimmerman, PG
Engineering Geologist

cc: Bureau of Land Management
(via email, blm_ca_tylerhorse_wind_project@blm.gov)
State Clearinghouse (SCH 2014044002)
(via email, state.clearinghouse@opr.ca.gov)
California Department of Fish and Wildlife, Region 4
(via email, reg4sec@wildlife.ca.gov)

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Cristina Gispert

From: cperry@blm.gov on behalf of Tylerhorse_Wind_Project, BLM_CA <blm_ca_tylerhorse_wind_project@blm.gov>
Sent: Monday, July 14, 2014 3:29 PM
To: Cristina Gispert
Subject: Fwd: public comment

---------- Forwarded message ----------
From: <terri_lynn@hughes.net>
Date: Mon, Jun 16, 2014 at 7:21 AM
Subject: public comment
To: "blm_ca_tylerhorse_wind_project@blm.gov" <blm_ca_tylerhorse_wind_project@blm.gov>

Greetings,

My name is Terri Hall, I live on Backus Road approximately 5 miles west of Highway 14, since 1989. I am impacted daily by the many large windmill projects near my home, they produce a loud rumbling noise at unpredictable times which can not be drowned out even when TV or radio is turned up loud… the character of the noise is more of a deep vibration than sound. Wind Turbines are ugly to look and with a substantial height impossible to miss, due to their enormous size aviation warning lights must blink at night. The near by turbines are visible from over 30 miles away and have a considerable visual impact on thousands of local residents

I have had difficulty sleeping getting up 4-5 times in the night, some nights I sleep thru I am not sure what the problem is.

My concerns about the tylerhorse project is

1. The damage to wildlife is not accountable…. I believe the information should be public and should be auditable by independent groups. Ivanapah solar facility recently had an unusual spike in their animal death count which seems to have correlated to non Brightsource employees being on site. http://www.kcet.org/news/rewire/solar/concentrating-solar/april-was-bad-month-for-birds-at-ivanpah-solar.html I do not trust that there is honest reporting in regards to the 30 year take permits of endangered animals. I have been unable to locate any data made public regarding the collateral wildlife damage occurring, at the wind projects in my local area.
2. I feel people of lower income do not receive fair representation of their interests with regard to the siting and construction of these projects. My quiet enjoyment of my property is impacted by these projects, because I am poor I am subjected to noise, nighttime lights, and a damaged view. Consider what response from the public would occur if 10, or even only 1 400 foot tall towers would be built in the Los Angeles basin.

The impact area is much larger than Kern county planning considers, as demonstrated by complaints from residents in the Palmdale Hills some 30 miles away.

I have grave concerns for the wildlife being impacted by the wind turbines, I do not trust that the impact to the fragile populations of birds and bats has been sufficiently weighed in consideration of long term sustainability. Destroy first, ask questions later seems to be standard with these high dollar projects, ethics dictates that the data from other projects be taken into account. However existing projects should have strict public accounting. Then new projects can be more objectively weighed by the people living around these projects.

Sincerely

Terri Hall
5826 Backus Road
Mojave, CA 93501

USDA United States Department of Agriculture | Forest Service | Pacific Southwest Region

Regional Office, R5
1323 Club Drive
Vallejo, CA 94592
(707) 562-8737 Voice
(707) 562-9240 Text (TDD)

File Code: 2350
Date: JUL 14 2014

Mr. Cedric Perry
Project Manager
Bureau of Land Management, Ridgecrest Field Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

Dear Mr. Perry:

I am submitting comments on the Draft Environmental Impact Statement (DEIS) and Draft Plan Amendment (DPA) for the Tylerhorse Wind Project. These comments are specific to the planning and management of the Pacific Crest National Scenic Trail (PCT).

The PCT was designated by Congress as a national scenic trail in 1968. The U. S. Forest Service is the lead agency for the trail and for many years we have worked collaboratively on the management of the PCT as it threads its way from Mexico to Canada. The nature and purpose of the PCT is to provide high-quality, scenic, primitive hiking and horseback-riding experiences, and to conserve natural, scenic, historic, and cultural resources along the PCT corridor.

The DEIS and DPA does not appear to address compliance with BLM Manual Policy Direction 6280 for National Scenic and Historic Trails and the direction to safeguard the nature and purposes of National Trails to provide for maximum compatible outdoor recreation potential, and protection, conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural qualities of the areas ***and associated settings*** through which such trails may pass, as well as the primary use or uses of the trail. As the lead administrator for the trail, the following actions are needed to ensure that a substantial interference or significant adverse impact to the nature and purposes of the PCT does not occur.

1. **The design of this project does not use strategies to avoid impacts to the PCT recreation and scenic experience.**

    a. The most western parcel labeled 476-030-11 in Figure 3.12-1 should be removed from the proposed action. The 3 towers proposed are within the primary trail corridor (1/2 mile of centerline) will have a significant adverse impact to the nature and purpose of the PCT. Since the proposed action (40 wind turbine generations) is within the primary trail corridor, the finding that the PCT will have "no direct effects" on Table ES-1 is incorrect. Alternatives 2-4 meet this request.

b. Need to define design strategies and mitigation that will reduce illegal motorized use on the PCT and adjacent private lands. This is a significant issue in this project area. Additional roads in parcels 476-061-09, 476-052-02, and 476-052-01 will further fragment this area and have the potential to increase illegal activities. The cumulative impact analysis does not sufficiently address the reasonably foreseeable connected actions of additional road construction on private lands and additional motorized trespass on both private lands and the PCT.

2. **The EIS does not comply with MS-6280 requirement for documenting the trail related resources, qualities, values, and associated setting and the primary uses that support the nature and purposed of the PCT. (3iii p.1-19).** "Inventory. The BLM shall conduct and maintain a standardized inventory of the trail-related resources, qualities, values, and associated settings and the primary use or uses that support the nature and purposes of the National Trail. The inventory will be used in order to establish a National Trail Management Corridor through the land use planning process. *Until such time as a National Trail Management Corridor is established through the Resource Management Plan in accordance with this policy, an inventory shall be conducted for proposed actions within the National Trail viewshed.* Inventory results inform future NEPA analyses for land use plans and for proposed actions by identifying the area of potential adverse impact, including the resources, qualities, values and associated settings and the primary use or uses present in that area."

3. **Visual Impact Analysis does not accurately summarize the adverse impacts to the PCT.** Key Observation Point (KOP 3) is 1.1 miles from the PCT, while the Proposed Action has wind turbines planned within the primary trail corridor and foreground. Several KOP should be analyzed for the PCT including one from the PCT and adjacent to the most western parcel 476-030-11. We concur with the analysis that "Views from the PCT, which passes alongside the Project boundary in a northerly direction, would be very prominent and in the foreground distance zone" and that "Users of the PCT are highly sensitive to visual changes because expectations for scenery and natural views are high." (p. 4.18-5) The additional KOP would have a "Strong" finding for form, line, color, and texture for the western parcel.

   The impacts on the western parcel are discussed in on pages 4.18-7 and 4.18-8. The justification that the development is moderate because the "region is already heavily impacted by wind energy developments (on private land)", does not account for the federal affirmative responsibility to protect the PCT and the trail experience. The surrounding wind energy development has been on private land – not federal - and to degrade the experience within the primary trail corridor should be evaluated as "Strong" not "Moderate" as suggested.

4. **The DEIS needs to assess and disclose whether the proposed developments would substantially interfere with the nature and purposes of the PCT.** ***If the determination is made that there is not substantial interference and the project will proceed, then offsite mitigation must be required.*** The slower pace of equestrian and foot travel means that the time spent viewing the proposed project from the trail would likely be prolonged, significantly degrading the natural experience that recreationists demand of a national scenic trail journey. Though it is desirable to have viewshed and recreation experience mitigation occur within the locality of the project area (i.e. within the same county), if such an opportunity does not exist, it is acceptable for mitigation to occur within the State of California (MS-6280 d(3) p. 1-23). An inventory of trail-wide PCT acquisition priorities exists and is available for finding willing sellers for land acquisition that would satisfy the requirements of offsite mitigation.

Mitigation Measure SD: Land acquisition along the PCT should be modified as follows:

The project Applicant shall provide funds for acquisition planning[1] and purchase of land along the PCT corridor. Funds will be used by the project Applicant, or transferred to the BLM or a third party, to plan and acquire property of equal value along the trail corridor. Priority will be given to acquisition within the southern Sierra Nevada/Tehachapi portion of the trail. If properties are not available for acquisition, funds may be used for restoration projects of equal value along the trail corridor that will improve visual integrity. The project Applicant shall provide funds for acquisition within one year of issuance of the Notice to Proceed from the BLM.
Land acquisition is based on the concepts developed in the Draft Pacific Crest National Scenic Trail Best Management Practices to Mitigate Scenery Impacts from Conflicting Land Uses (USFS, 2012). Under these Best Management Practices, the mitigation ratio for land acquisition is calculated by using the distance of the project from the PCT, the distance along the trail that the project is visible to trail users, and the contrast created by the project to the characteristic scenery. Under the preferred alternative, the project creates a moderate to high contrast to the characteristic scenery.

5. Additional resource concerns to be considered:
   A) There are limited camping opportunities in this area due to the narrow trail easements across private land. The federal lands offer one of the few opportunities to comply with Leave No Trace practices to camp and dispose of human waste properly "off" trail.
   B) There has been considerable work on the Tehachapi Upland Multi-Species Habitat Conservation Plan – for Tejon Ranch which is in close proximity to the project area. Since condors range up to 150 miles/day for forage, why is it considered Low/Moderate Potential Occurrence when they are known to be 3.9 miles away could be impacted by this project (Table 3.22-2)?

[1] The Optimal Location Review (OLR) process is used to ensure that the trail is located in the location that provides the best scenic and recreation opportunity. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5368489.pdf Outstanding BLM OLRs include Whitewater and Mexican Border to I-5 (Sunrise).

6. **Need for improved coordination with the U. S. Forest Service, lead agency, upon receipt of project applications actions that may adversely impact the PCT.** MS-6280 5.3 directs the Protocol for Proposed Actions which May Adversely Impact Designated National Trails. The most efficient way for coordinated efforts to occur is to work with the proponent on design criteria to avoid impacts to the Pacific Crest National Scenic Trail. We would welcome future opportunities to work, not only in the formal NEPA projects, but also with proponents to minimize impacts to the trail prior to the application and formal NEPA process. We are requesting "Cooperating Agency" status for this and future projects that are within the PCT Trail Corridor.

Please contact Beth Boyst, National PCT Administrator, at (707) 562-8881 or bboyst@fs.fed.us, if you have any questions.

Sincerely,

BETH BOYST
Pacific Crest National Scenic Trail Manager

cc: Carl B Symons, Mark Conley

---------- Forwarded message ----------
From: **Jessica Rempel** <jessica_rempel@fws.gov>
Date: Fri, Jun 13, 2014 at 12:47 PM
Subject: Service's informal comments on Tylerhorse DEIS (California condor sections)
To: Kim Marsden <kmarsden@blm.gov>
Cc: Amy Fesnock <afesnock@blm.gov>, Cedric Perry <cperry@blm.gov>

Hi Kim,

As discussed, attached are the Service's informal comments on California condor information as presented in the Affected Environment and Environmental Consequences sections of the BLM's Tylerhorse wind project draft Environmental Impact Statement. In general, we recommend that you use more recent California condor information in your analysis, reassess your California condor risk assessment once you have redone your analysis with that more recent information, and that any Final EIS be revised to incorporate that analysis and its results and to incorporate responses to our comments. Please note, we are not providing comments on the proposed California condor protection measures at this time as we have provided comments on those in the past and will continue to work with you and the applicant on the development of those measures through the formal section 7 consultation process.

Also, attached for your reference are documents we refer to in our comments (USFWS California condor monthly status report, California condor field program annual report, and California condor 5-Year review). We also recommend the BLM review more recent peer-reviewed literature and update its California condor analysis in the EIS based on these studies (e.g., Rivers JW, et al. (2014) Resource Selection by the California Condor (*Gymnogyps californianus*) Relative to Terrestrial-Based Habitats and Meteorological Conditions. PLoS ONE 9(2); Cogan CB, et al. (2012) Analysis of California Condor (*Gymnogyps californianus*) Activity Using Satellite Telemetry Data. The Open Ornithology Journal 5; and Johnson M, et al. (2010) Analysis of California Condor (*Gymnogyps californianus*) use of six management units using location data from global positioning system transmitters, southern California, 2004–09—Initial report: U.S. Geological Survey Open-File Report 2010-1287). We can provide copies of these papers, if needed.

Please note that we will be providing additional comments on other sections of the DEIS related to other trust resources (e.g., eagles and migratory birds) in subsequent correspondences.

We look forward to continuing to work with the BLM on its review of the Tylerhorse wind project. Please feel free to contact me anytime to discuss the above and attached comments.

Thanks,

Jessica

****

Jessica Rempel

Fish and Wildlife Biologist – Renewable Energy

U.S. Fish and Wildlife Service – Ventura FWO

2493 Portola Road, Suite B, Ventura, CA 93003

(805) 644-1766 x370, jessica_rempel@fws.gov

during both the winter raptor surveys and the spring and fall migratory surveys.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus*) is a federal Bird of Conservation Concern and a state fully protected species. The species often migrates individually through the project area and the Antelope Valley during the fall and spring. There are limited records of peregrine falcons in Kern County. The scrub and grassland habitats within the project area provide suitable foraging habitat during migration. Avian surveys in the project area verified that peregrine falcons migrate through the project area during a short window of time during fall and spring migrations. A single peregrine falcon was observed flying at above 500 feet AGL during the fall 2005 survey (Sapphos, 2011a). There are no records for nesting American peregrine falcons in the Tehachapi Mountains.

California Condor

The California condor (*Gymnogyps californianus*) is a federally-listed endangered and state-listed endangered and fully protected species. At the time of western settlement in North America, the condor range was limited to a narrow Pacific coastal strip extending from British Columbia, Canada to Baja California Norte (USFWS, 1996). The California condor experienced a steady population decline during the 20th century that was primarily related to factors including loss of habitat, low reproductive rate, poisoning, and shooting. By the 1980s, the condor range in California was restricted to a wishbone-shaped area encompassing six (6) counties just north of Los Angeles (USFWS, 1996). In 1982, fewer than 25 individuals remained in the wild and in 1987 the last remaining wild condors were taken into captivity. In 1992 the first reintroductions into the wild of captive-bred birds began, and reintroductions continue today. As of April 30, 2011, the wild condor population in California numbered 106 individuals. The southern California flock, which is the flock nearest the project area, consisted of 34 free-flying released adults, 10 wild-fledged birds, and 3 chicks in wild nests for a total of 47 birds (USFWS, 2012).

Comment [JAR1]: We suggest you include lead poisoning which was probably a much more significant factor in the decline than previously thought.

Comment [JAR2]: Can use more recent information: As of March 31, 2014, the wild condor population in California numbered 131 individuals. The southern California flock, …, consisted of 70 free-flying released and fledged birds. (March condor program status report).

Condors are currently intensively monitored by the USFWS, with approximately half of the wild Southern California flock ~~population~~ tracked using GPS transmitters. Such tracking provides some indication of condor use areas, but because many birds are not tracked via GPS, the current distribution of condors is considered larger than what is indicated by mapped GPS locations. However, the tracked birds give a general indication of areas of high condor use, as well as areas that condors use ~~forage in~~ less frequently. Further, these data, when viewed over the last 10 years, indicate that the wild condor population is expanding throughout their former range.

California condors are not known to occur within the project area. ~~However, the historic range of the California condor is located approximately 2.2 miles to the northwest of the project area.~~ In Kern County, condors forage extensively in the foothills adjacent to the northern boundary of the Los Padres National Forest, to Reyes Station in the west, to the Pleito Hills west of Interstate 5, and eastward throughout much of the region from the Tehachapi Mountains (including Tejon Ranch) north to Bear Mountain and ~~the slopes of Cummings Mountain~~ (Appendix C-1, pg. 5-24).

Comment [SK3]: There is no exact historic range accurately mapped to a scale that allows this level of analysis. Condors historically occurred in the Antelope Valley and other areas on the east slope of the Tehachapi and southern Sierra Nevada.

Another important foraging area in Kern County was the foothill rangelands around Glennville,

where condors foraged daily in the Cedar Creek and upper Pozo Creek drainages as far west as Blue Mountain and the old Granite Station crossroads south of Woody. Condors roosted primarily on Sequoia National Forest lands in the Greenhorn Mountains (USFWS, 1996). There are no known nesting sites within the project area or the Tejon Ranch Critical Habitat Unit (CHU). ~~All recent California condor nest sites in Southern California are located on public lands within the Los Padres, Angeles, and Sequoia National Forests. No cliffs or large trees of the size required by California condors occur in the project area or within the Tejon Ranch CHU~~.

Daily foraging flights of California condors may occur over vast areas encompassing hundreds of miles of travel (Meretsky and Snyder, 1992). Condors are highly gregarious at feeding sites and somewhat social during foraging flights. Daily foraging flights of California condors typically range from 31 to 44 miles from an active nest or roost site; the longest recorded daily? flight has been 141 miles (USFWS, 1996). ~~However, compared with critical habitat functions and values associated with nesting and roosting, foraging, particularly with today's captive released population, is much more subject to management through the provision of clean food sources (carcasses) in suitable locations. Condors have repeatedly demonstrated that they will locate and feed on carcasses provided throughout their historical range, including the Tejon Ranch critical habitat area. Based on the analysis conducted on condors fitted with GPS transmitters from 2008 to 2010, condors generally only used those areas within the Tejon Ranch critical habitat boundary that historically contained, and currently contain, animal carcasses, and supplemental feeding areas.~~

The currently defined range in California includes some areas of Southern and central California, where they are primarily restricted to chaparral, coniferous forest, and savanna habitats (USFWS, 1996). The preponderance of sighting and tracking data in the Tehachapi Mountains and southern Sierras of Kern County since 1992 are concentrated west and north of the Garlock Fault. Newly released birds venturing into the Tejon Ranch region and the Tehachapi Mountains are concentrated within their historical range, particularly into areas west and north of the Garlock Fault. ~~Released condors in Southern California have largely confined their movements within 30 to 37 miles from the Sespe Condor Sanctuary in Ventura County (Sapphos, 2011a~~).

However, a small proportion (estimated at less than 3 percent) of sighting and tracking data occurs east and south of the Garlock Fault, but within the physiographic province of cismontane California in the Tehachapi Mountains, which coincides with the historical range of the California condor. ~~None of the captive released birds have established populations in the Blue Ridge condor area, Kern County rangelands, and Tulare County rangelands (Walters et al., 2008)~~. In addition, few observations of California condors have occurred east and south of the Garlock Fault at the eastern end of the Tehachapi Mountains, within the TWRA, the Town of Tehachapi, or the Tehachapi Pass, which is also confirmed by the absence of sightings by annual bird counts from this region (Sapphos, 2011a). No condor sightings have occurred southeast of this area within or adjacent to the project area. The nearest known observation of a California condor is that of a radio-tagged bird in summer 2010 located approximately 3.9 miles west of the project area (Sapphos, 2011a). The condor's potential to occur in or near the project area is considered low because the project area supports marginal foraging habitat, lacks available nesting sites, and

Comment [JAR4]: Reference to Tejon Ranch CHU needs to be put into context as it is the first time reference to California condor critical habitat is presented. Need to define what it is and where it is in relation to the project (2.7 miles west). Need to present that information first so the reader knows how it relates to the project.

Comment [SK5]: Tejon CHU was established as foraging habitat but is not inclusive of all the foraging habitat on Tejon Ranch or in the Tehachapis. Also, in 2013, a successful condor nest was documented in the immediate vicinity of Bitter Creek National Wildlife Refuge. The nest was not on a large cliff or in a tree.

Comment [SK6]: This is not accurate. Please note, the 1996 recovery plan is not an updated source of information for current condor activity. Annual reports from the various recovery program participants and the Service's Five Year Review are much more up to date.

Comment [SK7]: There are areas on Tejon and in the Tehachapis that are very similar to where condors nested near Bitter Creek. We anticipate nesting can and will likely occur in the Tehachapis at some point in the future.

Comment [SK8]: Update with current info from 5-Y Review: "Telemetry data and Global Positioning System (GPS) devices on some birds have documented other long-distance flights, including flights from southern Utah to Flaming Gorge, Wyoming (over 400 mi (643 km)) and from Sierra de San Pedro Martir in Baja California to Imperial County, California (approximately 155 mi (250 km) (Service, unpubl. GPS telemetry data)."

Comment [JAR9]: It appears this language is attempting to suggest that current foraging behavior is dependent on management actions. Although this may have been true in the past, recent activity suggests otherwise. We suggest deleting or rephrasing this section of this paragraph as California condors readily find food on their own.

For example, see page 12 in 5-year review (USFWS 2013), "… The distribution of each of these populations continues to expand as release efforts persist and the current wild population matures and becomes more aware of the available food resources within their respective ranges… Telemetry and GPS records reveal condors currently exceed the boundaries of the occupied habitat that was known and defined at the time of the initial field reviews conducted by the Service in the late 1960s, and take advantage of food opportunities at increasingly farther distances from release or other management sites (Service, unpubl. data, 200 ... [1]

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Comment [SK10]: No nesting in Sierra yet; however, increasing use of the S. Sierra (e.g., in 2013, one condor flew as far north as Fresno County and in June 2014 8 condors (2 with GPS units) were reported in Sequoia NF and NP).

Comment [SK11]: According to more recent data – condors are now regularly flying over Hwy 58.

Comment [JAR12]: More recent data: 1 GPS-tagged bird 1.3 miles northwest of the project in fall 2013.

lacks traditional and temporary roost sites for overnight and diurnal roosting locations.

Comment [JAR13]: This section of your analysis depends on old data. We recommend updating this analysis with more recent GPS data, information from more recent condor program references, and other more recent references. We suggest that the condor's potential to occur in or near the project area is moderate to high as condors currently occur near the project area. In addition, we recommend you update your assessment of its potential to occur in Table 3.22-2.

Comment [SK14]: We do not think this is a strong rationale for potential to occur in or near project area as they already occur near the project area.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is a federal Bird of Conservation Concern and state Species of Special Concern. This species typically occurs within lowlands and grasslands throughout California. They prefer open habitats with scattered shrubs, trees, posts, fences, and other perches. All of the shrub plant communities in the project area provide suitable nesting habitat for this species. Loggerhead shrikes were observed during numerous surveys of the project area, with the detection of approximately 10 to 15 breeding individuals (Sapphos, 2011a), and are a year-round resident of the project area.

American White Pelican

The American white pelican (*Pelecanus erythrorhynchos*) is a state Species of Special Concern. This species breeds primarily on isolated islands in freshwater lakes and forages on inland marshes, lakes, or rivers, favoring shallow water. American white pelicans were observed in the Manzana Project study area during several surveys conducted for migratory raptors. Most of these soaring migrants were observed in large flocks (i.e., 50 to 100 birds) at low altitudes (approximately 200 feet) in spring and in large flocks (i.e., 50 to 100 birds) at both low and high altitudes (greater than 1,000 feet) in fall. Therefore, this species is likely to migrate through the project area (Sapphos, 2011a).

Le Conte's Thrasher

Le Conte's thrasher (*Toxostoma lecontei*) is a federal Bird of Conservation Concern and state Species of Special Concern. This species can be found in low mixed desert scrub habitats and desert wash areas. Suitable habitat for the species exists within the Mojave Desert wash scrub, Mojavean juniper woodland and scrub, and Joshua tree woodland plant communities within the project area. Based on detailed field surveys, Le Conte's thrasher was identified as a year-round resident in the project area.

Mammals

Four terrestrial special-status mammals were identified in the project region: southern grasshopper mouse (*Onychomys torridus*), San Joaquin pocket mouse (*Perognathus inornatus*), American badger (*Taxidea taxus*), and Mohave ground squirrel (*Xerospermophilus* (=*Spermophilus*) *mohavensis*). These species and special-status bats are discussed below.

Southern Grasshopper Mouse

Southern grasshopper mouse is a state Species of Special Concern that is common in desert habitats of the Mojave Desert and southern Central Valley. The species prefers alkali desert scrub and desert scrub habitats, with somewhat lower densities expected in other desert habitats, including succulent scrub, was, and riparian areas. This species also occurs in coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbush habitats. During small mammal trapping efforts in May 2010, Sapphos Environmental, Inc. recorded 10 southern grasshopper mice captures at traps in juniper desert scrub (5 captures), Joshua tree woodland (3 captures), and non-

Page 20: [1] Comment [JAR9]	Service	6/4/2014 3:07:00 PM

It appears this language is attempting to suggest that current foraging behavior is dependent on management actions. Although this may have been true in the past, recent activity suggests otherwise. We suggest deleting or rephrasing this section of this paragraph as California condors readily find food on their own.

For example, see page 12 in 5-year review (USFWS 2013), "… The distribution of each of these populations continues to expand as release efforts persist and the current wild population matures and becomes more aware of the available food resources within their respective ranges… Telemetry and GPS records reveal condors currently exceed the boundaries of the occupied habitat that was known and defined at the time of the initial field reviews conducted by the Service in the late 1960s, and take advantage of food opportunities at increasingly farther distances from release or other management sites (Service, unpubl. data, 2009–2012)… The available information indicates that they make use of various portions of their range at different times of the year, and seek out distinct habitats for each of their primary needs of foraging, nesting, and roosting (Meretsky and Snyder 1992, Hunt et al. 2006)… Supplemental feeding can lead to a restricted range due to the restraint of their natural wide-ranging foraging (Snyder 2007). This constricted range may also result in underestimating the severity, intensity, and number of threats that would occur in a more widely distributed population (Meretsky et al. 2000, Mee et al. 2007a). Despite the ongoing presence of proffered food, condors are still expanding their range (Johnson, et al. 2010)."

habitat off-site would be consistent with CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012) and would be in an area where WTGs would not pose a mortality risk. If off-site acquisition and protection is pursued, the acquisition of occupied owl foraging habitat may overlap with other off-site acquisition requirements, as applicable, if approved by BLM. To increase onsite workers' recognition of and commitment to burrowing owl protection, WIL-1c (Worker Environmental Awareness Program) includes education on burrowing owl identification, sensitivities, and protection measures. Furthermore, impacts to burrowing owl foraging habitat would be minimized through the implementation of VEG-1 (Minimize Construction-related Impacts), which requires the minimization of temporary work areas to the smallest feasible size, and VEG-3 (Habitat Restoration and Revegetation Plan).

Potential indirect effects during construction include degradation of foraging habitat. The TWP would indirectly affect burrowing owls if it resulted in the introduction or spread of invasive weed species that result in changes in prey abundance or species assemblages. Soil disturbance during construction can encourage invasive weeds to encroach into the habitat from areas outside the site and weed seed can be introduced to the site if construction vehicles and equipment entering the site is not cleaned properly. Invasive weed species have the potential to out-compete native species and change the overall quality of the habitat. Impacts associated with introduction or spread of invasive weed species would be mitigated by the implementation of VEG-1c (Weed Management Plan).

California Condor

The California condor (*Gymnogyps californianus*) has not been historically or recently documented in the Project area. Results of a probability of use model developed for the condor in the Antelope Valley as it merges with the Tehachapi and San Gabriel Mountains, suggest that the Project area is located in a zone of low probability of use for condors. The analysis suggests that components of topography, specifically, relatively low site elevation and southeast-facing and northeast-facing aspects of the Project area, contribute to the low likelihood of condor use (Sapphos, 2011b).

USFWS condor flock data identifies the nearest California condor as approximately 3.9 miles west of the Project area. ~~Even at this distance, however, the species' potential to occur on the Project area is considered low because the site lacks available nesting sites, traditional and temporary roost sites for overnight and diurnal roosting locations, and terrain that creates sufficient thermal air currents than that of the adjacent Tejon Ranch and designated critical habitat.~~ Thus, no construction impacts are anticipated to California condor.

Comment [JAR1]: Note – Construction Section

Comment [SK2]: As noted in the Affected Environment section, we do not consider this a good measure of prob. of occurrence. Condors have been documented in the Antelope Valley, Tehachapis, and recently documented near wind turbines via GPS.

Comment [JAR3]: These results need to be updated with the results of analysis of more recent data. Also, here, and/or in the operations section, we suggest you update with information from more recent condor references

Comment [JAR4]: 1 GPS-tagged condor was recorded 1.3 miles to NW of southwestern most parcel in Oct. 2013.

Comment [SK5]: We do not think this is accurate in predicting whether condors would or would not occur on the project area.

Comment [JAR6]: We suggest there may be impacts due to construction and suggest mitigation measures be proposed (e.g., WEAP, trash plan, waste management plan, etc.)

Swainson's Hawk, Ferruginous Hawk, American Peregrine Falcon, American White Pelican, White-tailed Kite, Northern Harrier, Sharp-shinned Hawk, Merlin, and Vaux's Swift

Each of these species was observed in the Project area in 2005 during the spring and fall migration and subsequent surveys (Sapphos, 2011a; 2013). Implementation of the Proposed Action would result in the direct disturbance of a small amount (approximately 98.5 acres) of Joshua tree woodland, Mojave Desert wash scrub, and Mojavean juniper woodland and scrub, which are considered suitable foraging and perching habitat for many of these species. Short-term, construction-related impacts to these species is not expected because these species do not

27, 2013). The results suggest that from 0 to 7 golden eagles could be killed during the life of this project.

As required by WIL-1k1, implementation of a USFWS-approved Golden Eagle Conservation Plan (GECP) is required to address the potential for take of golden eagles. The GECP would reduce Project-related impacts and help ensure that the Project would be in compliance with the Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA), as amended. The GECP for the Proposed Action may be used to support authorization by the USFWS of a programmatic permit for non-purposeful take of golden eagles under the BGEPA. As required by the GECP, post-construction monitoring for golden eagle (and California condor) in particular will commence in the first year of Project operation and continue for the life of the Project. To meet the requirements of USFWS *Eagle Conservation Plan Guidance* (USFWS, 2013), the GECP (WIL-1k1) will additionally identify eagle risk and an adaptive management strategy for the Project and compensatory mitigation; and post-construction monitoring and reporting procedures for golden eagles. The eagle risk assessment predicts the taking of 0.16 eagles annually, which means that during the30-year life of this project, more than one eagle is expected to be taken. Should an eagle be killed without the Project having a BGEPA permit, Project operations will be modified to ensure that additional eagles are not taken (WIL-1k31p: Minimize Eagle Mortality).

Burrowing Owl

While burrowing owls in the Project area have some exposure to turbine mortality, there have been no documented burrowing owl fatalities at wind energy facilities in the region. Studies in the Altamont Pass Wind Resource Area (e.g., Smallwood and Thelander, 2005) indicate that can be susceptible to collisions with WTGs. It is anticipated that any burrowing owl mortality that might occur over the Project life would be at a very low level and would have minor effects on burrowing owl populations. As required by WIL-1l, Implementation of the Bat and Bird Conservation Strategy (BBCS) would reduce Project-related impacts to burrowing owl.

California Condor

Based on the locations of known California condor sightings in close proximity to the project area, the level of risk associated with the Proposed Action to the California condor is considered to be moderate. It is conceivable for a California condor to soar into the Project area. While the ability of condors to avoid wind turbines is unknown, the hazards of wind turbines to other vulture species are well documented and these surrogate species demonstrate there is a mortality risk for California condors. However, to date, there are no known California condor deaths that have been attributed to wind turbines in the TWRA or elsewhere. As California condor numbers continue to increase in Southern California, including the Tehachapi Mountains, and their range expands, the risk of condor mortality from collisions with wind turbines increases.

Comment [JAR7]: Note – Operations section

Comment [JAR8]: Based on our review of more recent information on California condor activity in the area, we suggest the level of risk may be moderate to high.

If condors were to occur onsite, direct impacts from operation and maintenance could include disturbance from human activity, collision with WTGs, and collision with or electrocution from transmission lines. Other potential direct impacts would be similar to those discussed above for construction and include the loss or disruption of foraging habitat from vegetation removal or

grading, the introduction of hazardous microtrash and exposure to toxic ethylene glycol antifreeze that condors may ingest during operation and maintenance activities.

Indirect effects could result from the use of new access roads and subsequent increase in human activities; or, conversely, the attraction of condors to the site by roadkills resulting from normal site operations. A potential increase in carrion forage could result from mammal (e.g., rabbit, kit fox, or deer) collisions with vehicles or from avian interactions with WTGs. Condors would also be susceptible to collision with WTGs if grazing were to occur on the site during operation as birds could be attracted to the site by the presence of dead livestock. In each case, the presence of onsite food sources could attract condors and increase their risk of colliding with WTGs.

These potential direct and indirect impacts to California condors during operation and maintenance of the TWP would be reduced through the implementation of WIL-1h (California Condor Protection Measures), WIL-1i: Avoid California Condor Turbine Strikes, WIL-1j: California Condor Adaptive Management Strategy to Avoid Turbine Strikes, WIL-1l (Bird and Bat Conservation Strategy), WIL-1m (Wildlife Mortality Reporting Program), WIL-1o (Avian Power Line Interaction Committee Standards), WIL-3a (Minimize Vehicle and Equipment Impacts during Operation and Maintenance), and WIL-3b (Operation and Maintenance Education Program).

These measures include requirements for worker environmental awareness training, vehicle speed limits of 15 miles per hour, and control of fugitive dust. In addition, Measure WIL-1h requires monitoring during periods of livestock grazing to ensure immediate removal of livestock carcasses that could attract condors to the Project site and increase the potential for WTG strikes. The project proponent would also be required to work with the area grazing permittees to develop Best Management Practices to minimize attraction of 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 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.

Comment [JAR9]: Good measure but how does it reduce impacts to California condor? Control dust so turbines are more visible?

Swainson's Hawk, Ferruginous Hawk, American Peregrine Falcon, American White Pelican, White-tailed Kite, Northern Harrier, Sharp-shinned Hawk, Merlin, and Vaux's Swift

Impacts to Swainson's hawk (*Buteo swainsoni*), ferruginous hawk, American peregrine falcon (*Falco peregrines anatum*), American white pelican (*Pelecanus erythrorhynchos*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), merlin (*Falco columbarius*), and Vaux's swift (*Chaetura vauxi*) flying between 200 and 400 feet may also result during Project operation due to potential for collision with WTGs and power lines that could result in injury and/or direct mortality. American white pelicans in particular were observed flying within this height range during spring surveys of the Project area; however, American white pelican mortality has not been documented at any wind farm. Vaux's swift was observed in limited numbers during migration surveys. Vaux's swift is an aerial insectivore and frequently migrates at altitudes favorable for collision (197 to 410 feet).

At Altamont, California, monitoring has documented a decline in raptor mortality from collisions with wind turbines at large turbines, such as ones proposed to be built for the Proposed Action,

California Condor

Gymnogyps californianus

Recovery Program

Population Size and Distribution

March 31, 2014

Overview Page

Refer to the subsequent pages for details and trends

TOTAL POPULATION			**414**
WILD POPULATION			**232**
California (Managed by US Fish & Wildlife Service, Ventana Wildlife Society, Pinnacles National Park)		**131**	
Chicks - in wild nests **PNP= 1 SoCal= 0 VWS= 1**	**2**		
Free-flying birds - Released & Fledged - **Southern California (USFWS)**	**70**		
SoCal Fledged = **18**			
Free-flying birds - Released & Fledged - **Ventana Wildlife Society (VWS)**	**32**		
VWS Fledged = **9**			
Free-flying birds - Released & Fledged - **Pinnacles National Park (PNP)**	**27**		
PNP Fledged = **1**			
Baja California, MX, Sierra de San Pedro Martir NP (SPM), Zoological Society of San Diego		**29**	
Chicks - in wild nests	**0**		
Free-flying birds - Released & Fledged	**29**		
Baja Fledged = **2**			
Arizona, Vermilion Cliffs, The Peregrine Fund (World Center for Birds of Prey)		**72**	
Chicks - in wild nests	**0**		
Free-flying birds - Released & Fledged	**72**		
Arizona Fledged = **10**			
40 Wild & Free fledglings			
CAPTIVE POPULATION			**182**
Los Angeles Zoo		**27**	
San Diego Zoo Safari Park (Display: 29, 36, 497, 524, 635)		**30**	
San Diego Zoo - 319, 471, 500		**3**	
World Center for Birds of Prey, Boise, ID, The Peregrine Fund (Display: 282, 580)		**55**	
Oregon Zoo, Portland, OR		**41**	
Chapultepec Zoo, Mexico City - 86, 140		**2**	
Santa Barbara Zoo - 174, 327, 433, 464, 544		**5**	
Mentor birds in field pens - 35 (SPM)		**1**	
Pre-release birds in field pens:		**9**	
Arizona - 641, 657, 669, 677, 679, 680	**6**		
Baja -	**0**		
Pinnacles -	**0**		
SoCal -	**0**		
Ventana - 631, 650, 652	**3**		
Temporarily in captivity		**9**	
Arizona -	**0**		
Baja - 495, 510	**2**		
LAZoo - 289, 651, 656, 661, 662, 667, 673	**7**		
OZoo -	**0**		
Pinnacles -	**0**		
SDZSP -	**0**		
SoCal -	**0**		
Ventana -	**0**		
WCBP -	**0**		

Production

"totals" column since 2001

Wild Production, 2011- 2020 *(running totals)*

	'01-'10	18	21	19	19	0	0	0	0	0	0	166
	89	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	totals
Wild-laid eggs, Arizona	32	3	4	4	4							**47**
Wild-laid eggs, Baja	6	1	3	5	5							**20**
Wild-laid eggs, SoCal	35	7	6	3	3							**54**
Wild-laid eggs, Pinnacles	3	2	3	2	2							**12**
Wild-laid eggs, Ventana	13	5	5	5	5							**33**
Wild-fledged birds, Arizona	12	2	0	3								**17**
Wild-fledged birds, Baja	0	1	2	0								**3**
Wild-fledged birds, SoCal	13	4	4	4								**25**
Wild-fledged birds, Pinnacles	1	1	0	0								**2**
Wild-fledged birds, Ventana	10	0	3	0								**13**
	36	**8**	**9**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**

Production: Eggs & Chicks - 2014

		laid	fertile	fertile / died	non-viable / dead	unknown	transferred: in	transferred: out	chicks*	
		eggs								
	totals	**60**	**22**	**0**	**8**	**30**	**0**	**0**	**7**	
LAZoo	41	9	3		2	4			1	**5**
OZoo	captive	6	5			1			2	captive
SDZSP (WAP)		7	6			1			2	
WCBP		19	5		2	12				
Wild, Arizona (AZ)	19	4			1	3				**2**
Wild, Baja (BC)	wild	5				5				wild
Wild, SoCal (USFWS)		3	2		1					
Wild, Pinnacles (PNP)		2				2			1	
Wild, Ventana (BS)		5	1		2	2			1	

total eggs	**60**
potential hatchings	**43**
chicks	**7**

* total hatched at location

* does not account for chicks that died

RED = new entry

Sex

	male	female
(wild+captive) FIELD	131	108
(captive+temporary) ZOO's	87	78
TOTAL	218	186

= **404 known**
10 unknown
414 total

Egg History - 2014 season

Count	Lay Date (est)	Egg ID	Sire	Dam	Status	Day 57	Hatch date	Hatch Location	Stud Book #	Sex	Egg Transferred: to-date	Comments
1	4-Mar-14	14CHUH1	47	51	F	10-Apr-14						
2	14-Mar-14	14HAKU1	85	77	F	10-May-14						
3	23-Feb-14	14HONS 1	50	57	F	21-Apr-14						
4	22-Feb-14	14HOSI 1	138	84	F	20-Apr-14						
5	27-Feb-14	14HOY 1	48	97		25-Apr-14						
6	23-Feb-14	14HUYA 1	99	88	F	21-Apr-14						
7	18-Feb-14	14KARE 1	71	56	F	16-Apr-14						
8	18-Feb-14	14KITS 1	309	69	F	16-Apr-14						
9	18-Feb-14	14KOYO 1	104	76		16-Apr-14						
10	27-Feb-14	14KSEN 1	92	94	F	25-Apr-14						
11	7-Mar-14	14LIKU1	83	26	--	--	--	--	--	--		
12	16-Feb-14	14PIRU 1	53	34	inf	--	--	--	--	--		
13	19-Mar-14	14PIRU2	53	34		15-May-14						
14	23-Feb-14	14SIXU 1	60	166	F	21-Apr-14						
15	12-Mar-14	14SULK1	62	93	F	8-May-14						
16	21-Feb-14	14TAKI 1	27	139	F	19-Apr-14						
17	26-Mar-14	14TAKI2	27	139		22-May-14						
18	10-Mar-14	14TECU1	67	30	F	6-May-14						
19	24-Mar-14	14TOWA1	91	49		20-May-14						
20	10-Feb-14	AZ0114	342	383	--	--	--	--	--	--		Sand Crack, failed 15Feb14
21	11-Feb-14	AZ0214	266	296		9-Apr-14						Wave Cave
22	11-Feb-14	AZ0314	293	389	--	--	--	--	--	--		Saddle Cyn., failed 28Feb14'
23	28-Feb-14	AZ0414	337	409		26-Apr-14						Taylor Crk.
24	1-Feb-14	BC114	261	217	unk	30-Mar-14						CD14
25	2-Feb-14	BC214	269	284	unk	31-Mar-14						SPM 14
26	12-Feb-14	BC314	446	406	unk	10-Apr-14						
27	16-Feb-14	BC414	361	373	unk	14-Apr-14						SPMS 14
28	18-Feb-14	BC514	320	220	unk	16-Apr-14						CDS 14
29	25-Feb-14	BS114	251	222	--	--	--	--	--	--		broken, Partington Cyn
30	5-Feb-14	BS214	351	418		3-Apr-14						North McWay Cyn
31	8-Mar-14	BS314	167	190		4-May-14						McWay Cyn
32	24-Feb-14	BS414	168	208	F	22-Mar-14	22-Mar-14	VWS-wild	729			Big Creek
33	20-Mar-14	BS514	251	222	unk	--	--	--	--	--		crushed, Partington Cyn.
34	2-Feb-14	FW114	374	180	F	31-Mar-14						TC14 "Tom's Cyn"
35	8-Feb-14	FW214	125	111	F	6-Apr-14						KR14 "Koford's Ridge"
36	3-Mar-14	FW314	247	79	inf	29-Apr-14						SP14 "South Potrero"
37	16-Jan-14	LA114	1	68	F	14-Mar-14	13-Mar-14	LAZ	727			
38	22-Jan-14	LA214	5	141	inf	--	--	--	--	--		
39	15-Feb-14	LA314	46	11	F	13-Apr-14						
40	18-Feb-14	LA414	5	141	inf	--	--	--	--	--		
41	19-Feb-14	LA514	1	68		17-Apr-14						
42	26-Feb-14	LA614	23	172		24-Apr-14						
43	2-Mar-14	LA714	380	355	F	28-Apr-14						
44	8-Mar-14	LA814	120	95	unk	--	--	--	--	--		
45	26-Mar-14	LA914	5	141		22-May-14						
46	21-Jan-14	OZ01-2014	55	43		19-Mar-14	18-Mar-14	OZ	725			
47	25-Jan-14	OZ02-2014	73	37		23-Mar-14	20-Mar-14	OZ	728			
48	6-Feb-14	OZ03-2014	348	155		4-Apr-14						
49	6-Feb-14	OZ04-2014	295	108		4-Apr-14						
50	24-Feb-14	OZ05-2014	189	40		22-Apr-14						

Egg History - 2014 season

Count	Lay Date (est)	Egg ID	Sire	Dam	Status	Day 57	Hatch date	Hatch Location	Stud Book #	Sex	Egg Transferred: to-date	Comments
51	23-Mar-14	OZ06-2014	30	120		19-May-14						
52	25-Mar-14	PN114	219	310		21-May-14	25-Mar-14	PNP-wild				TR14 "The Rocks"
53	20-Mar-14	PN214	431	375		16-May-14						
54	16-Jan-14	WAP1401	44	32	F	14-Mar-14	14-Mar-14	SDZSP				
55	18-Jan-14	WAP1402	20	157	F	16-Mar-14	18-Mar-14	SDZSP				
56	22-Jan-14	WAP1403	28	54	F	20-Mar-14						
57	15-Feb-14	WAP1404	221	264	F	13-Apr-14						
58	21-Feb-14	WAP1405	135	52	F	19-Apr-14						
59	4-Mar-14	WAP1406	25	45	F	30-Apr-14						
60	8-Mar-14	WAP1407	--	29	inf	--	--	--	--	--		
								--				
								--				
								--				
								--				

RED = new entry

total eggs=	60
potential hatchings=	43
chicks=	7

(does not account for chicks that died)

Transfers & Releases - 2014

count	sb #	from	to	date	initial reason	RE-release	Comment
1	340	LAZ	PNPFP	3-Jan-14	healthy	4-Jan-14	
2	444	LAZ	PNPFP	3-Jan-14	healthy	4-Jan-14	VWS bird
3	631	LAZ	VWSFP	7-Jan-14	TEMPORARY		
4	646	LAZ	VWSFP	7-Jan-14	TEMPORARY		
5	650	LAZ	VWSFP	7-Jan-14	TEMPORARY		
6	652	LAZ	VWSFP	7-Jan-14	TEMPORARY		
7	262	SoCal-wild	LAZ	15-Jan-14	Pb		
8	493	LAZ	HMFP	15-Jan-14	healthy		
9	493	HMFP	SoCal-wild	24-Jan-14	healthy		RE-rel fr Hopper
10	262	LAZ	SoCal-wild	28-Jan-14	healthy		RE-rel fr Hopper
11	489	SoCal-wild	LAZ	5-Feb-14	Pb		
12	489	LAZ	SoCal-wild	22-Feb-14	healthy		
13	677	SDZSP	VCFP	28-Feb-14	pre-release		
14	679	SDZSP	VCFP	28-Feb-14	pre-release		
15	680	SDZSP	VCFP	28-Feb-14	pre-release		
16	646	VWSFP	VWS-wild	25-Mar-14	ORIGINAL REL.		

RED = new entry

1 = ORIGINAL RELEASES

2 = birds treated for lead toxicosis

Pb = Lead Toxicosis
HCB = Hold for Captive Breeding
SPM = San Pedro Martir (Baja)
HMFP = Hopper Mtn. Flight Pen
PNPFP = Pinnacles Nat.Park Flight Pen
VCFP = Vermilion Cliffs Flight Pen
BCFP = Bitter Creek Flight Pen
VWSFP = Ventana Wildlife Society Flight Pen
LWV = Liberty Wildlife Veterinarian, Phoenix
MA&EC = Monterey Avian & Exotic Clinic
UABC = Mexicali Veterinarian
Tx = in transit

Mortalities - 2014

count	sb #	type*	location	date	cause of death	comments
1	393	WCR	AZ	5-Dec-12	unk	clerical error
2	699	Ca	WCBP	1-Jan-14	pending	
3	257	WCR	AZ, Liberty Wildlife Vet	5-Feb-14	pending	at Vet. for lead toxicosis
4	537	WCR	AZ, Vermilion	Feb-14	pending	recovered 2Mar14
5	720	N	AZ, Kaibab	Feb-14	unk	

RED = new entry

*** : WCR**=Wild-CaptiveReared; **Ca**=Captive; **N**=Nestling (chick); **F**=Fledgling

414 = total population (31Dec2013=412)+ hatchlings - mortalities

NOTE: 404 total birds 31Dec12;+ 47 hatchling + 1 Baja = 452

0 **= DIED THIS YEAR FROM LEAD TOXICOSIS**

3 = pending

3 = WCR
1 = Ca
1 = N
0 = F
5

Mortalities - 2013

count	sb #	type*	location	date	cause of death	comments
1	133	WCR	AZ, Vermilion Cliffs	13-Feb-13	trauma	
2	194	WCR	VWS	30-Nov-13	unk	no carcass recovered
3	210	WCR	AZ, Grand Cyn	13-Feb-13	Pb	
4	239	WCR	SoCal	19-Jun-13	unk	missing
5	274	WCR	AZ (Utah)	18-Nov-12	unk	missing
6	299	WCR	AZ, So. Utah	30-Dec	pending	
7	306	WCR	PNP	9-Jun-13	powerline/electrocution, toxic liver lead levels	
8	312	WCR	PNP on private property	12-Apr-13	Pb	
9	313	WCR	PNP on private property	8-Aug-13	Pb	
10	332	WCR	PNP	2-Jul-13	Pb	found 3Jul13
11	334	WCR	AZ, Vermilion Cliffs	27-Jul-13	Pb	recovered early August
12	335	WCR	PNP	5-Jun-13	Pb	
13	343	WCR	AZ, Vermilion Cliffs	16-Jan-13	Pb	
14	345	WCR	PNP	29-May-13	Pb	
15	352	WCR	AZ (Zion NP)	16-Jan-13	unk	no carcass recovered
16	371	WCR	AZ	2-Dec-12	unk	missing
17	413	WCR	AZ, Kaibab Plateau	19-Jun-13	trauma	
18	428	F	LAZ (SoCal)	4-Sep-13	Pb	died during sugery @ LAZ to remove lead shot
19	451	WCR	PNP	7-Dec-13	Pb	found 8Dec13
20	484	WCR	AZ, Vermilion Cliffs	13-Jan-13	brain hemorrhage	
21	494	Ca	San Pedro Martir NP	4-Aug-13	pending	
22	501	F	VWS	30-Nov-13	unk	no carcass recovered
23	512	WCR	SoCal, Bitter Creek NWR	9-Jan-13	trauma	predator trauma, suspected golden eagle
24	536	WCR	SoCal, Stallion Springs	2-Sep-13	undertermined	drowning suspected
25	553	WCR	AZ (Utah)	5-Dec-12	pending	missing/recovered
26	581	WCR	AZ	22-Jun-12	unk	missing
27	591	WCR	SoCal	20-Sep-13	trauma	blunt force collsion/vehicle impact
28	592	WCR	AZ, Vermilion Cliffs	29-Jun-13	pending	
29	630	F	SoCal, Bear Valley Springs	27-Sep-13	drowning	drowned in dip tank
30	670	F	SoCal	12-Aug-13	unk	missing
31	681	N	PNP	13-Apr-13	unk	no carcass recovered
32	686	N	VWS	1-Jun-13	unk	undetermined - post mortem degradation
33	689	N	SoCal, HopperMtn NWR	30-Aug-13	trauma	
34	690	F	SoCal, South Potrero	14-Nov-13	trauma	predator trauma, suspected golden eagle
35	693	N	PNP	8-Sep-13	unk	
36	705	N	WCBP (captive)	17-May-13	bacterial infection	
37	708	N	VWS	12-Jul-13	trauma	
38	710	N	San Pedro Martir NP	18-Aug-13	pending	recovered 17Oct13
39	714	N	VWS	28-Aug-13	trauma	
40	715	N	VWS	30-May-13	unk	no carcass recovered

RED = new entry

*** : WCR**=Wild-CaptiveReared; **Ca**=Captive; **N**=Nestling (chick); **F**=Fledgling

412 = total population (31Dec2012) + hatchlings - deaths + 1 Baja (2012 newly discovered chick)

NOTE: 404 total birds 31Dec12;+ 47 hatchling + 1 Baja = 452

10 **= DIED THIS YEAR FROM LEAD TOXICOSIS**

5 = pending

25	= WCR
1	= Ca
9	= N
5	= F
40	

Wild Chicks and Fledglings

	count by	stud bk #	hatch date	hatch loc.	laid loc.	sex	status	fledge date	release date	sire	dam	rearing	foster f-sire	foster f-dam	NOTES
1	1	263	22-Jun-01	SoCal	LAZ	F	**dead**	cd	-	21	40	***foster***	**100**	**111/108**	died 25Jun01; LC01
2	1	271	11-Apr-02	SoCal	wild	M	**dead**	cd	-	100	108	parent	-	-	died 1Oct02; PC02
3	2	285	10-May-02	SoCal	wild	F	**dead**	cd	-	98	155	parent	-	-	died 13Oct02; UHC02
4	3	288	28-May-02	SoCal	wild	M	**dead**	cd	-	107	112	parent	-	-	died 21Oct02; LHC02
5	1	305	03-May-03	AZ	wild	M	**dead**	Oct-03	-	123	127	parent	-	-	died 26Mar05
6	2	308	10-May-03	SoCal	wild	M	**dead**	cd	-	125	111	parent	-	-	died 24Sep03; BM03
7	1	326	09-Apr-04	SoCal	wild	M	flying	2-Nov-04	-	107	161	parent	-	-	LowerHopperCyn nest
8	2	328	11-Apr-04	SoCal	wild	M	flying	-	3-Oct-07	21	192	parent	-	-	BigNarrows nest; to LAZoo, micro trash & broken wing 18Aug04; fr LAZ 13Mar07 to BCFP; rel BC; **NOT WILD FLEDGED**
9	3	333	22-Apr-04	SoCal	wild	M	**dead**	cd	-	125	111	parent	-	-	died 17Aug04; KR04
10	4	342	10-May-04	AZ	wild	M	flying	Oct-04	-	114	149	parent	-	-	
11	5	350	22-May-04	AZ	wild	M	flying	Nov-04	-	122	119	parent	-	-	
12	1	370	22-Apr-05	SoCal	SDWAP	F	flying	-	24-Oct-07	7	31	***foster***	**21**	**192**	LAZoo, micro trash, 18Aug05; fr LAZ 13Mar07 to BCFP; rel BC **NOT WILD FLEDGED**
13	2	386	19-May-05	SoCal	wild	M	**dead**	cd	-	125	111	parent	-	-	died 25Aug05
14	3	389	28-May-05	AZ	wild	F	flying	Nov-05	-	114	126	parent	-	-	
15	4	392	05-Jun-05	AZ	wild	M	flying	Nov-05	-	123	127	parent	-	-	
16	1	396	25-Mar-06	SoCal	wild	unk	**dead**	cd	-	107	161	parent	-	-	died 16Jun06; LHC06
17	2	412	01-May-06	SoCal	LAZ	M	**dead**	22-Oct-06	-	42	39	***foster***	**237**	**214**	FW406; PC06; to LAZ 9May11 medical; euthanized 24Jan12
18	1	428	26-Mar-07	SoCal	wild	F	**dead**	29-Aug-07	-	21	192	parent	-	-	WC13; AB07"Wanderer"; died 4Sep13
19	2	429	8-Apr-07	VWS	LAZ	F	**dead**	26-Sep-07	-	1	43	***foster***	**168**	**208**	missing 4Dec07
20	3	437	20-Apr-07	Baja	wild	unk	**dead**	cd	-	261	217	parent	-	-	died 21May07
21	4	441	28-Apr-07	AZ	wild	M	flying	24-Oct-07	-	134	210	parent	-	-	
22	5	443	03-May-07	SoCal	wild	F	**dead**	Sep-07	-	107	161	parent	-	-	found 16Nov07; mort. signal 30Oct07
23	6	444	5-May-07	VWS	LAZ	F	flying	22-Oct-07	-	33	68	***foster***	**167**	**190**	
24	7	449	12-May-07	SoCal	wild	F	flying	5-Dec-07	-	206	255	parent	-	-	WC17;
25	8	450	15-May-07	SoCal	wild	F	**dead**	10-Nov-07	-	135	52	***foster***	**111**	**125**	died 12Dec08
26	9	459	06-Jun-07	AZ	wild	F	**dead**	Dec-07	-	114	126	parent	-	-	missing 5Dec10
27	1	462	28-Mar-08	SoCal	LAZ	M	flying	4-Nov-08	-	33	68	***foster***	**247**	**79**	LA108; HB08
28	2	470	12-Apr-08	VWS	LAZ	M	flying	Oct-08	-	1	43	***foster***	**204**	**222**	
29	3	472	16-Apr-08	AZ	wild	M	**dead**	16-Oct-08	-	123	127	parent	-	-	died 4Jan10
30	4	474	21-Apr-08	SoCal	WCBP	F	**dead**	18-Oct-08	-	99	88	***foster***	**107**	**161**	died 7Mar09
31	5	475	21-Apr-08	VWS	WCBP	M	**dead**	Oct-08	-	71	56	***foster***	**194**	**171**	died 20Dec08
32	6	476	21-Apr-08	AZ	wild	unk	**dead**	25-Oct-08	-	187	133	parent	-	-	missing 15Mar11
33	7	477	22-Apr-08	VWS	wild	M	flying	Oct-08	-	199	231	parent	-	-	
34	8	482	30-Apr-08	SoCal	wild	M	flying	-	10-Nov-09	98	289	parent	-	-	LAZoo microtrash 22Sep08; fr LAZ 21Jul 09 BCFP; rel BC **NOT WILD FLEDGED**
35	9	489	13-May-08	SoCal	wild	M	flying	1-Oct-08	-	237	214	parent	-	-	FW408; PC08
36	10	493	26-May-08	SoCal	wild	F	flying	22-Nov-08	-	125	111	parent	-	-	FW508; KR08
37	1	499	28-Mar-09	VWS	WCBP	F	**dead**	22-Sep-09	-	60	166	***foster***	**167**	**190**	090Sixu1; died 15Nov11
38	2	501	3-Apr-09	VWS	WCBP	F	**dead**	30-Sep-09	-	27	139	***foster***	**194**	**171**	09Taki1; died, not recovered Nov2013
39	3	503	4-Apr-09	VWS	LAZ	F	**dead**	cd	-	33	68	***foster***	**168**	**208**	LA209; died 7Jul09
40	4	509	12-Apr-09	SoCal	wild	M	flying	24-Sep-09	-	107	161	parent	-	-	FW109
41	5	514	18-Apr-09	PNP	LAZ	M	flying	17-Oct-09	-	120	95	***foster***	**313**	**303**	LA409
42	6	515	18-Apr-09	AZ	wild	unk	**dead**	11-Nov-09	-	114	126	parent	-	-	AZ0109; mising 26Dec09
43	7	526	4-May-09	SoCal	wild	F	flying	15-Oct-09	-	21	192	parent	-	-	FW209
44	8	527	7-May-09	AZ	wild	unk	**dead**	Oct-09	-	122	210	parent	-	-	AZ0209; missing 21Jul09

Wild Chicks and Fledglings

	count by	stud bk #	hatch date	hatch loc.	laid loc.	sex	status	fledge date	release date	sire	dam	rearing	foster f-sire	foster f-dam	NOTES
45	9	531	7-May-09	Baja	wild	unk	**dead**	cd	-	269	284	parent	-	-	BA109; died 22Oct09
46	10	533	15-May-09	SoCal	wild	unk	**dead**	cd	-	98	289	parent	-	-	FW409; died 17Jun09
47	11	538	23-May-09	VWS	wild	F	flying	Oct-09	-	209	236	parent	-	-	BS409
48	12	539	24-May-09	SoCal	wild	M	**dead**	cd	-	206	255	parent	-	-	FW509; died 8Sep09
49	13	546	01-Jun-09	SoCal	wild	F	**dead**	cd	-	125	111	parent	-	-	FW609; died 9Jul09
50	1	550	24-Mar-10	PNP	SDWAP	F	flying	-	31-Oct-11	221	264	***foster***	**318**	**317**	WAP1003; to LAZ 12May10; to PNM 18Aug11; rel PNM **NOT WILD FLEDGED**
51	2	555	7-Apr-10	Baja	wild	unk	**dead**	cd	-	269	284	parent	-	-	BA110; died 29May10
52	3	556	7-Apr-10	SoCal	wild	M	**dead**	cd	-	247	79	parent	-	-	FW110; died 28Apr10
53	4	558	11-Apr-10	AZ	wild	unk	**dead**	20-Oct-10	-	114	126	parent	-	-	AZ110; missing 19Apr11
54	5	560	12-Apr-10	SoCal	wild	F	flying	27-Oct-10	-	125	111	parent	-	-	FW210: KR10
55	6	567	25-Apr-10	VWS	WCBP	M	flying	3-Nov-10	-	53	34	***foster***	**194**	**171**	10PIRU1; McWay
56	7	574	8-May-10	VWS	wild	M	flying	Nov-10		219	310	parent	-	-	VWS flock Apr2011
57	8	587	27-May-10	SoCal	wild	F	**dead**	cd	-	206	255	parent	-	-	FW310; died 13Jul10
58	1	595	24-Mar-11	PNP	OZ	F	CAPTIVE	-	-	73	37	***foster***	**318**	**317**	OZ01; *to LAZ fr PNM 5Aug11 Med*; permanent captive, flightless; **"DOLLY"**
59	2	598	7-Apr-11	PNP	WCBP	F	**dead**	16-Sep-11	-	60	166	***foster***	**313**	**375**	11Sixu1; died 8Dec12
60	3	599	8-Apr-11	SoCal	PNM	F	flying	23-Sep-11	-	219	317	***foster***	**247**	**79**	PN211, SP11;
61	4	603	9-Apr-11	VWS	OZ	F	CAPTIVE	-	-	348	155	***foster***	**251**	**222**	OZ03-11; PR11; *to LAZ fr VWS 21Jun11 Pb*; temporary captive; HCB
62	5	608	20-Apr-11	Baja	wild	F	**dead**	Oct 2011	-	269	284	parent	-	-	died 25Dec11
63	6	610	21-Apr-11	AZ	wild	F	flying	27-Oct-11	-	193	241	parent	-	-	
64	7	616	21-Apr-11	SoCal	wild	F	flying	28-Sep-11	-	107	161	parent	-	-	FW411, HC11
65	8	617	23-Apr-11	SoCal	WCBP	unk	**dead**	cd	-	99	88	***foster***	**21**	**192**	11Huya1, AB11, FW211; died 5May11
66	9	621	28-Apr-11	VWS	WCBP	unk	**dead**	cd	-	47	51	***foster***	**168**	**208**	BC11; died 29Apr11; 11Chuh1
67	10	633	10-May-11	AZ	wild	unk	**dead**	cd	-	187	133	parent	-	-	died 27Sep11
68	11	624	22-May-11	VWS	OZ	unk	**dead**	cd	-	90	121	***foster***	**167**	**190**	died 29May11; OZ11-1
69	12	634	27-May-11	AZ	wild	F	flying	20-Nov-11	-	234	280	parent	-	-	AZ0311;
70	13	627	28-May-11	SoCal	wild	M	flying	7-Dec-11	-	125	111	parent	-	-	FW511, KR11
71	14	629	6-Jun-11	SoCal	WCBP	unk	**dead**	cd	-	309	69	***foster***	**328**	**216**	SC11; 11KITS1; euthanized 2Oct11
72	15	630	8-Jun-11	SoCal	WCBP	F	**dead**	2-Dec-11	-	67	30	***foster***	**237**	**255**	PC11; 11TECU2, died 27Sep13
73	1	659	4-Apr-12	AZ	wild	unk	**dead**	cd	-	114	126	parent	-	-	VC12, AZ112; MIA 21Jul12
74	2	644	12-Apr-12	VWS	WCBP	M	**dead**	Oct-12	-	60	166	***foster***	**194**	**171**	MC12; 12SIXU1; died 10Nov12
75	3	675	19-Apr-12	Baja	wild	M	flying	Oct-12	-	361	373	parent	-	-	BA112, SA12; visual 4Feb13
76	4	646	20-Apr-12	VWS	wild	F	flying	-	-	167	190	parent			AC12; BS212; to LAZ 26Jul12; to VWS 7Jan14
77	5	648	22-Apr-12	SoCal	WCBP	F	flying	5-Oct-12	-	27	139	***foster***	**374**	**180**	TC12, 12TAKI1;
78	6	654	26-Apr-12	SoCal	WCBP	F	flying	24-Oct-12	-	61	70	***foster***	**247**	**79**	SP12, 12TENE1;
79	7	658	29-Apr-12	SoCal	wild	M	flying	5-Dec-12	-	206	370	parent	-	-	DG12, FW112;
80	8	663	30-Apr-12	VWS	wild	M	flying	Nov-12	-	209	236	parent	-	-	SC12, BS112
81	9	660	2-May-12	AZ	wild	unk	**dead**	cd	-	187	133	parent	-	-	GC12, AZ212; died 27Sep12
82	10	682	2-May-12	Baja	wild	F	flying	Nov-12	-	220	?	parent	-	-	BA212, 403M or 320M, visual 24Mar13
83	11	670	5-May-12	SoCal	wild	F	**dead**	Nov-12	-	239	289	parent	-	-	RC12, FW212; missing 12Aug13
84	12	674	7-May-12	AZ	wild	unk	**dead**	cd	-	287	210	parent	-	-	AZ0312, Tapeats Cyn, Grand Cyn
85	13	664	8-May-12	VWS	wild	F	flying	Oct-12	-	251	306	parent	-	-	PC12, BS412
86	14	665	17-May-12	VWS	wild	M	flying	15-Nov-12	-	62	93	***foster***	**168**	**208**	BC12, 12SULK1
87	15	671	28-May-12	SoCal	wild	unk	**dead**	cd	-	328	216	parent	-	-	SC12, FW512; died 16Aug12
88	16	672	23-Jun-12	SoCal	wild	unk	**dead**	cd	-	125	111	parent	-	-	KR12, FW612; died 28Sep12

Wild Chicks and Fledglings

	count by	stud bk #	hatch date	hatch loc.	laid loc.	sex	status	fledge date	release date	sire	dam	rearing	foster f-sire	foster f-dam	NOTES
89	1	693	2-Apr-13	PNP	wild	unk	**dead**	cd	-	219	310	parent	-	-	very remote; died 8Sep13
90	2	681	10-Apr-13	PNP	wild	unk	**dead**	cd	-	340	444	parent	-	-	LP11; died 13Apr13
91	3	683	10-Apr-13	SoCal	wild	M	flying	30-Aug-13	-	21	192	parent	-	-	AB13
92	4	690	15-Apr-13	SoCal	WCBP	M	**dead**	11-Nov-13	-	60	166	***foster***	**247**	**79**	SP13; 13SIXU1; died 14Nov13
93	5	710	15-Apr-13	Baja	wild	unk	**dead**	cd	-	269	248	parent	-	-	BA213; died 8Aug13, recovered 17Oct13
94	6	689	16-Apr-13	SoCal	wild	F	**dead**	cd	-	125	111	parent	-	-	KR13; died 30Aug13
95	7	686	17-Apr-13	VWS	WCBP	unk	**dead**	cd	-	138	84	***foster***	**194**	**171**	McWay13; 13HOSI1; died 1Jun13
96	8	694	23-Apr-13	SoCal	LAZ	M	flying	19-Oct-13	-	46	11	***foster***	**107**	**161**	HC13, LA713
97	9	719	30-Apr-13	AZ	wild	unk	flying	18-Nov-13	-	234	280	parent	-	-	AZ032013, 234/280, Grand Cyn; Battleship
98	10	723	2-May-13	AZ	wild	unk	flying	3-Dec-13	-	122	316	parent	-	-	AZ042013, 122/316, Grand Cyn; Tower of Ra
99	11	708	8-May-13	VWS	WCBP	unk	**dead**	cd	-	91	49	***foster***	**251**	**222**	13TOWA 1, Partington Cyn; died 12Jul13
100	12	722	10-May-13	AZ	wild	unk	flying	9-Oct-13	-	273	302	parent	-	-	AZ052013, 273M/302M/354F
101	13	712	19-May-13	SoCal	wild	M	flying	6-Nov-13	-	63	147	parent	-	-	OD13
102	14	714	20-May-13	VWS	wild	unk	**dead**	cd	-	167	190	parent	-	-	BS313, Anderson Cyn; died28Aug13
103	15	715	21-May-13	VWS	wild	unk	**dead**	cd	-	345	400	parent	-	-	BS413, Avila Ranch; died May2013
104	16	720	21-May-13	AZ	wild	unk	**dead**	-	-	158	346	parent	-	-	AZ062013, 158/346, Kiaibab; died Feb14
105	17	717	30-May-13	SoCal	wild	F	flying	17-Nov-13	-	237	255	parent	-	-	PC13
106	1	729	22-Mar-14	VWS	wild	unk	chick	-	-	168	208	parent	-	-	Big Creek, BS414
107	2	pnp114	25-Mar-14	PNP	wild	unk	chick	-	-	219	310	parent			PNP114,TR14

Count of	hatch location					
status	AZ	Baja	PNP	SoCal	VWS	Total
CAPTIVE			1		1	2
chick			1		1	2
dead	12	5	3	26	12	58
flying	10	2	2	21	10	**45**
Total	22	7	7	47	24	107

flying fledged*

Count of	status				
sex	CAPTIVE	chick	dead	flying	Total
F	2		18	19	39
M			13	23	36
unk		2	27	3	32
Total	2	2	58	45	107

"flying" = fledged & usually in wild but occasionally in temporary captivity
"cd" = died as chick

total wild eggs 2001-2013 = **166**
hatched wild eggs = **74**
hatched zoo eggs in wild = **31**
total fledged = **62**
dead fledglings = **23** previous months May-Dec2013 in error
dead as chicks (cd) = **35**

***includes 3 birds in SoCal & 1 in PNP wild hatched but not wild fledged**

RED = new entry

Wild Population Statistics

Releases:
1988-92: SoCal – 15 Andean condors released, 1 died, 14 recaptured and released in South America
1992-93: SoCal – 13 California condors released: 6 died, 6 returned to permanent captivity. **2006**: No.79 RE-released back into wild on 29 November

ORIGINAL RELEASES - Captive Reared - - as of report date

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
1	98sc	118scD	114az	176azD	168v	60azCa	206sc	218ba	217ba	265p	297az	334azD	327azCa	367azD	372azD	413azD	63sc	505ba	597v	646v	1
2	99scCa	125sc	116azD	177azD	174scCa	70azCa	213scD	236v	220ba	266p	302az	337az	328sc	381az	378azCa	435az	496az	508ba	602p		2
3	100scD	129scD	119azD	182azD	175scD	74azD	214scD	237sc	261ba	269ba	314azD	338baD	359baD	383az	379az	442azD	498ba	548azD	606p		3
4	101scD	130scD	122az	184azD	178scD	82azD	215scD	238scD	267scD	270pD	315baD	344baD	361ba	384azD	380azCa	468ba	510ba	549ba	609az		4
5	102scD	131scD	123az	186azD	179vD	199v	216sc	239sc	268scD	279baD	320ba	354az	362ba	395ba	391azD	469ba	512scD	552az	611az		5
6	103scD	132scD	124azD	187az	180v	200vD	219v	240azD	272az	282azCa	321baCa	356vD	366azD	403ba	393azD	484azD	516az	553azD	615v		6
7	105scD	133azD	126az	191azD	181scD	201scD	222v	241az	273az	284ba	322baD	357vCa	368az	404azD	421pCa	486az	521az	554azD	626p		7
8	106scD	135scCa	127azD	193az	185scD	202scD	230vD	242v	274azD	286pD	323baCa	358scD	370sc	406ba	422pD	495ba	523az	551ba	628sc		8
9	107sc	136azD	128azD		188scD	204v	231v	243az	275az	291azD	324azCa	360sc	373ba	407baD	426azD	507sc	528az	559v	632sc		9
10	108scCa	142azD	134vD		189vCa	208v	233vD	245scD	276azD	293az	325baD	363vD	374sc	409az	430baD	511scD	529ba	561az	636sc		10
11	109scD	143scD	137vCa		190v	209v		246azD	277scD	294vD	329azD	364scD	390baD	414azD	436baD	513sc	530az	562ba	637sc		11
12	111sc	149azD	145vCa		192v	210azD		247sc	278pD	296az	330p	365sc	397scD	418p	446ba	518sc	541az	569v	640az		12
13	112scD	150azD	147v		194vD	212vD		248azD	280az	298vD	331azD	369sc	400p	420azD	447az	520az	545ba	571azCa	642sc		13
14	113scD	151azD	152scD		195azD	223azD		249azD	281azD	299azD	332pD	371azD	401p	431p	453az	525p	550p	572ba	643sc		14
15			153scD		196azD	224azD		250azCa	287p	300azD	335pD	375v	402scD	438p	454azD	532scD	563sc	573ba	647az		15
16			155scCa		197azD	227azD		251v	289scD	301vD	336pD	376vD	405p	448p	455az	534p	564p	577ba	653az		16
17			156sc		198azD	228azD		252azD		303vD	340p	377vD	408scD	451pD	460p	536scD	566v	581az6D	655az		17
18			158az		203az	232azD		253azD		304azD	343azD	387azD	411p	452sc	463p	537azD	568sc	582az	668az		18
19			161v		207azD	234az		254vD		306pD	345pD	353azD	417pD	457sc	466azD	542sc	570sc	583v			19
20			162az		211azD	235azD		255sc		307pD	346az		423az	458scD	467sc	543p	576sc	586az			20
21			164vD					256vD		312pD	347azD				478pD	547p	584sc	590sc			21
22			165azD					257azD		313pD	349az				480sc		585sc	591scD			22
23			167v					258azD		318vD	351p				481p		588pD	592azD			23
24			169azD					259baD			352azD				482scD		589p	593az			24
25			170vD					260vD							483sc			594sc			25
26			171v					262sc							485azD			596sc			26
27															487sc			601az			27
28																		604sc			28
29																		605v			29
30																		619v			30
31																		620v			31
32																		625sc			32
SoCal	14	8	4	0	6	2	5	7	4	0	0	5	6	3	5	7	8	6	6	0	**109**
Pinnacles	0	0	0	0	0	0	0	0	2	8	7	0	5	5	6	4	4	0	3	0	**44**
Ventana	0	0	9	0	7	6	5	6	0	5	0	6	0	0	0	0	1	6	2	1	**53**
Baja	0	0	0	0	0	0	0	2	3	3	6	2	5	4	3	3	4	8	0	0	**43**
Arizona	0	6	13	8	7	12	0	11	7	7	11	6	4	8	13	7	7	12	7	0	**146**
TOTAL	**14**	**14**	**26**	**8**	**20**	**20**	**10**	**26**	**16**	**23**	**24**	**19**	**20**	**20**	**27**	**21**	**24**	**32**	**18**	**1**	**395**
wild	3	1	11	2	5	5	5	11	8	6	8	6	12	12	12	14	22	25	18	1	**187**
captive	2	1	3	0	2	2	0	1	0	1	3	1	1	0	3	0	0	1	0	0	**26**
died	9	12	12	6	13	13	5	14	8	16	13	12	7	8	12	7	2	6	0	0	**182**

original release sites: sc=SoCal, az=Arizona, ba= Baja, v=Ventana, p=Pinnacles d=dead Ca=Captive NOTE: sb# 163 & 173 never assigned to a live bird 395
NOTE: totals are 1992 thru present

Wild Population Statistics

DEATHS - Free Flying Birds - Released & Fledged (Nestlings & Captive excluded) - - as of report date - - from 1992

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
1	-	109sc	103sc	143sc	113sc	74az	132sc	100sc	w170v	176az	y164v	119az	136az	u134v	127az	195az	t64sc	s246az	133az	257az	1
2		118sc	128az	152sc	124az	82az	201sc	186az	179v	279ba	235az	149az	227az	w238sc	w286p	331az	w112sc	253az	194v	393az	2
3			129sc	w153sc	130sc	101sc	215sc	212v	198az	300az	249az	196az	i232az	276az	w303v	359ba	213sc	298v	210az	537az	3
4			w131sc	169az	175sc	102sc	228az	233v	x200v		h291az	c224az	w245sc	278p	329az	397sc	w214sc	314az	239sc		4
5			142az	177az	178sc	105sc	230v	240az	202sc		305azF	248az	301v	281az	358sc	408sc	223az	318v	274az		5
6			151az		185sc	106sc		252az	254v		347az	259ba	307p	w336p	372az	414az	s270p	322ba	299az		6
7					188sc	116az		258az	256v			277sc	x325ba	344ba	391az	420az	294v	381az	306p		7
8						150az			260v			304az	356v	377v	404az	436ba	364sc	w412scF	312p		8
9						165az			267sc			315ba	390ba	384az	422p	454az	366az	430ba	313p		9
10						181sc			268sc			338ba	417p	402sc	h426az	458sc	367az	442az	332p		10
11						182az						353az	429vF	407ba	474scF	459azF	387az	466az	334az		11
12						184az						m363v	443scF	450scF	515azF	472azF	499vF	478p	335p		12
13						191az						376v		475vF	527azF	485az	558azF	548az	343az		13
14						197az										511sc	608baF	552az	345p		14
15						207az										532sc		554az	352az		15
16						211az												588p	371az		16
17																		598pF	413az		17
18																		644vF	w428scF		18
19																			451p		19
20																			484az		20
21																			501vF		21
22																			512sc		22
23																			536sc		23
24																			553az		24
25																			581az		25
26																			591sc		26
27																			592az		27
28																			630sc		28
29																			670sc		29
30																			690scF		30
SoCal	-	2	3	3	6	5	3	1	3	0	0	1	2	3	2	5	5	1	8	0	**59**
Pinnacles											0	0	2	2	2	0	1	3	7	0	**17**
Ventana							1	2	6	-	1	2	3	3	1	0	2	3	2	0	**26**
Baja										1	0	3	2	2	0	2	1	2	0	0	**13**
Arizona			3	2	1	11	1	4	1	2	5	7	3	3	8	8	5	9	13	3	**86**
TOTAL	**0**	**2**	**6**	**5**	**7**	**16**	**5**	**7**	**10**	**3**	**6**	**13**	**12**	**13**	**13**	**15**	**14**	**18**	**30**	**3**	**201**

sc=SoCal, az=Arizona, ba= Baja, v=Ventana, p=Pinnacles (original site) u=died in AZ w=died at LAZoo x=died at SDWAP t=died in Baja F=fledged
y=HMNWR m=MA&EC c=WCBP h=died in Utah i=Phoenix Zoo s=died at Liberty Wildlife NOTE: totals are 1992 thru present

Wild Population Trend - including fledglings & chicks (Running Totals: present year as of report date, previous years as of Dec 31)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010**	2011[M]	2012	2013	2014
California					22	17	16	22	23	23	23	-	-	-	-	-	-	-	-	-
SoCal (rel'd)	21	27	27	24								24	31	31	34	22	44	52	52	52
VWS (rel'd)			7	7								29	24	22	20	20	20	20	22	23
PNP (rel'd)											13	13	16	20	25	28	32	31	25	26
chicks							(1)	(3)	(2)	(3)	(2)	(2)	(9)	(10)	(13)	(6)	(8)	(11)	(12)	2
Wild-fledged										1	1	2	6	11	16	16	22	28	26	28
CA Total	21	27	34	31	22	17	16	22	23	24	24	**68**	**77**	**84**	**95**	**86**	**120**	**129**	**125**	**131**
Baja (rel'd)									5	7	12	11	8	15	18	19	18	27	27	27
chicks													(1)	(0)	(1)	(1)	(1)	(2)	(1)	0
Wild-fledged													0	0	0	0	0	2	2	2
Baja Total									**5**	**7**	**12**	**11**	**8**	**15**	**18**	**19**	**18**	**29**	**29**	**29**
Arizona (rel'd)		6	15	21	20	20	26	32	36	43	51	47	53	59	65	66	66	71	65	62
chicks									(1)	(2)	(2)	(0)	(2)	(2)	(2)	(1)	(3)	(3)	(4)	0
Wild-fledged									1	3	4	4	6	8	10	8	7	7	10	10
AZ Total		**6**	**15**	**15**	20	20	26	32	37	46	55	**51**	**59**	**67**	**75**	**74**	**73**	**78**	**75**	**72**
TOTAL	**21**	**33**	**49**	**46**	42	37	42	54	65	77	91	**130**	**144**	**166**	**188**	**179**	**214**	**236**	**229**	**232**

rel'd = captive reared released "1234" = questionable accuracy ** SoCal 17 birds cap. temp. for safety [M] = 5 Baja birds @ Mexicali Pb (n) = total chicks hatched in wild that year

Explanatory Notes

Numbers reported in the monthly status report should be treated as tentative data. These are based on the best information available each month from cooperators in the field and facilities. If a reporting error is discovered after posting online, no correction will be disseminated, unless the error is substantive. Occasionally, a missing bird will continue to be reported live each month until field personnel are satisfied that there is little likelihood it is still alive. For such individuals, the date last detected normally is presumed to be the date of death. Questions about these summaries should be directed to : steve_kirkland@fws.gov.

SB# - Condor Studbook number.

"CAPTIVE POPULATION" includes:
-birds captured from the wild prior to 1988 that are still in a captive facility (e.g., zoo)
-previously released birds returned to captivity permanently or for care and possible RE-release
-captive-hatched birds retained for captive breeding
-young birds held in breeding facilities in preparation for transfer to a field pen for release
-"mentor birds" from a captive facility transferred temporarily into a field pen to aid socialization of pre-release birds
-birds transferred from a captive facility to a field pen in preparation for initial release or RE-release

- LAZ is Los Angeles Zoo; SDZSP (San Diego Zoo Safari Park) is Zoological Society of San Diego; WCBP is World Center for Birds of Prey, The Peregrine Fund; OZ is Oregon Zoo; MZ is Mexico Zoo; V(VWS), BS (Big Sur) is Ventanna; P(PNP) is Pinnacles; SDZ is San Diego Zoo; SBZ is Santa Barbara Zoo.

“Released” (rel'd) refers to birds raised in captivity and introduced to the wild at a second location; and to birds captured prior to 1988 that were returned to the wild after 1995.

“RE-released” refers to previously released birds that were re-captured temporarily and held in field pens, or that were re-captured for long-time care or observation in breeding facilities, and that were later returned to the wild population.

"WILD POPULATION" includes:
-free-flying birds recently accounted for
-free-flying birds, assumed to be alive, although not recently accounted for
-nestlings in wild nests

"California" refers to combined birds of SoCal, Ventana, & Pinnacles National Park.

"So. Calif.""SoCal""sc" refers to birds originally released at sites from San Luis Obispo County to Ventura County by the U.S. Fish and Wildlife Service Hopper Mountain National Wildlife Refuge Complex.

"Central Calif." refers to birds originally released at sites north of San Luis Obispo County by the Ventana Wildlife Society **"VWS"** & Pinnacles National Monument **"PNM"** (presently National Park). Birds released in these two California release areas now freely intermingle.

“Baja Calif.” refers to birds originally released in Baja California, Mexico, by the Zoological Society of San Diego, the Centro de Investigación Científica y de Educación Superior de Ensenada, and the Instituto Nacional de Ecología.

"Arizona" refers to birds released by The Peregrine Fund in Arizona and that range in Arizona and other states east of California.

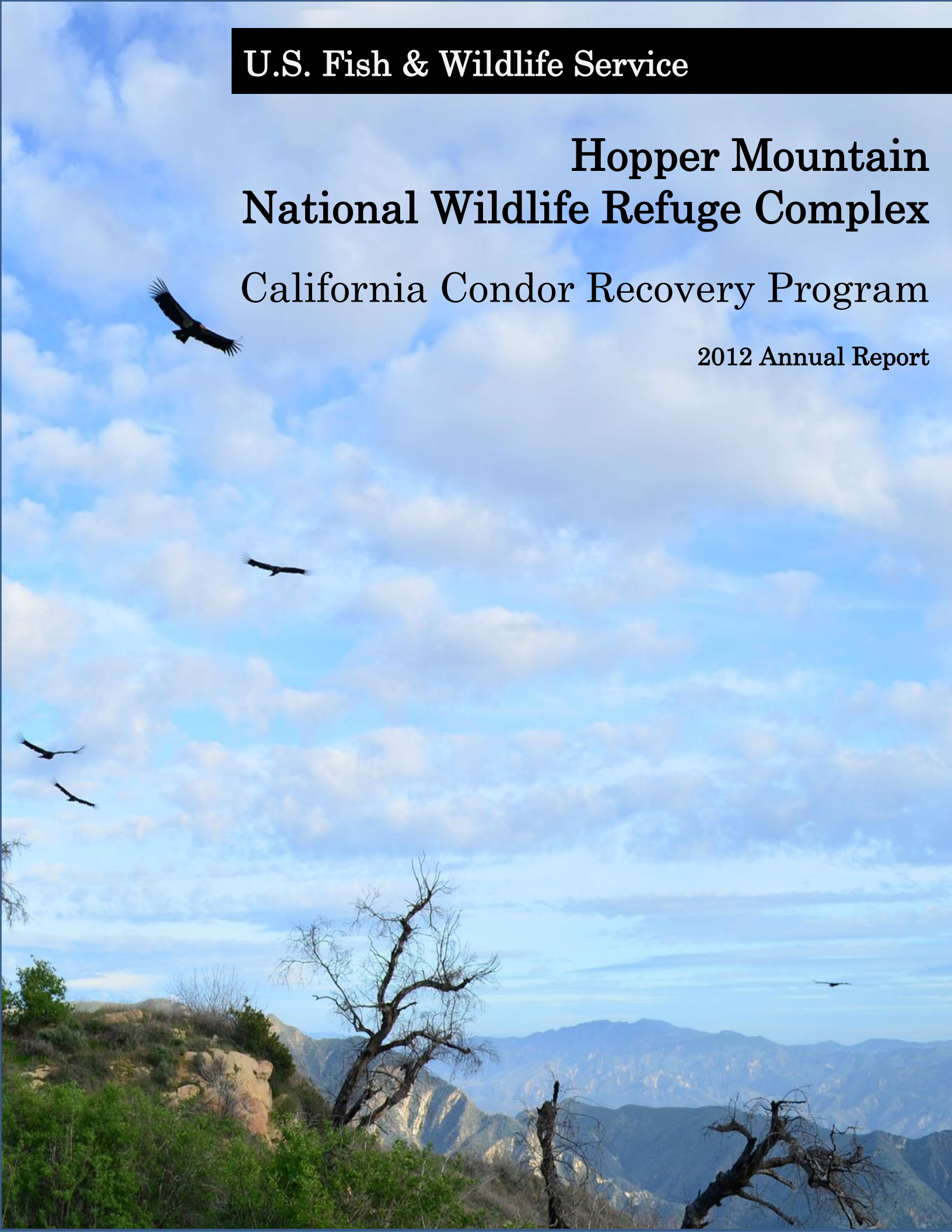
Mortalities requiring law enforcement investigation often will not be publicly reported immediately.

U.S. Fish & Wildlife Service

Hopper Mountain National Wildlife Refuge Complex

California Condor Recovery Program

2012 Annual Report



On the Cover: Condors soaring near Hopper Mountain NWR
Photo Credit: Ben Teton, USFWS Volunteer, 2012-2013

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Acknowledgements

The California Condor Recovery Program would not be possible without the support of our partners, volunteers, Hopper Mountain National Wildlife Refuge Complex staff, and others. Santa Barbara Zoo staff, Molly Astell and Ria Boner, located nests, observed nests, trained volunteers and staff on nest protocol, and assisted with camera system observations. Santa Barbara Zoo also provided the use of X-Ray equipment for non-proffered carrion studies, ongoing public outreach and California condor nesting behavior research. The Los Angeles Zoo condor keepers and veterinary staff including Mike Clark, Chandra David, Debbi Ciani, Jenny Schmidt, Nick Carey, Karl Hill and Curtis Eng provided treatment to the wild condor population, training of Service personnel on chick handling, and assistance with nest entries. Tejon Ranch (Rob Peterson and Chris Niemela), and Wind Wolves Preserve (David Clendenen) provided land access and condor sighting reports. The University of California Davis and Santa Cruz continued research on lead in California condors. James Rasico assisted the Service in tracking and monitoring of California condors, as well as locating non-proffered food sources. Ben Smith and Leland Brown with the Institute for Wildlife Studies led multiple lead-free hunter education events. Fred Workman, Law Enforcement with the Service conducted law enforcement activities on the refuges during hunting season. Volunteer efforts provided by Bill Langford, Carol Saunders, Julian Lange, Julie Kummel, Peggy Burbank, Rachel Wing, Roderick E. Lang, Stephanie Herrera, Vince Gerwe, Debbie Parisi, Amethyst Yale, Helen Johnson, Ron Dow, Steve Goltra, Suzanne Ruffner, Zac Hamber, Will Reed, Jan Hamber, Mike Matejcek, and Anthony Prieto. The Friends of the California Condor Wild and Free provided assistance with work projects and outreach. Volunteer interns, Sam Simmons, Matt Landever, Danny Raleigh, Caitlin Bowman, Ryane Cox, Chris Smith, Angela Woodside, Marian Wahl, Corinne Ross, Christina Varian, Marie McCann, Ben Teton, and Jerry Cole assisted in field management actions. Hopper Mountain NWR staff members Mike Brady, Ken Convery, Dan Tappe, Steve Kirkland, Irma Barraza, Min Windhorst, Ivett Plascencia, Janet Garcia, and Michael Woodbridge as well as California Condor Recovery Coordinator, John McCamman, assisted in various aspects supporting the field program. Barry Angel, Lee Hamrick, Daniel Chaplin, Charles Eldermire, and Tom Brooks assisted with the development of the remote camera systems. The Bear Valley Springs Home Association, Police and Fire Department, and Les and Millet Robinson assisted during behavioral modification actions at Bear Valley Springs. Ventura County Search and Rescue provided a helicopter to evacuate a California condor chick to Los Angeles Zoo veterinary staff for treatment and return it to its nest cavity. Nick Echevarrias allowed access across Wildlands Conservancy leased land during a condor trapping effort. James and Victoria Van Trees allowed biologists access their property to perform nest entries on adjacent lands. Benz Ranch, King's Ranch, Snedden's Ranch, Temescal Ranch, and Johanson's Ranch provided information regarding condor activity. Habitat Works and Los Padres Forest Watch conducted microtrash cleanups. Producer of Shadow of the Condor, Jeff McLoughlin, created a thorough documentary on the California condor recovery effort. We would also like to acknowledge all hunters using lead-free ammunition for proving a clean and safe food source for condors across their range.

Executive Summary

The Hopper Mountain National Wildlife Refuge Complex manages a reintroduced California condor population in Southern California. The Bitter Creek and Hopper Mountain National Wildlife Refuges are used as the primary management locations for the release, monitoring, and recapturing of condors in this region.

As of December 31, 2012 the condor population managed directly by the Service consisted of 69 free-flying condors. Four wild chicks fledged in 2012 with assistance from the Service and the Santa Barbara Zoo's Nest Guarding Program. In addition to the wild reproduction, 7 captive-bred condors were successfully released by the Service at Bitter Creek National Wildlife Refuge. The reintroduced condor population continues to recolonize its former habitat, exemplified by increased condor activity in the Northern Tehachapi and Southern Sierra Nevada Mountains.

The field team trapped the population twice during the year to monitor for lead exposure from lead shot carrion or gut piles and maintain transmitters on each condor. As a result, 10 condors, including one chick, required treatment for elevated blood lead levels.

There were 3 condor deaths in 2012 including a free-flying condor that was euthanized after becoming entangled on a large radio antenna and suffering a serious wing injury in 2011, and 2 chicks that died prior to fledging.

A significant event involving interactions between condors and humans took place in the Bear Valley Springs Community of the Northern Tehachapi Mountains. This event was mitigated through community outreach and hazing without having to capture any condors for behavioral reasons.

A remote nest camera system was developed and successfully installed into an active condor nest allowing for the first video archive of condor nesting activity to be used for behavioral research and outreach, including a new Service Facebook page entitled The Condor Cave. Other outreach activities included lead-free shooting demonstrations in partnership with the Institute for Wildlife Studies. This was the first time a lead-free shooting demonstration was conducted in Southern California.

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Introduction

The California condor is a federally listed endangered species. The current recovery priority ranking for the California condor is 4C. The "4" designation indicates that the California condor is a monotypic genus that faces a high degree of threat and has a low potential for recovery. The "C" indicates conflict with construction, development projects, or other forms of economic activity.

California condors are among the largest flying birds in the world, with a wingspan measuring up to 2.9 meters (9.5 feet). Condors are a long-lived species with an estimated lifespan of 60 years. They are slow to mature and typically begin to reproduce at 6 years of age. Condors often form long-lived pairs and fledge one chick every other year. If a nestling fledges relatively early (in late summer or early fall), its parents may nest again the following year (Snyder and Hamber 1985).

California condor habitat can be categorized into nesting, foraging, and roosting components (USFWS 1975). Condors forage in the open terrain of foothill grassland, oak savanna, and woodland habitats, and on the beaches of steep mountainous coastal areas when available. Condors maintain wide-ranging foraging patterns throughout the year, which is an important adaptation for a species that may be subjected to an unpredictable food supply (Meretsky and Snyder 1992). Condors at interior locations feed on the carrion of mule deer, tule elk, pronghorn antelope, feral hogs, domestic ungulates, and smaller mammals, while the diet of condors feeding on the coast also includes the carrion of whales, sea lions, and other marine species (Koford 1953; USFWS 1984; Emslie 1987; USFWS, unpubl. data). California condors are primarily a cavity nesting species and typically nest in cavities located on steep rock formations or in the burned out hollows of old-growth conifers (coastal redwood [*Sequoia sempervirens*] and giant sequoia trees [*Sequoiadendron giganteum*]) (Koford 1953; Snyder et al. 1986). Less typical nest sites include cliff ledges, cupped broken tops of old-growth conifers, and in several instances, nests of other species (Snyder et al. 1986; USFWS 1996). Condors repeatedly use roosting sites on ridgelines, rocky outcrops, steep canyons, and in tall trees or snags near foraging grounds or nest sites (USFWS 1984).

The U.S. Fish & Wildlife Service (Service) Hopper Mountain National Wildlife Refuge Complex (Complex) serves as the lead office for the California Condor Recovery Program (Recovery Program) and is one of many partners that support this multi-state and international recovery effort. Since 1992, the Complex has participated in the California condor reintroduction effort. The Service operated a number of different release sites both on refuges and on U.S. Forest Service lands and has released condors from the captive breeding facilities annually. Over time,

these releases led to the establishment of the Southern California condor population, the group of condors directly managed by the Complex's condor field team. Over the last 20 years, the field team has been responsible for the continued monitoring and management of the reintroduced population, working both on and off refuge. Today, 2 of the wildlife refuges from the Complex, Bitter Creek National Wildlife Refuge (Bitter Creek NWR) and Hopper Mountain National Wildlife Refuge (Hopper Mountain NWR) are the primary management locations for the Southern California condor population, which currently inhabits portions of Santa Barbara, Ventura, Los Angles, Kern, and Tulare Counties.

The California Condor Recovery Plan (Recovery Plan) provides the overarching guidance for field activities. The primary objective driving the reintroduction effort is the establishment of one of the 2 wild, self-sustaining populations of 150 individuals with 15 breeding pairs (USFWS 1996). The Recovery Plan consists of 5 key actions: 1) establish a captive breeding program, 2) reintroduce California condors into the wild, 3) minimize mortality factors, 4) maintain condor habitat, and 5) implement condor information and educational programs (USFWS 1984). In accordance with the Recovery Plan, "Released California condors should be closely monitored by visual observation and electronic telemetry" (USFWS 1984).

To support the second key action in the Recovery Plan, biologists monitor the free-flying population of condors to identify threats and reduce adverse effects to condors, including minimizing mortality factors. Each refuge provides facilities designated for trapping and holding condors, which is necessary for attaching tags and transmitters to condors and performing routine health checks. Another key action in the Recovery Plan is to minimize mortality factors in the natural environment. In accordance with the Recovery Plan, "Condor blood, feathers, eggshells, and other tissues will be collected opportunistically and analyzed for heavy metals, pesticides, and other potential contaminants" (USFWS 1984).

The field team is comprised of a number of different positions including Service employees, partner employees, and volunteers. In 2012, the Service employed one full-time permanent supervisory wildlife biologist, 2 full-time term wildlife biologists, 2 full-time term biological science technicians, and 1 part-time student biological science technician. The Santa Barbara Zoo employed 1 full-time nesting technician and the University of California, Davis funded a full-time junior specialist; both positions worked as members of the field team and assisted in conducting condor monitoring and management. In addition to the various staff positions, the Complex has 4 volunteer intern positions that are filled throughout the year. Individuals who volunteered for these positions committed to working 40 hours a week for 6 months for a stipend for each day worked. The field program also utilized a number of unpaid volunteers who primarily assisted with monitoring nests during the 8 month nesting season. A variety of support also came from other program partners. The

Los Angeles Zoo provided assistance in caring for sick and injured condors and helped during handling events and nest entries. The Friends of the California Condor Wild and Free helped with outreach events and project work such as building blinds or flight pen maintenance.

This annual report describes the activities conducted by the field team. Primary management operations undertaken by the field team are described in detail. The staff resources attributed to each operation are reported for the year. The outcomes of these activities are described and discussed.

1.0 Funding

In 2012, the Hopper Mountain Wildlife Refuge Complex Office received $523,924.00 in USFWS Recovery funds (1113). These resources were used to fund the field team and their activities as well as a programmatic condor coordinator position.
Refuge management funds (126x) were also used and contributed significantly to condor related activities.

2.0 Actions

2.1 Monitoring Resource Use

The loss and modification of California condor foraging, roosting and nesting habitat has been identified as a historic threat to the recovery of the species. As noted in the 1979 Recovery Plan (USFWS 1979), adequate nest sites, roost sites, and foraging habitat with adequate food are the basic habitat needs of the condor. The 1996 Recovery Plan (USFWS 1996) acknowledges the presence of sufficient remaining condor habitat in the Southwestern states but notes that maintaining this habitat is a key recovery action (USFWS 1996). The field team monitors nesting, roosting, and foraging habitat use across Southern California using data from global positioning system (GPS) transmitters attached to condors.

GPS transmitter locations are produced by solar-powered, patagial-mounted GPS transmitters (Argos/GPS PTT; Microwave Telemetry, Inc. ©, Columbia, Maryland) that are attached to a subset of individual condors during routine handling. Units are assigned to individuals of different sexes and age classes while also considering breeding status or captive release circumstances. Data from these transmitters show locations accurate to tens of meters for each condor at a frequency of 1-hour intervals. GPS transmitter locations are used to understand condor resource use over a large geographic and temporal scale. All California condors in Southern California are equipped with either 2

very high frequency (VHF) transmitters attached to a central rectrix (Kenward 1978) or a combination of one VHF and one patagial-mounted (Wallace 1994) GPS transmitter unit to ensure each condor can be tracked.

The field team monitors GPS transmitter locations daily in order to target locations of immediate interest for on-the-ground investigation, a process referred to as ground-truthing. Non-proffered feeding events and potential threats are prioritized for ground-truthing. A feeding event is confirmed by the presence of carrion. When possible, carrion is collected for further examination, including radiographing and dissection, at the Santa Barbara Zoo. Any metallic objects, including lead or other metals detected in this process are recovered and analyzed for ongoing research by the University of California, at Santa Cruz and Davis (Appendix I). When the field team identifies potential threats such as a lead exposure source, microtrash source, or habituation event, these areas can be targeted with outreach or management actions.

GPS transmitter locations also inform program-wide objectives via long-term research projects. Some of the ongoing research using this data includes evaluating the success of the Ridley-Tree Condor Preservation Act (Appendix I), monitoring condor distribution and activity across the landscape (Johnson et al. 2010; Cogan et al. 2012), and informing condor population viability analyses (Appendix I). Findings from these studies may inform management strategies and policy aimed at addressing lead-based ammunition and other threats to condor survival.

2.2 Lead Monitoring and Mitigation

Lead poisoning is an ongoing major concern for all condors, including those in the Southern California population. The Ridley-Tree Condor Preservation Act (2008) regulates the use of lead ammunition in California and may reduce the amount of lead-contaminated carrion available to scavengers throughout condor range. However, there is still potential for condors to encounter lead fragments from animals shot with lead ammunition (Finkelstein et al. 2012). The purpose of monitoring and mitigating lead exposure in California condors is to inform management and policymaking and prevent lead related mortalities.

Twice each year, the field team traps and handles the entire Southern California condor population to monitor blood lead levels and treat condors for lead exposure. Handling occurs once in early summer (starting in June) and again in late fall (starting in November). Some condors are tested opportunistically at additional times throughout the year when a lead exposure is suspected or when they are handled for other purposes and obtaining a blood lead level is possible. The field team also samples the blood lead levels of wild condor chicks during routine nest entries (see: Nest Management section). While handling each condor, biologists collect 3 blood samples from the medial metatarsal vein using blood vials containing EDTA. One sample is used immediately for field blood lead testing

using a portable lead analyzer. Condors with a field blood lead value below 35 µg/dL are released into the wild and all condors with a field blood lead value greater than or equal to 35 µg/dL are transported to the Los Angeles Zoo for treatment.

Treatment at the Los Angeles Zoo consists of radiographing the condor to identify possible metallic objects in the digestive system and chelation treatment to remove lead from the bloodstream. Chelation treatment consists of daily intramuscular injections of Calcium EDTA (calcium edetate) in conjunction with subcutaneous fluids. Treatment time varies between weeks to months depending on the level of lead exposure. Zoo technicians are able to identify metallic objects in radiographic images but are not able to determine the type or composition of these objects unless recovered. Los Angeles Zoo staff closely monitor condors with metallic-positive radiographs; they recover castings and fecal material and, when possible, remove metallic objects for analysis.

Additional blood samples collected from handling condors are refrigerated and sent to the California Animal Health and Food Safety Laboratory System at UC Davis for lab analysis of lead concentrations and the Microbiology and Environmental Toxicology Department at the University of California Santa Cruz for lead isotope analysis. In addition, feather samples collected from trapped condors are used to monitor lead exposure over long periods of time.

2.3 Detecting Mortalities

Identifying the causes of California condor mortalities is an important aspect of California condor recovery. Despite decades of research, the reasons for the species' decline in historic populations are poorly documented. Understanding the factors contributing to mortalities in the reintroduced wild populations is essential to the conservation of the species (Rideout et al. 2012). It is important to quickly identify and locate dead condors in order to determine the cause of death and detect any immediate threats. Detection of mortalities by radio telemetry and GPS monitoring is one of the highest priority operations occurring in the field program.

The field team usually detects condor mortalities using VHF transmitters attached to each condor. All deployed VHF transmitters have an automatic mortality signal function. After a 12-hour period of inactivity, the VHF transmitter will emit a beep with a frequency about twice as fast as the normal rate, also called a mortality signal. When a mortality signal is detected it can indicate the VHF transmitter has fallen off the condor via a molted feather, the condor has not moved for some time (mortality signals can occur in the morning before the condor has moved from its roost), or the condor is dead. When reviewing condor GPS transmitter locations, stationary GPS transmitter locations for a single condor over an unusually long period may indicate a mortality.

Condors are monitored throughout the day using radio telemetry at both

Hopper Mountain NWR and Bitter Creek NWR. If a condor is undetected for more than one week, the field team will expand their search for the missing condor by mobile tracking. Mobile tracking involves driving to various off-refuge locations within Southern California condor range to detect a signal for the missing condor.

Condor chick mortalities are detected during routine nest monitoring (see: Nest Management section). Monitoring nests regularly allows biologists to identify chick mortalities immediately or shortly after they occur. Condor chick carcasses are transferred to the San Diego Zoo Pathology Lab for postmortem examination in order to determine cause of death.

2.4 Nest Management

Nesting in the Southern California condor population of began in 2001. Between 2001 and 2006, only 2 condor chicks fledged from 16 nests. The field team identified the leading cause of nest failure as the consumption of small, human-made materials, also called microtrash, brought to nests by parent condors. Documented microtrash items include nuts, bolts, washers, copper wire, plastic, bottle caps, glass, and spent ammunition cartridges (Mee et al. 2007; Walters et al. 2010). When chicks ingest large quantities of these items it can result in digestive tract impaction, evisceration, internal lesions, and death (Grantham 2007; Snyder 2007; Rideout et al. 2012). In 2007, the Service partnered with the Santa Barbara Zoo to create an intensive nest management strategy, the California Condor Nest Guarding Program. This program is modeled after a nest guarding program for the endangered Puerto Rican Parrot (Lindsey 1992). Nest guarding combines monitoring nests to detect threats to thwart nest failure. The goals of the California Condor Nest Guarding Program are to identify the leading causes of nest failure and to increase the number of wild fledged condor chicks in Southern California.

The field team locates nests using visual observations, radio telemetry, and ground-truthing GPS transmitter locations of breeding age condors early in the nesting season (Mee et al. 2007; Snyder et al. 1986). The field team first identifies pairs by tracking courtship behaviors. Existing pairs will often re-nest in previously used cavities or in cavities located nearby. A nest is identified by visual confirmation of an egg. In the case of difficult-to-view cavities, nests are not confirmed until biologists enter the cavity to check the fertility of the egg.

Nests are observed at frequencies based on their accessibility and visibility. Typically, each nest is observed for 2 hours 3 to 4 times per week. More remote nests are observed less frequently or not at all. Nest cavities that are not fully visible are monitored for attendance using radio telemetry or GPS transmitter locations. While nests are primarily monitored through direct field observations, a nest camera system was piloted this season to facilitate closer and more frequent monitoring (see: Appendix II).

Active nests are routinely entered by specially trained biologists to monitor the status of the egg or chick, and to sift for and remove microtrash. Biologists enter nests once during the egg stage to check the egg's fertility. During the chick stage, the nest is entered when the chick is 30, 60, 90, and 120 days old. During each nest entry, biologists give the chick a health exam. The chick's stomach and crop are palpated for foreign bodies or blockages. Biologists take a blood sample, weight, and tail feather length measurement to assess the chick's development and overall health. In addition to the health exam, the nest is sifted for any foreign material. At 30, 60, and 120 days of age, the chick is vaccinated for West Nile virus. The 120-day nest entry is normally the last nest entry to discourage possible premature-fledging. During this entry, the chick is fitted with a patagial tag and VHF transmitter.

Nest interventions take place when problems arise or when pair history dictates preventative measures should be taken to ensure success. During the egg stage, nonviable eggs are removed and replaced with dummy eggs until a captive-laid viable egg can be switched with the dummy egg prior to hatching. Additional interventions occur as needed to mitigate threats detected during observations. In the event of a nest failure, biologists enter the nest to recover the remains of the egg or chick. Chick carcasses are submitted to the San Diego Zoo Pathology Lab for necropsy.

When chicks fledge, they are closely monitored much like newly released captive-bred condors (see: Captive Releases and Transfers section), to ensure they are integrating into the population and displaying normal behavior.

2.5 Captive Releases and Transfers

During the fall season of each year, the field team releases captive-bred juvenile California condors into the wild at Bitter Creek NWR. The purpose of releasing captive-bred condors is to augment the wild population, offset mortalities that occur in the wild, and ensure genetic diversity in the Southern California population of condors.

The California condor is one of many endangered species managed to maximize the genetic diversity present in the original population, minimize genetic loss, and emphasize optimal productivity (Ralls and Ballou 2004; USFWS 1996). As outlined in the 1996 Condor Recovery Plan (USFWS 1996), productivity must be increased beyond the California condor intrinsic rate of reproduction through a captive breeding program (USFWS 1996). Captive-bred California condors selected for release in the wild must be physically and behaviorally healthy, have been successfully socialized with other release candidates, have been kept in isolation from humans to prevent taming, and have undergone aversion training to condition avoidance of humans and manmade structures (USFWS 1996). In addition to juvenile captive-bred releases, the field team releases adult California condors deemed no longer valuable as breeders or mentors.

Prior to release, condors spend time in a flight pen (or captive enclosure) at Bitter Creek NWR to allow time to transition from the breeding facility into the wild. Pre-release condors will spend at least 6 weeks in a flight pen on the refuge. This extended period in the flight pen allows the pre-release condors to become familiar with their new surroundings and interact with wild condors perching or feeding nearby. During this time, the field team monitors pre-release condors 2 to 4 days per week during 4-hour observations in order to examine and record social behavior and physical health. On the day prior to release, biologists place identification tags and VHF transmitters on each condor and move condors into a secondary enclosure within the flight pen.

The field team typically releases California condors during the fall months because the weather is cooler and there are fewer thermal updrafts of air. These weather conditions are conducive to keeping newly released condors close to the release site and to supplemental food and water sources while they are learning to fly.

Condors are usually released in pairs to encourage socialization. Supplemental carrion is provided near the release pen in order to lure other free-flying condors in to feed and interact with the new releases. The newly released condors are monitored closely for a minimum of 30 days. Additional releases take place only after the previously introduced condors roost appropriately off the ground and become familiar with the location of water and supplemental feeding sites. Supplemental feeding is an integral component of the condor release program (USFWS 1996). Supplemental food and water act as a substitute for the parental care that the released condors would have received had they fledged from a wild nest.

The field team will trap a newly released condor and return it to captivity (temporarily or permanently) if it exhibits unfavorable or dangerous behavior in the wild. This behavior includes approaching humans, not socializing with other condors, and/or the inability to locate supplemental carrion.

2.6 Behavioral Modification

The California condor is an inquisitive species whose range overlaps with human development. The inevitability of this overlap leads to the potential for isolated incidences of habituation. Condors that have become overly habituated to human activity and structures are at greater risk to behavioral conditioning, which ultimately affects their ability to survive in the wild. A habituated condor may also cause other condors to become habituated given the social nature of the species. In some cases, condors have caused property damage at habituation sites. Condors can also jeopardize human safety in the event a habituated condor approaches people.

Cade et al. (2004) grouped undesirable behavior into 3 categories. Type I behavior is considered normal and is categorized by condors remaining at least 15 meters from people, exploring anthropogenic objects infrequently, landing on manmade structures limited

to those that resemble natural perches or offer adequate protection from predators, and abandoning the undesirable behavior after 1-2 deterrence activities, i.e., "hazing" or "aversion training" (Cade et al. 2004). Hazing is defined as "an activity directed at a condor by humans in attempt to discourage a behavior" while aversion training is defined as "making an undesirable activity or behavior unpleasant without direct human interaction" (Grantham 2007).

Type II behavior is an "intermediate category", and is exemplified by condors "landing or flying closer than 15 meters to humans, but maintaining an 'individual distance' when approaching or being approached by humans" and "circumventing humans when investigating their belongings, allowing close human approach only when a clear escape route is present" and "fleeing when hazed" (Cade et al. 2004).

Type III behavior is of utmost concern, and "consists of condors allowing close human approach when no escape route is present (no fear of being boxed in), seeking out and initiating contact with humans, allowing touching and handling (including capture)" and "not responding to hazing, and showing no fear of humans" (Cade et al. 2004). These types of behaviors have been observed in similar vulture species in the United States including the black vulture [*Coragyps atratus*] (Lowney 1999).

While Type I and Type II behavior are considered normal exploratory and play activities that may be adaptations related to foraging and the social nature of the species, these behaviors may lead to the development of Type III behaviors. In turn, case studies have shown that Type III behavior can be changed to Type I or Type II behavior by hazing the individual or temporarily removing the offending individual from the population, though this is not effective in every situation (Cade et al. 2004).

Although lowest on the undesirable behavior spectrum, even Type I behaviors can cause risks to condors. While this category is not associated with approaching humans, it does result in condors approaching or landing on human structures. In many cases, these structures are hazardous because condors can become entangled or entrapped on or in structures or ingest poisonous household or industrial items, leading to injury or death (Figures 2.6.1 & 2.6.2).

Figure 2.6.1: Photo of condor #412 entangled and hanging from a communications tower in May 2011. The injuries from this incident were so severe the condor was euthanized.

The field team employs aversion training, hazing, and trapping of habituated condors as a means to

manage Type I and II behaviors and prevent Type III behaviors and subsequent injury to condors.

In the early stages of reintroducing condors into the wild, a number of mortalities were attributed to power line collisions and electrocution. As a result, mock power poles that delivered nonfatal electric shocks to any condor landing on the structure were constructed in pre-release flight pens. This aversion training has proved very effective in conditioning pre-release condors to avoid these structures once they join the free-flying population.

Field staff identify habituation sites and habituated condors using radio telemetry, GPS transmitter data, and visual monitoring, and responding to reports of condors engaged in undesirable behavior. Hazing, in combination with removing any potential attractants, has been effective at discouraging condor activity at many locations.

Figure 2.6.2: Photo of condor #63 covered in motor oil at Rancho la Cruz.

Hazing techniques include making loud noises, clapping and waving hands, using slingshots with non-injurious food items (e.g. grapes and gumdrop candies), spraying streams of water from hoses and water guns, and using restrained dogs. Hazing is an effective deterrent only when biologists are able to respond quickly and haze consistently. Inconsistent hazing can allow condors to develop a tolerance of the hazing techniques thereby making them less effective.

The capture of condors due to habituation issues is considered a last resort, but on rare occasions, is necessary for the safety of the individual condor or the benefit of the population. The capture of an individual is deemed necessary if the condor exhibits Type III behavior, exhibits Type II behavior and no longer responds to deterrence activities, or exhibits Type II behavior and the recurring stimulus presents an immediate risk of physical harm or death.

Access to the location where the undesired behavior is occurring is also an important factor. Without access to the affected individual, the only course of action to correct persistent or harmful undesirable behavior is to capture and remove that individual from the wild in an attempt to break the pattern of behavior. Often times, the captive condor is given a “time out” period, usually lasting a few months or longer, and then released back into the wild, on other occasions, the habituated condor’s behavior warrants a permanent return to captivity.

2.7 Outreach

The field team performs outreach in order to create awareness and educate the public about issues pertaining to California condor conservation in Southern California. Performing outreach for condors also helps further the Service's national goals of connecting people with nature and broadening awareness of endangered species conservation and the National Wildlife Refuge System.

The field team targets outreach to inform and educate the local hunting community about potential sources of lead exposure in the condor food supply and how these sources can be eliminated using lead-free ammunition. The field team coordinates with the Institute for Wildlife Studies (IWS) to conduct shooting demonstrations of lead-free ammunition, staff informational booths, and perform presentations at hunter education classes. In addition, the field team works with IWS to identify locations for events, organize outreach materials, setup demonstrations and displays, and attend events.

In other cases, outreach is targeted to help resolve an immediate management issue. A common example of this is providing information to communities and local residents within condor range where the potential for condor habituation with humans and human structures is likely. In these cases, the field team communicates need to the community, coordinates with residents to prevent habituation, organizes and prepares presentations, and travels to the community to present and discuss issues with residents.

The preservation of condor foraging habitat is a priority for condor conservation according to the Recovery Plan and the Complex's Comprehensive Conservation Plan (USFWS 1996; CCP). The field team strives to contact land managers within the species' range to encourage the use of lead-free ammunition when dispatching animals and to allow dead livestock to remain on their property. The field team also continues to provide outreach and information to government agencies in order to ensure they integrate information on condor biology and habitat use into land planning documents.

The field team performs a number of additional outreach activities with the intention of creating awareness and educating the public about condor conservation issues. The Service authorizes refuge tours, co-hosts events with program partners such as the Friends of the Condor Wild and Free, and presents to local schools. When possible, the Service accommodates media requests and contributes to several social media outlets and scientific publications.

3.0 Outcomes

3.1 Monitoring Resource Use

In 2012, almost 1/2 (n = 31) of the Southern California condor population wore GPS transmitters for at least part of the year. This number was lower than in 2011 (n = 36) because several transmitters failed and were not replaced. GPS transmitter locations included over 80,000 observations for 2011 and over 117,000 observations for 2012.

Relative condor activity across the landscape based on this subset of California condors spanned approximately 10,500 square miles. Condors ranged from the San Gabriel Mountains in the south to the lower Sierra Nevada Range in the north with concentrated activity around Hopper Mountain NWR, Bitter Creek NWR, Bear Valley Springs, and Tejon Ranch (Figure 3.1.1).

Relative condor activity across the landscape changed from 2011 both in expanse and areas most frequented. (Figure 3.1.1). Of particular note, the Northern Tehachapi Mountains were heavily used in 2012. Exploratory flights of condors wearing GPS transmitters were most common to the Southern Sierra Nevada and Sierra Madre Mountains. Nesting activity in 2012 was concentrated primarily near Hopper Mountain NWR (n = 4) with one nest on Hopper Mountain NWR and one nest near Bitter Creek NWR (Figure 3.1.2).

The field team confirmed 31 non-proffered feeding events in 2012 (Figure 3.1.3). Carrion items were collected from 17 of these feeding events. Thus far 9 carrion items have been radiographed and dissected. Metal fragments recovered from these items are being analyzed and the results are pending. The most common types of carrion were cow, deer, and pig (Figure 3.1.4). A junior conservation specialist employed by the University of California at Davis assisted in locating non-proffered feeding events and spent 20 hours per week ground-truthing suspected non-proffered feeding events. This position located 23 of the 31 feeding events.

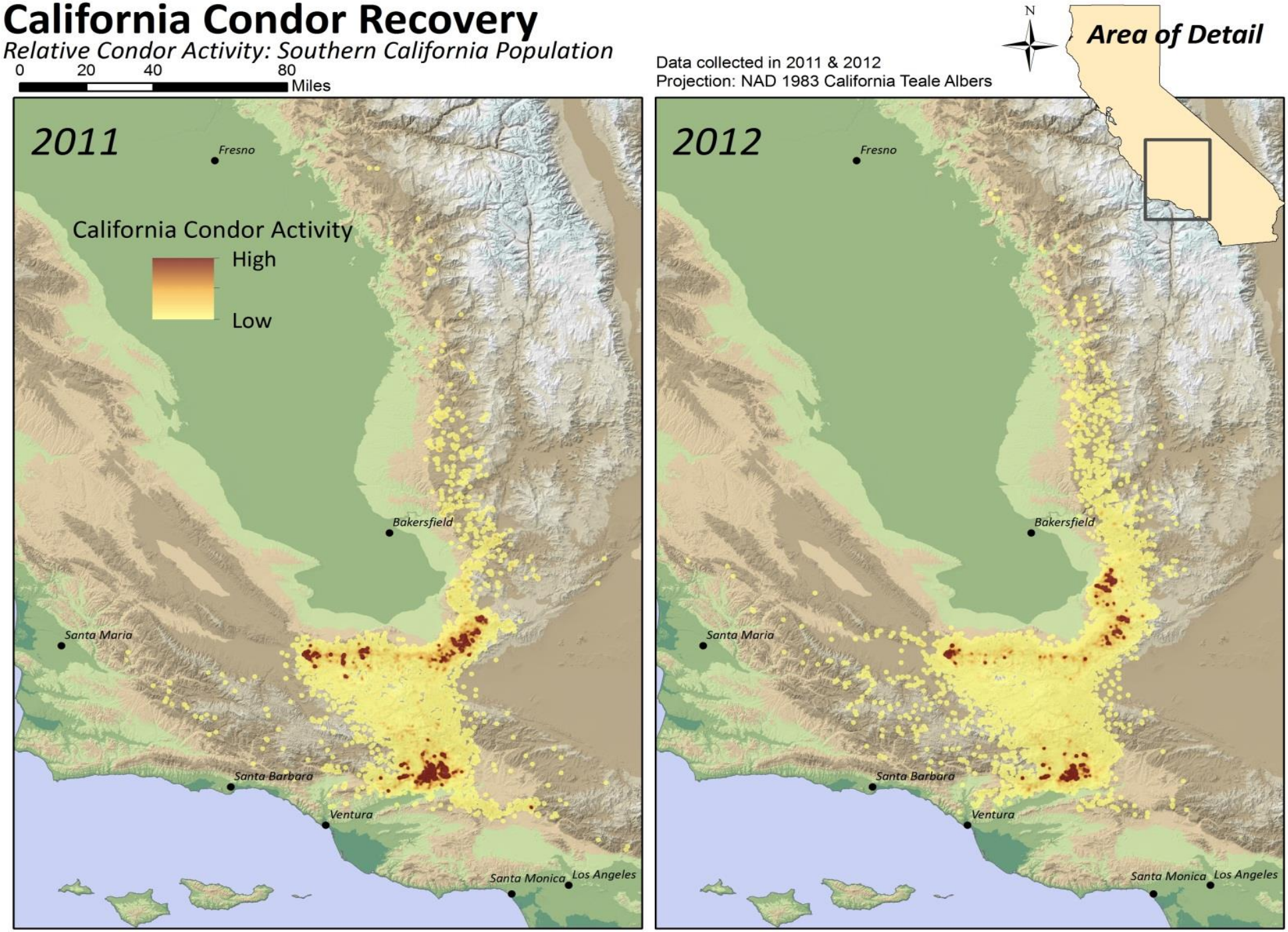


Figure 3.1.1: Relative condor activity in 2011 and 2012. Relative condor activity estimated using a fixed kernel density estimate (KDE) for all California condor wearing GPS transmitters in their respective years. KDE averaged across individuals for 2011 (n=36) and 2012 (n=31) using a neighborhood of one kilometer (cell size = 100 meters). N=80,382 observations (2011), 117,643 observations (2012).

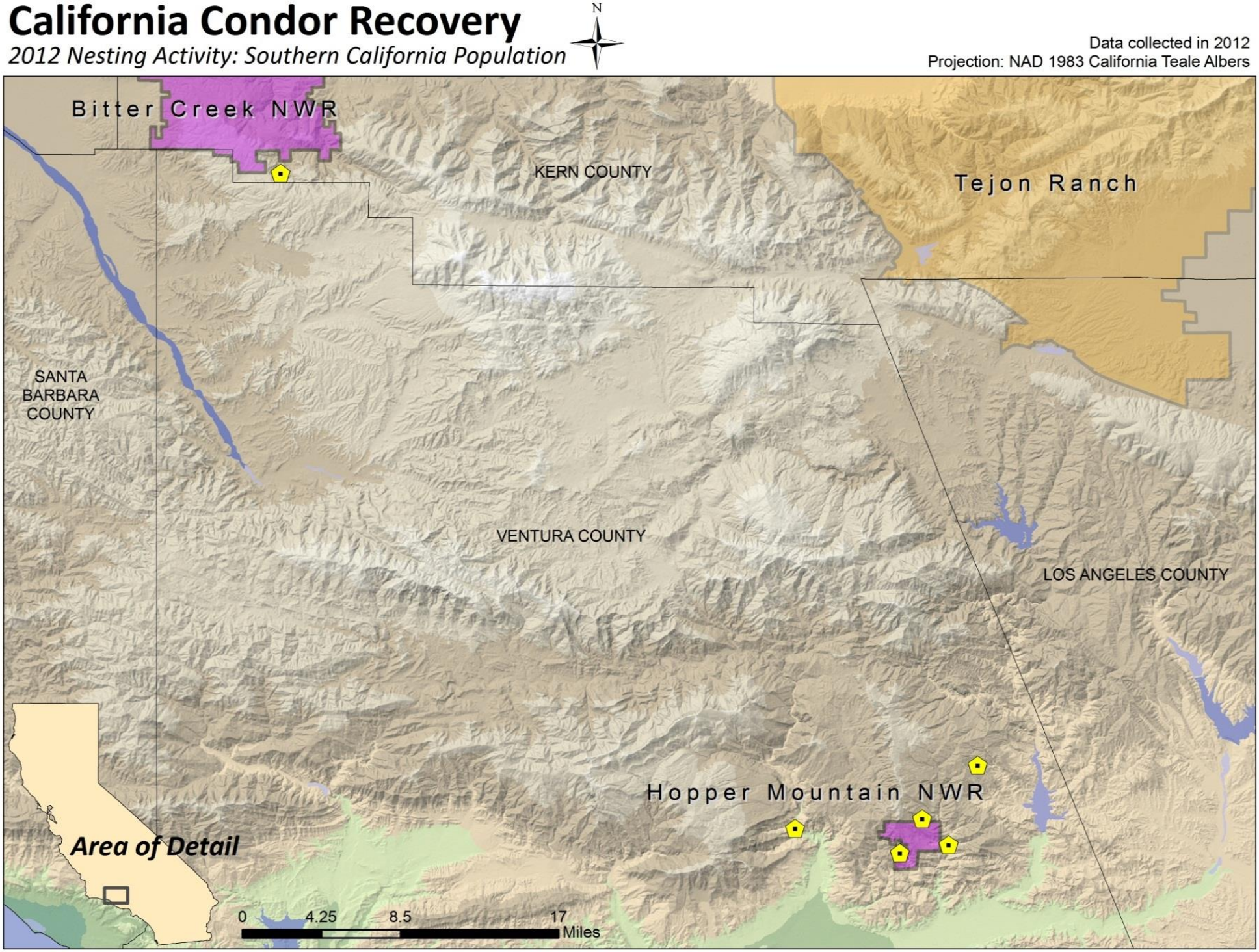
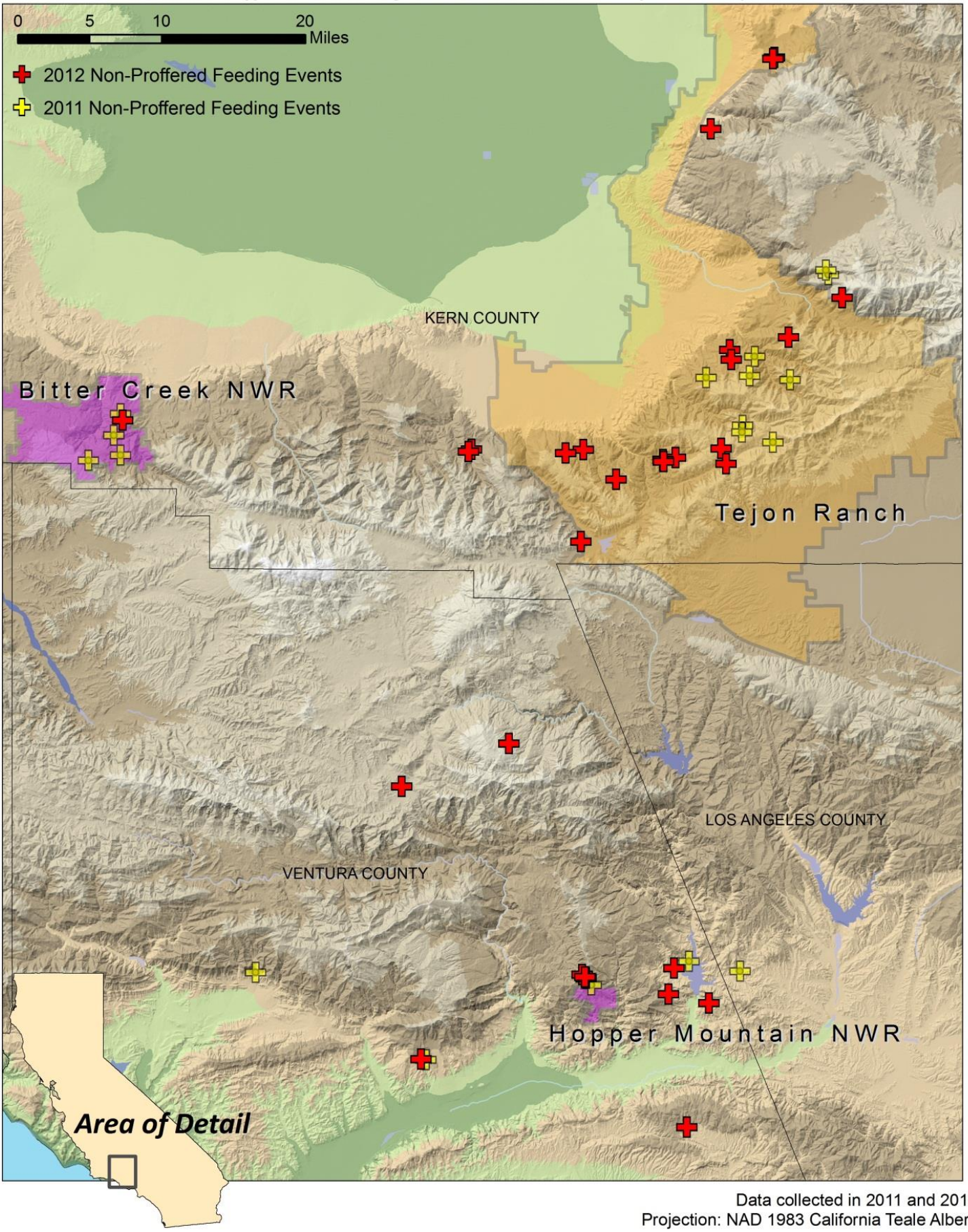


Figure 3.1.2: Nesting activity (n = 6) in 2012 for the Southern California population of California condors. The yellow pentagons represent nests.

California Condor Recovery

2011 and 2012 Non-Proffered Feeding Events: Southern California Population



Data collected in 2011 and 2012
Projection: NAD 1983 California Teale Albers

transmitters or estimated based on clustering of GPS transmitter locations characteristic of a feeding event from California condors wearing GPS transmitters. Contact with private landowners was sometimes used to identify locations of feeding events.

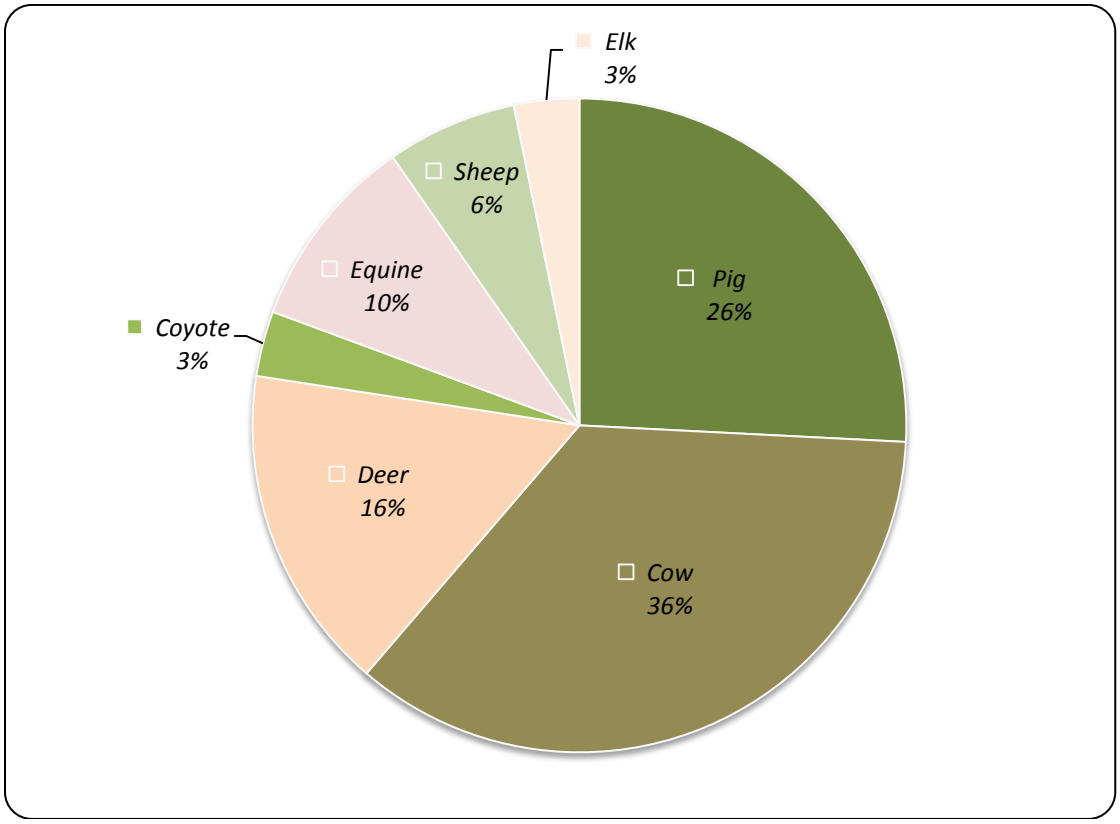


Figure 3.1.4: Non-proffered feedings in 2012 by type of carrion (n = 31).

3.2 Lead Monitoring and Mitigation

Fifty-seven out of 58 condors were trapped at least twice during 2012, once in the summer and then again in the fall. One condor was only trapped a single time. Condors were trapped and handled 131 times, not including chicks and pre-release condors. Each trapping season lasted 2 months, June and July in the summer and November and December in the fall. Trapping condors required biologists and volunteers to spend about 4 to 5 days per week in a blind trapping. The field team handled condors on a weekly basis with each condor requiring about 30-45 minutes of handling time and, depending on the number of condors, between 2 to 10 biologists assisting at each handling event.

The field team transported 10 individual condors to the Los Angeles Zoo for chelation treatment in 2012 (using the treatment threshold of 35 µg/dL in the field test kit). Of the 10 condors, one condor was a chick from the DG12 nest, and one adult, condor #289, was treated twice. Condor #289 was the only treated condor with a radiograph that came back positive for metallic densities that Los Angeles Zoo technicians suspected were related to the lead poisoning. Castings and fecal material were collected and radiographed but the metal fragments were never recovered. There were no condor mortalities associated with lead toxicosis in Southern California in 2012.

Using this criterion of ≥ 10 ug/dL for exposure, 42 condors in the Southern California population had blood lead levels above background levels in 2012. The results for blood lead levels in 2012 were similar to values for the previous several years (Figure 3.2.1). There is no indication of a clear trend towards an overall increase or decrease in exposure.

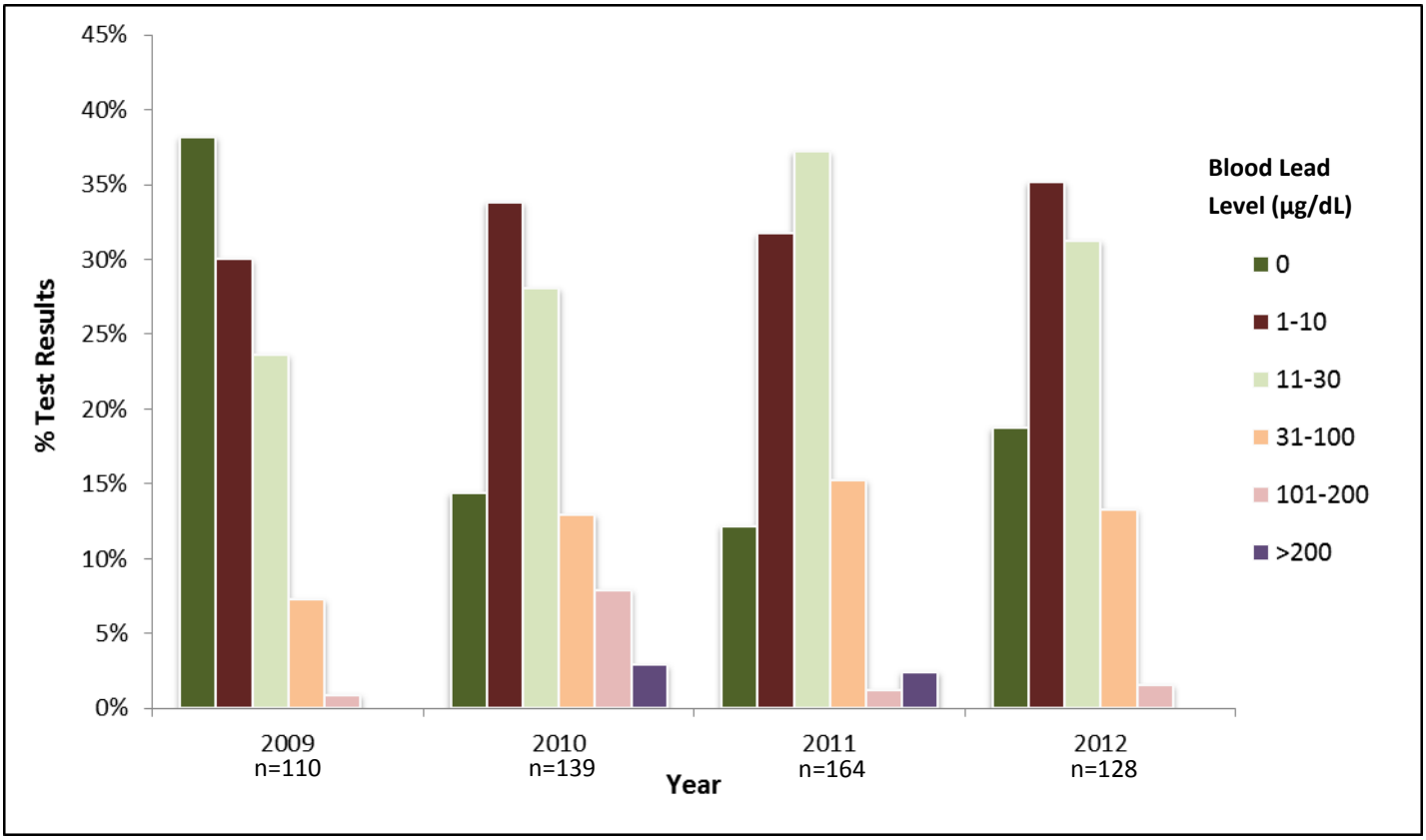


Figure 3.2.1: Summary of blood lead levels in the Southern California population of California condors by year. All of the lead values given represent lab blood lead values. Values returned as "not detected" are indicated by 0. Number of tests performed each year represented as "n" for each year.

3.3 Detecting Mortalities

The field team spent 30 to 40 hours each week attempting to detect the VHF signal of each condor. There were no deaths of free-flying condors detected in Southern California during 2012.

In 2012, there were 3 California condor mortalities outside of the free-flying population (Table 3.3.1). Condor #412 was the only adult mortality. This condor was injured in May 2011 and euthanized in January 2012. His injuries were the result of entanglement in a human-made structure and required amputation of one of his wings.

Condors #671 and #672 were chicks from wild laid eggs that died at their nests. During a period of observation at condor #671's nest, a volunteer became alarmed when the chick was not visible in its open nest cavity. Biologists discovered the carcass below the nest; the cause of death was trauma and the chick likely died on impact from falling out of the nest (Necropsy Report #RP19128).

The cause of death of condor #672 has not yet been determined. Before discovering the chick in poor condition, observers noted that parental attendance was lower than normal for a 3-month-old chick. Biologists entered the nest for the 90-day physical exam and discovered the chick was underweight and lethargic. The chick died before an evacuation could be performed. Condor #672's carcass went to the San Diego Zoo Pathology Lab for postmortem examination; results are pending.

Table 3.3.1: California condor mortalities in 2012.

Studbook Number	Sex	Hatch Date	Mortality Date	Cause of Death	Location of Death
412	Male	1-May-06	24-Jan-12	Euthanasia	Los Angeles Zoo
671	Unknown	28-May-12	16-Aug-12	Trauma	Santiago Canyon nest site
672	Male	23-Jun-12	28-Sep-12	Unknown	Koford's Ridge nest site

3.4 Nest Management

The 2012 nesting season spanned over 10 months, with active nests occurring from March until December. There were 6 active nests during the season, 4 of which fledged chicks and 2 of which failed (Table 3.4.1). Nest guarding has been effective at increasing the number of wild fledged chicks in the Southern California population. Nesting success, defined as the total number of chicks to fledge out of the total number of nests, has increased dramatically since nest guarding was implemented across all nests in 2007 (Figure 3.4.1).

Table 3.4.1: Nesting attempts and outcomes for the 2012 breeding season. Sire Studbook Number is the studbook number of the male attending the nest. Dam Studbook Number represents the studbook number of the female attending the nest. Foster Eggs were captive laid eggs used to replace the wild laid egg when it was not viable. Chick Studbook number is the studbook number of the chick that hatched in the wild nest.

Nest Identification	Date Nest Located	Sire Studbook Number	Dam Studbook Number	Egg Identification	Lay Date	Foster Egg Used	Foster Egg Identification	Date Hatch	Chick Studbook Number	# of Nest Entries	Nest Fate
DG12	15-Mar	206	370	FW112	1-Mar	no	NA	27-Apr	658	9	Fledged by 4-Dec
RC12	2-May	239	289	FW212	9-Mar	no	NA	5-May	670	3	Fledged by 20-Nov
TC12	20-Mar	374	180	FW312	13-Mar	yes	12TAKI1	23-Apr	648	6	Fledged on 5-Oct
SP12	19-Mar	247	79	FW412	15-Mar	yes	12TENE1	25-Apr	654	6	Fledged on 24-Oct
SC12	2-Apr	328	216	FW512	1-Apr	no	NA	28-May	671	3	Failed on 16-Aug
KR12	30-Apr	125	111	FW612	27-Apr	no	NA	23-Jun	672	6	Failed on 29-Sep

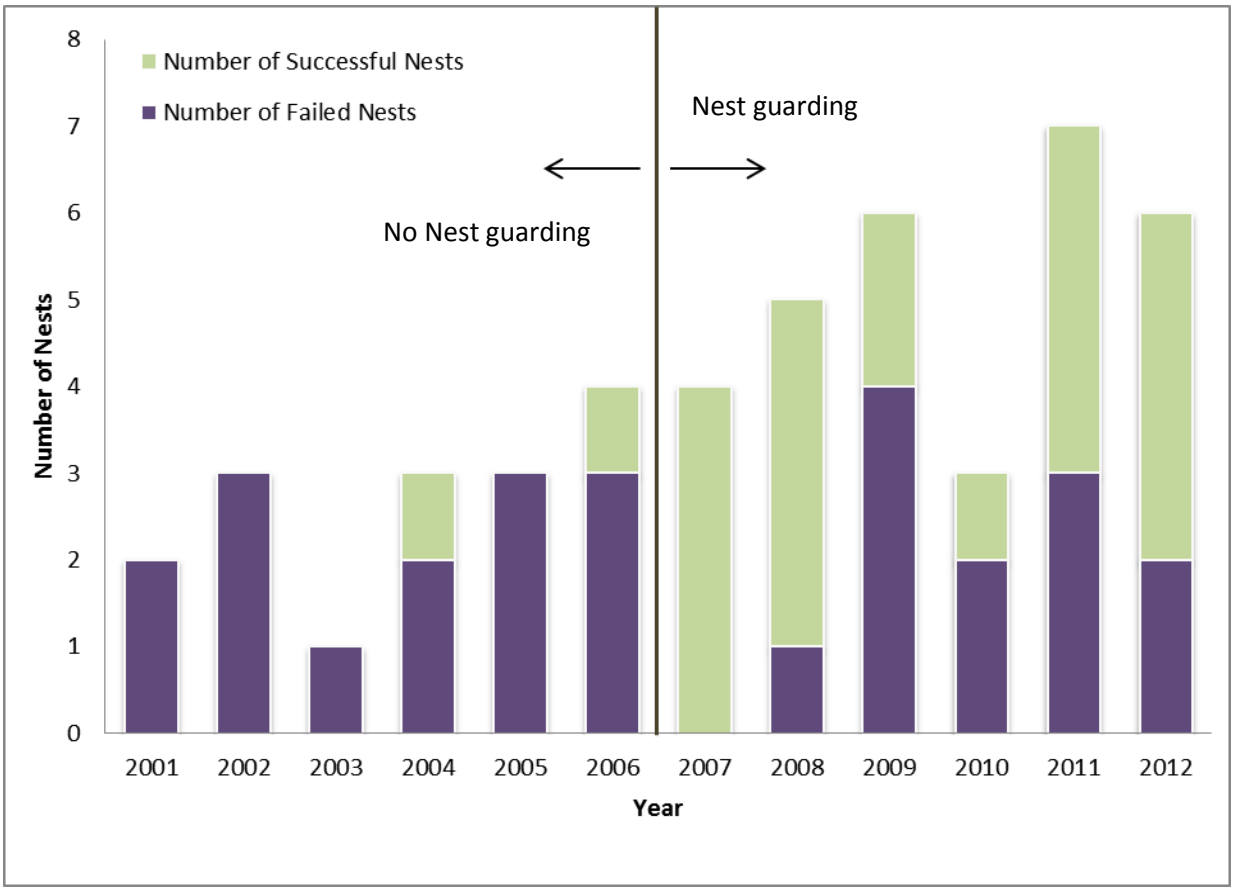


Figure 3.4.1: Condor nesting outcomes from 2001 through 2012. The Nest Guarding Program was implemented on a single nest in 2006 then across all nests starting in 2007.

In 2012, each nest was monitored over the course of the season using direct observation and periodic nest entries. The field team performed 33 nest entries over the course of the year. Each entry required 2 to 4 personnel for 8 to 12 hours. RC12 required an overnight camp in the backcountry to reach the nest. Los Angeles Zoo staff provided assistance on 12 of the nest entries. Nests were observed for a total of 1,034 hours taking place over 387 observer days. DG12 and RC12 were observed less due to their remote locations. Unpaid volunteer nest observer hours accounted for a quarter of all observation hours (Table 3.4.2).

Table 3.4.2: Hours spent observing nests during 2012.

Personnel Type	Observation Hours
Service Staff	78.5
Santa Barbara Zoo Staff	338.5
Volunteer Interns	354.5
Unpaid Volunteers	263
Total Observation Hours	1034.5

A nest camera was successfully installed in the SP12 nest during 2012 to record the behaviors of the parent condors and their chick at the nest site. Footage was successfully reviewed and archived after wireless transmission from the nest site to the facilities at Hopper Mountain NWR. The archived footage is being used for The Condor Cave Facebook page (see: Outreach section and Appendix II).

The field team performed interventions on 3 nests this season. Interventions in 2 of those nests took place during the egg stage when the eggs were found to be nonviable during routine nest entries. Both of these eggs were replaced first with dummy eggs and later with 2 eggs from the condor breeding facility at the World Center for Birds of Prey in Boise, Idaho. The eggs were first transported to the Los Angeles Zoo prior to placement into the wild nests. The third intervention took place when condor chick #658, at nest DG12, was found to have an elevated blood lead level. This chick was temporarily evacuated from the nest to be radiographed and to initiate chelation treatment. The radiographs revealed a metallic item requiring the contents of the chick's stomach and crop to be surgically removed. The metallic item found was microtrash but not the source of the lead exposure. After surgery, condor chick #658 spent the night at the Los Angeles Zoo and was returned to the nest within 23 hours. To perform this temporary evacuation the Ventura County Sheriff's Air Unit provided Helicopter Support. Their crew assisted the field team in long-lining the chick directly to and from the nest. After treatment at the Los Angeles Zoo, additional chelation treatments occurred during follow up exams. The chick's development was slower than normal but the chick was eventually tagged at 150 days of age and fledged in December.

Preventative interventions were also taken at each nest. At 30, 60, and 120 days of age, biologists vaccinated chicks for West Nile virus. The substrate of each nest was sifted and microtrash was found to be present in all 6 nests in 2012 (Table 3.4.3).

The amount of microtrash collected from nests can be compared across years to help determine the degree to which microtrash collection continues to be a problem (Table 3.4.3). The average amount of microtrash collected per nest was less during 2010-2012 than 2002-2009.

Table 3.4.3: Microtrash recovered from nesting attempts during 2002-2012 nesting seasons. Values represent the total number of items collected from the chick and substrate. (*Nest failed prior to the chick being 90 days of age, value was not included in the average or nest count.)

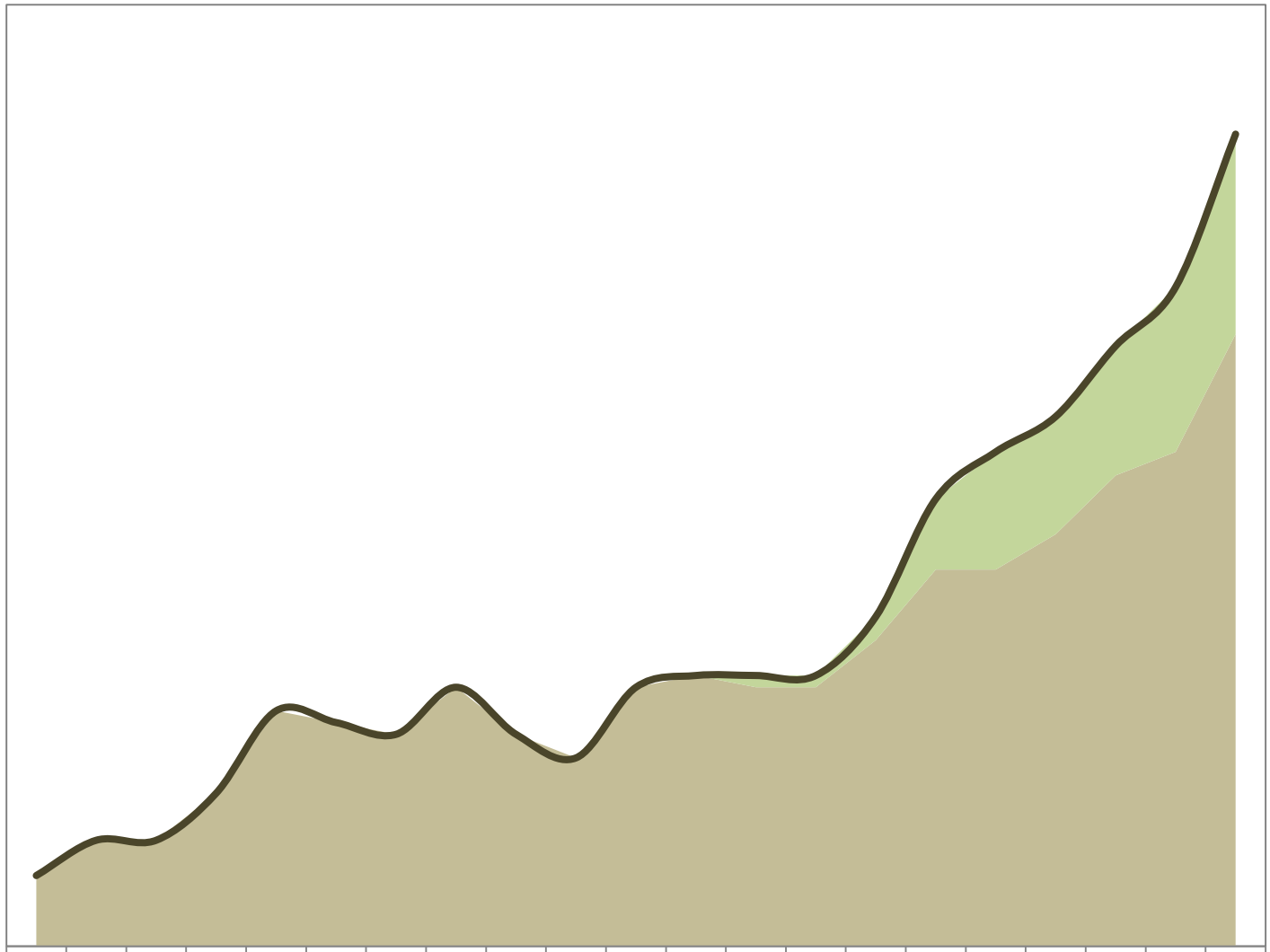
Nest	Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AB	-	-	143	321	1*	233	-	60	-	3*	-
DG	-	-	-	-	-	38	-	52	32*	-	31
HB/SP	-	-	-	-	-	-	0	?*	-	10	1
HC	20	-	?	-	46	19	26	103	-	55	-
HW	86	-	-	-	-	-	-	-	-	-	-
HW/3C	-	-	-	-	-	-	322	12*	-	-	-
KR	0	44	53	41	-	43	11	10*	26	3	9*
LC-PC	53	-	-	-	-	-	-	-	-	-	-
LP	-	-	-	5*	-	-	-	-	-	-	-
PC[1]	-	-	-	-	48	-	115	-	-	-	-
PC[2]	-	-	-	-	-	-	-	-	-	32	-
SC	-	-	-	-	-	-	-	-	-	21	1*
GF	-	-	-	-	-	-	-	-	-	0*	-
RC	-	-	-	-	-	-	-	-	-	-	3
TC	-	-	-	-	-	-	-	-	-	-	71
Average	40	44	98	184	47	95	95	72	26	24	27

3.5 Captive Releases and Transfers

In 2012, the field team released 7 California condors resulting in an approximate 11% increase to the Southern California population (Figure 3.5.1).

In the fall of 2012, the field team released 6 juvenile captive-bred condors and re-released condor #137 over the span of 1.5 months (Table 3.5.1). Releases required an average of 2 personnel daily, per week, from October 3 to December 15, 2012. Staff closely monitored newly released condors every day, for approximately 10 hours per day, for a minimum of 30 days after release (Table 3.5.2). One of these releases, condor #137, was recaptured and placed back into captivity after he failed to integrate into the wild population. While the annual captive-bred releases occur in the fall, the Service released condor #137 in January at Bitter Creek NWR. This condor's mate, condor #147, had been released in late 2011 just prior to the release of condor #137. After spending a number of years in the captive breeding program at the Oregon Zoo, it was determined that the pair was genetically less valuable and should no longer be used for captive breeding. Condor #147 successfully integrated into the wild population, but biologists had to trap condor #137 and return him to the release pen for failing to find food and socialize with other condors.
After spending 8 months in the release pen and regularly feeding and perching with other condors, the field team decided to re-release condor #137 in the fall with the juvenile cohort.
Unfortunately, the field team had to re-trap him 1.5 months after his second release. Although he successfully interacted and fed with the wild flock, he approached humans at Wind Wolves Preserve in December. This behavior led the field team to decide to return condor #137 to captivity permanently.
From February to October 2012, the Service held several captive-bred juvenile condors in the release pen with adult condor #137 before releasing any condors into the wild.

For those approximately 8 months, the field team checked on the health of pre-release condors daily and conducted intensive 4-hour observations 2 to 4 days a week. While held in captivity, these condors required regular fresh food and water, which necessitated at least one person on duty daily at the refuge.



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Fledged	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	6	10	10	11	14	17
Captive Released	6	9	9	13	20	19	18	22	18	16	22	23	22	22	26	32	32	35	40	42	52
Total Max Population	6	9	9	13	20	19	18	22	18	16	22	23	23	23	28	38	42	45	51	56	69

Figure 3.5.1: Annual maximum population size for the Southern California population of condors. "Wild fledged" represents any condors that fledged from a wild nest since 1992.

Table 3.5.1: Captive-bred releases in 2012. Note: SDZSP=San Diego Zoo Safari Park; WCBP=World Center for Birds of Prey; NA=not applicable.

Studbook Number	Sex	Hatch date	Hatch location	Transfer date	Release date	Fate	Re-trap date	Age at Release (in years)
137	male	4-May-96	SDZSP	16-Nov-11	1-Jan-12	retrapped	6-Feb-12	15.7
137	male	4-May-96	SDZSP	7-Mar-12	25-Oct-12	retrapped	12-Dec-12	16.5
590	male	14-Mar-11	SDZSP	15-Mar-12	3-Oct-12	successful	NA	1.6
591	male	16-Mar-11	SDZSP	15-May-12	25-Oct-12	successful	NA	1.6
594	female	29-Mar-11	SDZSP	15-May-12	15-Nov-12	successful	NA	1.6
596	female	1-Apr-11	SDZSP	15-May-12	3-Oct-12	successful	NA	1.5
604	female	18-Apr-11	SDZSP	15-May-12	25-Oct-12	successful	NA	1.5
625	male	21-May-11	WCBP	14-Aug-12	15-Nov-12	successful	NA	1.5

Table 3.5.2: Condor field team release effort. Note: proffered carrion = still born calf carcasses.

	January	February	March	April	May	June	July	August	September	October	November	December
Number condors Released	1	0	0	0	0	0	0	0	0	5	2	0
Approx. Employee Hours	620	120	0	0	0	0	0	0	0	744	600	300
Number Proffered Carrion Provided	39	34	26	21	19	10	17	16	16	23	34	27

3.6 Behavioral Modification

In 2012, condors frequented 4 areas of human development. Most condor activity centered on residential homes in a gated community in the Northern Tehachapi Mountains called Bear Valley Springs (See: Appendix III). Condors also visited 3 other developed areas, but much less frequently: Rancho de La Cruz (UTM 11S 285955.92 E 3861633.18N), Cazador Cabin on Tejon Ranch (UTM 11S 345347E 3873191N, and ITT Towers on the Angeles National Forest (UTM 11S 370417.41E 3801603.47N. After Bear Valley Springs, Rancho de La Cruz had the highest number of associated GPS transmitter locations with condor visits beginning in February and ending in August. Only 2 condors wearing GPS transmitters (condors #237 and #255) had GPS transmitter locations within 100 meters of ITT Towers this year in April. Condor #98 visited Cazador Cabin on Tejon Ranch once in June.

Bear Valley Springs required the greatest amount of field team hours as it necessitated daily monitoring. Field team staff spent 60 to 100 hours each week, from July to October, to monitor and haze condors from 28 confirmed private homes. This level of coverage required numerous trips per week from Ventura, Bitter Creek NWR or Hopper Mountain NWR. Each trip required 4 to 6 hours of driving per round trip.

3.7 Outreach

The field team led or co-hosted several outreach events in 2012. Biologists participated in 7 hunter outreach events in conjunction with the Institute for Wildlife Studies, reaching an estimated 380 people. These events targeted hunters and gun enthusiasts in an attempt to share information about lead-free ammunition (Figure 3.7.1).

Figure 3.7.1: Photo of participants inspecting fragments from a bullet during a lead-free shooting demonstration.

Five events were co-hosted with the Friends of the California Condor Wild and Free, reaching an estimated 110 people. These events targeted local members of the public in an effort to foster condor conservation. They included tours of Bitter Creek NWR to a Boy Scout group, a tribal youth organization, and a minority student group. Biologists gave a 20-minute presentation about condors to a local nature organization that reached 30 people and 3 school outreach presentations about condors that reached approximately 170 students and parents.

Two outreach events were conducted for the residents of Bear Valley Springs due to the potential for condor habituation. Biologists discussed condor biology, the risk of habituation, and solutions. These

events reached approximately 225 people.

The field team utilized several media outlets for outreach by conducting interviews and hosting television and movie crews on refuge lands. A French production company shot footage for a mini-series featuring the condor in an episode. A British Broadcasting Corporation (BBC) children's show entitled Naomi's Nightmares filmed biologists handling condors during spring handling at Bitter Creek NWR. A representative from the American Public Media show, Marketplace, interviewed members of the field team for a radio broadcast. Biologists were also interviewed for an article that appeared in Forbes Magazine in January.

The field team launched a Facebook page called The Condor Cave in cooperation with the Santa Barbara Zoo in December (Figure 3.7.2).

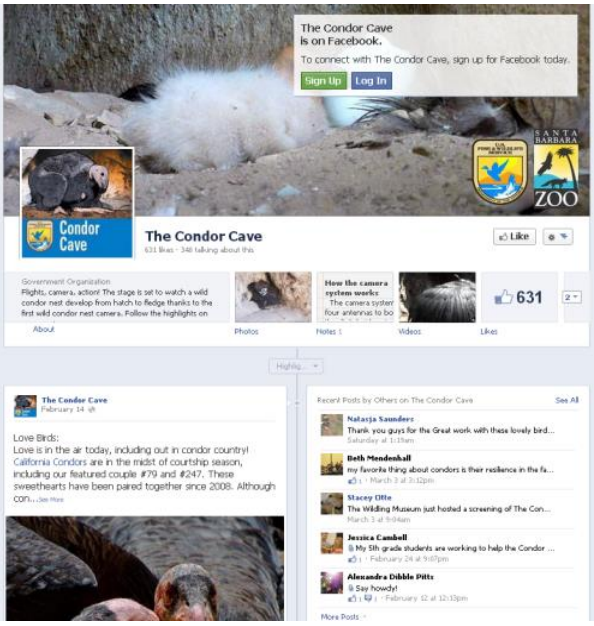


Figure 3.7.2: A screenshot from The Condor Cave Facebook page.

This page has the potential to educate thousands of people on condor conservation.

Intra-agency outreach and presentations to partner programs also spread awareness of condor conservation in 2012. The field team gave a presentation about condors to approximately 200 people at a Marsh Management Workshop hosted by Sacramento NWR Complex. Two field staff members wrote articles for the FWS journal, Field Notes. One article documented the evacuation of a condor chick from a nest site and a second article documented a successful condor handling day. In addition, the field team welcomed members of Kern NWR Complex and Don Edwards San Francisco Bay NWR to participate in the handling of 8 condors during the fall.

4.0 Discussion

The management of condors in Southern California during 2012 raised a number of events worthy of discussion. The future direction of field activities should take into account changes in funding, the growing condor population, and results from recent research. Topics related to monitoring resource use, lead monitoring and mitigation, nest management, and captive releases and transfers are of particular interest.

Monitoring Resource Use

In 2012, the majority of non-proffered carrion sampling to determine lead contamination was carried out by a junior conservation specialist employed through U.C. Davis and funded by the Cooperative Endangered Species Conservation Fund (16 USC § 1536). This funding is no longer available and raises the question whether sufficient data exists to cease the collection and analysis of non-proffered carrion and, if not, whether enough staff, time, funding, and training will be available in the future to continue ground-truthing feeding events.

In addition, the ability to radiograph carrion for metallic object recovery relies on the use of the Santa Barbara Zoo necropsy room and radiographing equipment. This process is often slow due to proximity from freezers, scheduling conflicts, and lack of available time and personnel. The purchasing of radiographing equipment for the Complex office could expedite this process.

Lead Monitoring and Mitigation

A study by Finkelstein et al. (2012) estimates the current practice of biannual blood lead monitoring may only be capturing ~10% of a condor's annual exposure history. The field team should consider how these results affect the current lead monitoring and treatment strategy. Changing the sampling regime could allow the field team to provide information on the trends in condor lead exposure. These changes should be weighed against the potential for an increase in trapping and handling activity.

Nest Management

Nest guarding activities treat the proximate threats of nest failure and not the underlying causes. As such, this nest management approach is not a long-term solution to the recurring causes of nest failure. Nest guarding tracks the changes in particular nest threats such as the quantity of microtrash sifted from the nests. The decrease in microtrash found in nests may be related to the time budget of individual breeders as their home ranges have expanded or because newly formed pairs have not developed

the propensity to collect trash items. Continuing to monitor the abundance of microtrash by periodically entering nests is necessary to determine if the level of microtrash is significantly decreasing and to understand if that decrease has any correlation with the history of breeding pairs and their movements.

The successful development and installation of a nest camera system in 2012 exemplifies the effort to improve nest observations. The camera system captures a greater amount of activity that can be reviewed in a shorter amount of time and archived for more detailed research. As the number of nests increases and as nests become more dispersed and remote, the nest camera system will be an invaluable tool for continuing observations of parent and chick activity. Real-time nest observation by volunteers can be used in conjunction with camera data to provide information about condor activity that takes place outside of the view of the nest camera and after the chick has left the nest but remains close by.

Captive Releases and Transfers

The release of adult condors typically requires a greater effort by the field team when compared to 1-2 year old condors. Adult condors take longer to assimilate into the wild population, and when unsuccessful require extensive effort to recapture. Although condor #137 failed as a release candidate this past year, the field team has successfully released other long-term captive condors. In the future, available adult condors should still be considered for release despite the risks involved, but with the knowledge that these individuals will require more resources such as GPS transmitters and additional monitoring.

Holding and releasing condors tends to create larger than normal groups of condors around the release site; these congregations can create vulnerability to predation. Releases are necessary to reach an appropriate population size for recovery, but to mitigate this potential threat, the field team should develop a predator management plan for the release site.

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Appendix I. Contributions to Ongoing Research

Data collected over the course of 2012 will contribute to ongoing research within the Service, various universities, and other federal agencies. Examples of this ongoing research include:

Genetic map and whole genome sequences of California condors

Years: 2006-present

Study Objective: Utilize robust genetic and genomic approaches, construct a complete genome-based database of genetic variation in California condors, and make findings available for population management and recovery. Anticipated findings include: detailed analysis of kinship among founder California condors, detailed characterization of variation at the single nucleotide polymorphism (SNP) level, assessment of retention of genetic variation in the species pedigree, identification of the mutation causing chondrodystrophy, identification of carriers of chondrodystrophy allele.

Principal Researchers: Oliver A. Ryder, Stephan C. Schuster (P.I.), Webb Miller, Michael Romanov.

Sponsor: U.S. Fish and Wildlife Service California Condor Recovery Program, San Diego Zoo Global.

Funding Source: San Diego Zoo Global, Seaver Institute, John and Beverley Stauffer Foundation, other private foundations.

Results to Date: A genetic map for California condors based on comparison to chicken and zebra finch genomes has been published. A microsatellite-based linkage map is in development. Sequencing of 30 California condor genomes utilizing Illumina technology has been proposed and funding is pending. This study would identify all extant genetic variation at the nucleotide level and affords the opportunity to identify the mutation associated with heritable chondrodystrophy.

Anticipated Completion: If current funding proposals are approved, the reference genome and initial descriptions of species variation would be completed within one year. More detailed analyses of demography and evolutionary population genetics would follow. Priority will be given to reporting recovery-relevant findings.

California condor West Nile virus vaccination study

Years: 2009 -2012

Study Objective: To determine the range of serological responses in chicks to a commercial canary pox vectored recombinant West Nile virus vaccine.

Principle Researcher(s): Donald L. Janssen, Michael Mace.

Sponsor: San Diego Zoo Global.

Funding Source: San Diego Zoo Global, Los Angeles Zoo, Oregon Zoo, USFWS Hopper Mountain NWRC.

Results to Date: Three zoos (Oregon Zoo, Los Angeles Zoo, San Diego Zoo Safari Park, and one field site combined efforts in 2011 and 2012 to vaccinate 21 (2011) and 22 (2012) California condor chicks with a canary-pox vectored WNV vaccine. The Cornell University WNV laboratory analyzed the serum samples from the 2011 and 2012 chick seasons. Statistical analysis was performed for the 2011 cohort. The chicks had significant maternal antibodies that persisted for up to 75 days of age. Follow up samples at about 5 months of age showed that up to 94% of condors were immune. No condors became sick or died from West Nile virus disease during this study. For the 2012 season, post vaccine titers were in general higher than in 2011, but statistical analysis is still pending.

Anticipated Completion: June 2012.

An assessment of the biological impact of contaminants and management actions that influence the long-term persistence of the California condor

Years: 2011-2016

Study Objectives: Synthesize existing data and collect new data on the risks of contaminant exposure to California condors. We will also identify the suitability of existing and proposed future habitat with respect to changes in contaminant exposure, human demographics, and climate. Quantify baseline measures of individual condor performance (e.g., survival, reproductive success) and how these rates are influenced by the effects of contaminants (e.g., lead, organochlorines, microtrash) and future habitat suitability from changes in human demographics, climate. Develop demographic modeling approaches for each condor population in California that allows estimation of how contaminants, global climate change, future habitat suitability, and management efforts will impact population recovery.

Principal Researchers: Donald R. Smith, Daniel F. Doak, Myra Finkelstein, Vickie Bakker

Sponsors: Department of Environmental Toxicology University of California, Santa Cruz; US Fish & Wildlife Service, Hopper Mountain NWRC, National Park Service, Pinnacles National Monument; US Geological Survey, Forest and Rangeland Ecosystem Science Center; US Fish & Wildlife Service Water Pollution Control Laboratory CA Dept. of Fish and Game, Office of Spill Prevention and Response; University of Wyoming, USFWS Ventura Ecological Service Office

Funding Sources: Montrose Settlement Restoration Funds, USFWS Environmental Contaminants Program On-Refuge Investigations Sub-Activity

Anticipated Completion: 2016

Examining the long-term transport of Montrose DDE via marine mammals: Evaluating risks to California condors.

Years: 2011-2013

Study Objective: To examine the risk to scavenging California condors from DDE discharged from the Montrose site in the Southern California Bight and transported via marine mammals along the California coast.

Principal Researchers: Myra Finkelstein , Don Smith

Sponsors: UC Santa Cruz, US Fish & Wildlife Service California Condor Recovery

Program Funding Source: Montrose Settlement Restoration Funds

Results to date: Pending

Anticipated Completion:2013

Monitoring post-ban lead exposure in the California condor (*Gymnogyps californianus*)

Years: 2010-2012

Study Objectives: Monitor lead exposure in condors over a 3-year period during various hunting activities and evaluate the effectiveness of the lead ammunition regulations by comparing historic lead exposure to lead exposure following the July 2008 ban on lead ammunition in condor range. Investigate sources of continued lead exposure in condors by a) using satellite telemetry and radio telemetry to track

condors and identify habitat use, foraging patterns, movements and behaviors associated with lead exposure, b) evaluating stable isotope composition of lead in condor samples and c) evaluating lead availability in hunted animal carrion recovered in condor range and microtrash recovered from condor nests. Evaluate the health effects of ongoing lead exposure on condors by assessing individual animal clinical outcomes and survival. Develop an on-line Data Management System for the California Region of the Condor Recovery Program.

Principal Researcher: Christine Johnson

Sponsors: Wildlife Health Center, University of California, Davis; Department of Environmental Toxicology University of California, Santa Cruz; US Geological Survey, Forest and Rangeland Ecosystem Science Center; US Fish & Wildlife Service Hopper Mountain NWRC; Pinnacles National Monument , California Department of Fish and Game, Ventana Wildlife Society

Funding Source: US Fish & Wildlife Service Endangered Species Act (Section-6) Grant-in-Aid Program

Results to date: Pending

Anticipated Completion: 2013

California condor Nest Guarding Project

Years: 2007- 2016

Study objective: Analysis of nest success in Southern California's reintroduced population of California condors along with the trends of breeding effort and nest success within this population in response to changes in foraging, demographics and management strategy (tentative plan).

Principal Researchers: Estelle Sandhaus and Joseph Brandt.

Sponsors: Santa Barbara Zoo; US Fish & Wildlife Service Hopper Mountain NWRC; Los Angeles Zoo.

Funding Source: Hopper Mt NWR base funds, SB Zoo base funds.

Results to date: 6% Nesting Success (2001-2006) increased to 60% nesting Success (2006-2011), Brandt et al. 2008 (presentation), Brandt et al. 2010 (poster), Sandhaus et al. (2012) Wynn & Stringfield 2011(?).

Anticipated completion: 2016

California Condor Movement and Space Use Relative to Wind Energy Potential

Years: 2009-2012

Study Objectives: Determining historic and current California condor space use and movement patterns. Development of a metapopulation model for condors throughout their historic range.

Principal Researchers: Jim Rivers

Sponsors: US Fish & Wildlife Service; US National Park Service, Pinnacles National Monument; US Geological Survey, Forest and Rangeland Ecosystem Science Center; Ventana Wildlife Society.

Funding Source: USFWS Hopper Mountain NWRC & Ventura ES Office.

Results to date: Development, maintenance, and distribution of Condor movement KML files for use by condor managers in CA.

Anticipated completion: 2012

Analysis of California condor (*Gymnogyps californianus*) activity using satellite telemetry data

Years: 2005-2012

Study Objectives: Predict different types of behaviors in California condors through the analysis of GPS Transmitter Data.

Principal Researcher: Chris Cogan, Jesse De'lia, Joseph Brandt, Ken Convery

Sponsors: California State University, Channel Islands;

Funding Source: USFWS and CSU Channel Islands

Results to date: Manuscript submitted for publication.

Anticipated Completion: 2013

Eggshell thinning and depressed hatching success of California condors reintroduced to Central California.

Years: 2006-2012

Study Objective: Compare condor hatching success and eggshell thickness between reintroduced populations of California condors in Central and Southern California. Evaluate the cause of egg failure in wild laid eggs and assess the potential sources of organochlorine contamination and determine its impact of the condor population in Central California.

Principal Researchers: Joe Burnett, Kelly Sorenson, Joseph Brandt, Bob Risebrough Sponsors; Ventana Wildlife Society, US Fish & Wildlife Service Hopper Mountain National Wildlife Refuge Complex, The Bodega Bay Institute, Los Angeles Zoo and Botanical Gardens, Santa Barbara Zoo.

Funding Source: Ventana Wildlife Society and USFWS Hopper Mountain NWRC

Results to date: Burnett et al. 2009 (presentation), Manuscript has been submitted to Condor and is currently in revision.

Anticipated Completion: 2012

Appendix II. Camera Project Description

Surveillance camera systems have become more accessible in recent years; technology has greatly improved and prices have dropped. As a result, digital imagery and video surveillance is increasingly being incorporated into wildlife research, management, and outreach in the form of game cameras, critter cameras (i.e. cameras worn by an animal), and nest cameras.

Archived and streaming video can be shared with the public to increase awareness, and include them in research such as online citizen science projects. Examples of online cameras include the Decorah Eagles (http://www.ustream.tv/decoraheagles), Red-Tailed Hawks and Herons hosted by Cornell University (http://cams.allaboutbirds.org/live-cams/), and webcams run by individuals such as the Hummingbird Cam located on Channel Islands (http://phoebeallens.com/). Wild Birds Unlimited Minnesota maintains a comprehensive list of active wildlife cameras (http://saintpaul.wbu.com/content/show/47639).

The current California condor nest management strategy implemented by the U.S. Fish and Wildlife Service (Service) involves frequent and detailed real-time observations of wild nests, and periodic nest entries to assess egg fertility and monitor the chick's development. If problems are detected biologists may intervene to prevent nest failure, or to understand the potential cause of failure. This hands-on approach is referred to as the Nest Guarding Program.

The Nest Guarding Program has been successful at increasing the number of wild-fledged chicks , there are however a number of limitations in the way nests are observed. Observation coverage is limited by accessability, observer's physical abilities, and weather. Some nests are more difficult to observe due to their location, size, and orientation.

A remote camera system increases quality observations while reducing time and money spent monitoring nests. Camera system footage can be collected during all daylight hours and can be reviewed at an accelerated rate allowing observers to watch nests more frequently and efficiently. As the condor population's distribution expands, nest-use in remote areas will increase and nest cameras may be the only feasible way to observe these nests.

Two remote camera systems were piloted during 2011 and 2012. In 2011, the Santa Barbara Zoo (SB Zoo) partnered with the Service in a cost share grant to pilot a nest camera system at Bitter Creek NWR. The second system was

deployed in a condor nest near Hopper Mountain National Wildlife Refuge (Hopper Mountain NWR) in 2012. The SB Zoo has continued their involvement in the project, pledging to purchase hard drives for video archiving and software for the cameras. A camera and database systems specialist with SB Zoo has provided some expertise and review of the current and future systems.

System Description

The cost of the equipment needed to run one camera and stream it to a computer for archiving was roughly $4,000. In addition to a camera, the system also required 4 antennas: one at the camera, 2 functioning as repeaters, and one at the archive computer (Figure 1). Paired transmitting and receiving antennas must have line of sight with each other in order to establish a link. Multiple repeaters can be used to transmit the signal over long distances or around topography. Each location required solar power and batteries to keep the system running during periods of reduced sunlight. A computer and hard drives were needed for archiving.

Table 1. The general cost of a solar powered camera system with a single repeater

Item	Cost $	Description
Camera and Lens	872	Captures video
Solar Panel and Batteries	1320	Power and backup power
Antenna	315	Transmitting video stream
1000' Cat5e cable and plugs	115	Power and data transfer
Primary wire and terminal ends	77	For connecting solar panels to batteries
Hard drives and enclosure	400	For archiving data
Fiberglass enclosure supplies	200	For housing the camera
Masts and mounting hardware	200	Mounting equipment
500' aluminum conduit	350	Protecting Cat5e from environment and condors
Total	3849	

Power consumption must be taken into consideration when selecting camera system equipment, because the system is powered by solar panels. Additionally, weight, size, and ease of setup were considered because the camera and its equipment were hiked by staff through rugged terrain. Other equipment considerations also included how well it could be camouflaged and protected from the elements and wildlife such as ravens and condors. Guy wires and large masts were not used as a precaution for the condors and other wildlife. Two to 3 personnel were needed during the nest camera installation for carrying equipment to the site and system setup. A laptop was required at the site during installation to assist with camera angle positioning and focus. A trained staff member was needed for troubleshooting and further system expansion planning. Batteries and hard drives may need to be replaced every few years. Costs may decrease with each similar

installation, building upon previous infrastructure when possible.

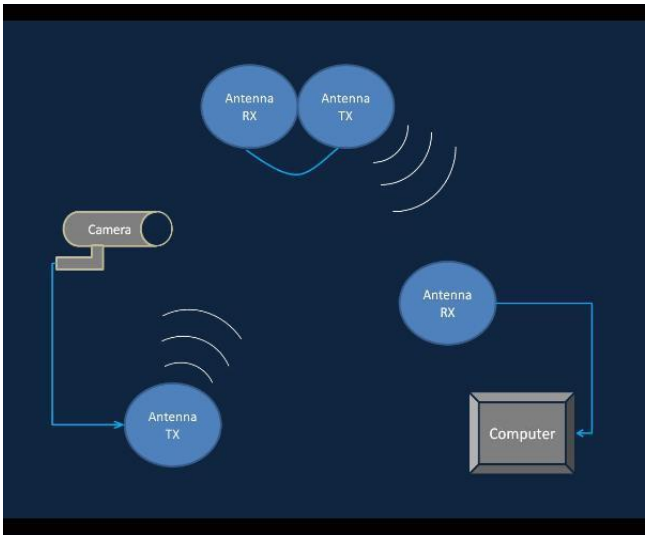


Figure 1. **Diagram of a remote wireless camera system. From the camera, a transmitting (TX) antenna sends digital footage to a repeater's receiving (RX) antenna. Data is then relayed to the archive using additional TX-RX**

The camera selected was an Arecont MP5115DN, which is a Power Over Ethernet (POE) Internet Protocol (IP) H.264 compression fixed high resolution digital Pan Tilt Zoom (PTZ) (http://www.arecontvision.com/). When the project was first researched and proposed in 2009, low power mechanical PTZ cameras were not cost effective. Generally, this type of camera required 15 watts or more. The antennas used were Ubiquiti Nanobridge M2 (2.4GHz) antennas (http://www.ubnt.com/). Ubiquiti products have a good reputation, offer product support via customer service and online community forums, and are inexpensive. Sixty watt polycrystalline solar panels and 36Ah high rate valve regulated sealed lead acid (VRLA) batteries were used from Tycon Power Systems (http://tyconpower.com/).

Deploying the System

The first camera system was installed at Bitter Creek NWR in 2011. This location was selected to test the feasibility of the system, and to learn how to install and use the equipment where it would be more accessible. A camera in a protective housing was attached to the flightpen at Bitter Creek NWR, and positioned to record activity at a supplemental feeding site adjacent to the flightpen. Power over Ethernet (Cat5e) cable was run along the flightpen in flexible aluminum conduit and then underground in PVC pipe approximately 300 feet away. The solar panel, batteries and transmitting antenna were placed at this distance as a precaution against destruction from condors. The signal was broadcast to a nearby hill (0.33 miles) where a repeater relayed the information to the archive computer (0.73 miles). The camera system functioned as expected and was not tampered with by condors visiting the flightpen.

Following the successful installation at the Bitter Creek NWR, a camera was installed in a nest cavity near Hopper Mountain NWR in April 2012. The

camera was installed in the SP12 nest cavity when the nest entry team entered to check the egg's fertility. The camera was housed in a camouflaged fiberglass enclosure, protecting it from direct weather, and potential destruction by condors (Figure 2). Similar to the Bitter Creek NWR installation, the SP12 camera system used 4 antennas to relay the digital video stream recorded within the nest cavity to an on-site archive computer.

The nest camera received power and sent video via Cat5e cable from a remote power and antenna station, which was positioned roughly 250 feet above the nest cavity. The Cat5e was protected by flexible aluminum conduit which was camouflaged with spray paint. The signal from the camera was wirelessly broadcast to a repeater on a ridge above (0.37 miles). The repeater relayed the signal towards the receiving antenna, which was connected to an archive computer located at the refuge facilities (1.3 miles). There, the video signal was decoded and archived, and live video was viewable by biologists.

The camera ran daily from sunrise to sunset, but experienced some power issues, especially during stormy weather. Hopper Mountain NWR is a dusty environment, and dust often finds its way inside the facilities; this dust creates potential problems for computer and camera equipment. As a precaution for drive failure and data loss, the current video archive setup consists of many smaller drives, each storing less data. Photo and video data was archived in real time by the Service on external hard drives, and physically transported to the office for storage.

The fiberglass camera housing in the nest cavity was originally installed with a plexiglass window; this quickly scratched, catching the dust and sunlight making footage suboptimal. During the 60 day nest entry to check the health of the chick, the housing's plexiglass window was switched for a slightly thicker glass window. The footage through the glass window was an improvement, although issues still persist due to dust from the cavity and periods of the day with direct sunlight.

Figure 2. **The camouflaged housing and camera in the corner of the SP12 nest cavity near Hopper**

While the video footage was recorded and viewable from the Hopper Mountain NWR facilities, daily nest observations were not conducted from this location. Biologists reviewed video footage on a weekly basis, but traditional eye-to-scope observations were still conducted at the nest site.

In 2012, the camera was only used to check the general status of the chick and not for data collection. Santa Barbara Zoo staff helped to review and create video clips, and to ensure the computer and camera were running correctly. Near the end of 2012, a Facebook page was approved by the Service's regional office, and in December 2012 the page was published. The Facebook page shared at least 2 video clips per week, focusing on the life of a condor chick in the nest. Santa Barbara Zoo staff is largely responsible for posting clips, with posts reviewed by Service staff.

Figure 3. Pictures taken by the camera since its installation in the nest near Hopper Mountain NWR. Condor #247 with newly hatched chick (top left). Condor #247 with 75 day chick (top middle). Condor #247 interacts with 75 day old chick (top right). 5 ½ month old chick (now condor #654) sunning 2 weeks prior to fledging (bottom left). The breeding pair (condor #79 and #247) continue to return to the nest cavity after the chick fledges (bottom middle). The pair just prior to copulation on February 18, 2013 (bottom right). An egg was laid 9 days later. This photo and the associated video represents the first close-up wild pair copulation caught on film.

Conclusions / Recommendations

Several things were learned following the first installation of a nest camera in to a wild condor nest. The system as a whole and individual equipment worked as expected. Power consumption and backup battery power were underestimated, because usable sunlight in a canyon is much less than the average recorded sunlight for a given area. Although only transmitting a black screen, power consumption by equipment at night is still a considerable draw on the backup batteries, and additional power and batteries must be added. A secondary switch to power down most of the system would result in considerable power savings, and extend battery life.

Problems with the nest camera system in 2012 revealed ways to improve the system for future years. There was a lack of data storage redundancy. Nest camera protocols lacked structure which led to camera system connection errors going unreported when the system went down, and personnel leaving the computer off during the day. Increased training, solar power, battery capacity and improved data storage should resolve many of these issues.

There are several additional equipment recommendations. Mounting the camera on the wall of the cavity off the ground could reduce dust on the housing window and result in higher quality images for a longer period of time. Enterprise brand hard drives have increased security and should be considered for archiving footage. To facilitate larger data transfers hard drives should include a USB 3 or eSata interface. A third party video viewing and archiving software, which is compatible with multiple camera manufacturers, should be used for long-term system expandability and ease of use by personnel. An additional camera located outside the nest cavity for viewing the chick after fledging may prove beneficial for management and outreach uses. The nest camera system should also be incorporated into weekly nest observation regimes, and protocols should be developed to instruct system users on data collection and the creation of clips.

During 2012, the Service worked to establish a partnership with the Cornell Lab of Ornithology (Cornell). The partnership aimed towards getting a live video stream of a California condor nest hosted on the Bird Cams website (http://cams.allaboutbirds.org/live-cams/). Additionally, selected footage will be uploaded and archived at the Macaulay Library (http://macaulaylibrary.org/). The Service hopes to provide footage to the public to increase appreciation and excitement in the recovery of the California condor, with hopes of continuing a long-term partnership with Cornell. By partnering with Cornell, the Service's condor camera gains access to the university's outreach channels. Cornell's Facebook page has 120,000 members, print publications are sent out to 100,000 individuals, 320,000 eNewsletters are sent to individuals, and 9 million unique visitors view their websites per year.

Because the Hopper Mountain NWR is without adequate internet or cell coverage, the nest video must be broadcast to a different location 13 miles away before it is able to be uploaded to the internet. Near the end of 2012, the development of a long distance link from Hopper Mountain NWR to the town of Fillmore began. Cornell will loan the Service the necessary long distance link equipment, pay for any software fees, and build and manage a page on the Bird Cams webpage with input from Service staff.

A partnership with California State University of Channel Islands (CSUCI) has also been established. CSUCI will be housing the receiving antenna and the host computer, which will receive the incoming data stream from Hopper Mountain NWR. CSUCI will also cover the bandwidth costs of uploading the footage onto the internet.

The 2013 live-streaming video project will expand our current camera system, with the installation of a POE IP H.264 PTZ (optical zoom) camera from Canon (http://www.usa.canon.com/cusa/professional/products/security_video_solutions) in a new cavity. This camera requires little additional power draw compared to the digital PTZ Arecont,which is currently used in the SP12 cavity. The optical PTZ will ease the installation process, obtain a closer view of the egg and chick, and allow the camera angle to be changed if the egg or chick moves from view for an extended period of time.

In 2013, the condor program also applied for a grant to involve the Fillmore Unified School District in a condor-related biology curriculum. The curriculum would include the use of footage from condor nest cameras, presentations from Service biologists, and field trips to the Santa Barbara Zoo's condor exhibit and Hopper Mountain NWR. Additionally, the grant will cover the cost of an information kiosk at Santa Barbara Zoo, which would house a monitor showing streaming video of the nest.

The camera system supports the Service's Nest Guarding Program, and may be the only available tool used to monitor nesting California condors as their range expands and their nest cavities become more remote. Video footage is capable of capturing highly detailed images that are often not possible through traditional observations with a scope. Video clips can be archived and shared with personnel to help guide management decisions. The system is capable of being adapted for remote or local applications with available AC power. The camera system has a potential to reduce the long-term cost of monitoring the California condor, and is applicable for many other wildlife species.

Appendix III. Bear Valley Springs Situation Report

Background

An unforeseen hurdle in the reintroduction of California condors has been undesirable behaviors related to condors coming into close proximity with human structures and humans. Each reintroduced population has dealt with condors landing on radio towers, telephone poles, houses and other structures. Condors can engage in these situations for a variety of reasons. In some cases, the availability of food is the attractant, but other factors may also play a role. Sometimes, the close proximity has resulted in humans directly feeding a condor, which has led to the association of human activity with food or a complete lack of wariness around people. In these cases, the affected condor is deemed habituated as it no longer has a fear for humans and will approach them, usually seeking them out as a source of food. Habituation increases the risk of injury to condors and results in abnormal foraging and feeding behaviors. Furthermore, human safety is jeopardized in the event that a condor may injure an individual that is approached. Periodically, condors will come across a structure or collection of structures that serves as an attractant. Their social nature usually means that more than one condor will engage in the activity simultaneously. Condors perching on houses or other human structures increases the likelihood of condor/human interactions that can lead to habituation. These events were exhibited at a much higher frequency during early years following the establishment of condor release sites and persist, to a lesser degree, in each of the wild populations.

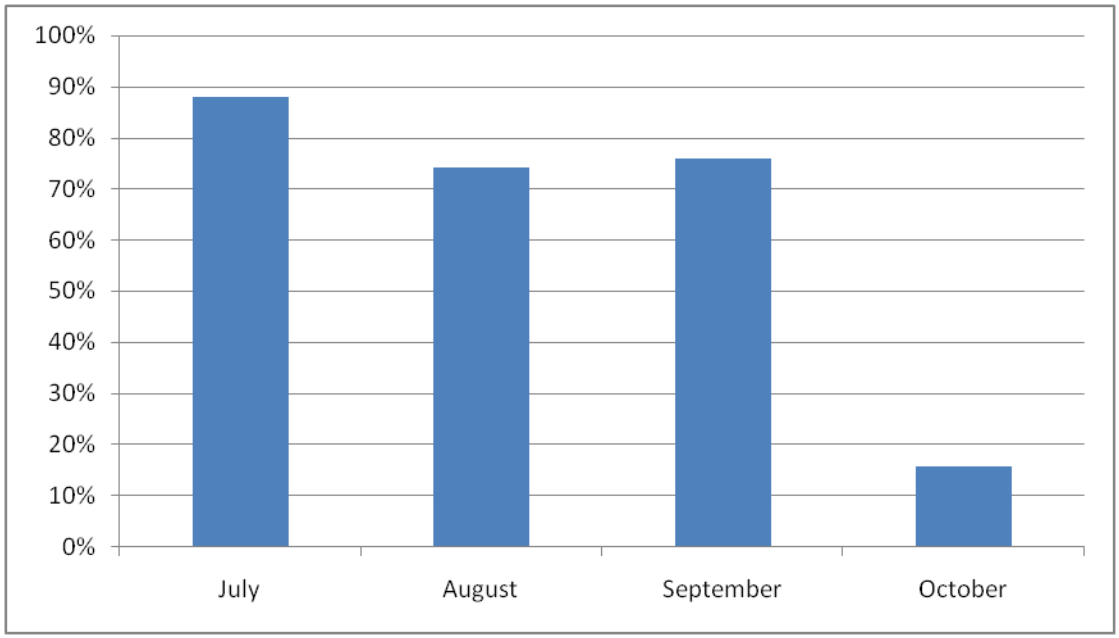
Figure 1. Condors loafing on a front porch of a BVS home.

In June 2012, condors began to perch and roost on and around the homes in the upper elevations of Bear Valley Springs (BVS), a gated community just outside the city of Tehachapi in Kern County, California. This situation involved a large number of the population of condors in Southern California that had recently expanded into the northern portions of the Tehachapi Mountains. The foothills of these mountains are actively ranched with cattle and it appears (as indicated by GPS

transmitter data) that these condorss are now regularly finding carrion in the area. After a feeding, condors will typically roost in nearby roosting habitat. The homes that condors visited in Bear Valley Springs are interspersed among high quality roosting habitat, which appeared to be the attractant in this situation.

Timeline of Situation

On June 19, 2012 a single condor was detected via GPS in the vicinity of houses at BVS. Since that time, the number of condors in the area increased with about 40% to 50% of the population present on most days. The GPS transmitter locations correspond with the visual data collected during the same time. The first report from BVS residents of condors in the area came on the 28th of June. A number of homes are not lived in year-round or are only inhabited during weekends. This could explain the delay in the initial report of condors observed in BVS. Condor Field Staff responded to reports, searched the surrounding area, and found condors perched on the roofs of houses. Staff were present the great majority of the days since the initial investigation with complete coverage (i.e. a person on site from sunrise to sunset) since July 10th when a campground was provided by the community. From July 1st to October 18th, 57 out of the 58 condors or 97% of the entire southern CA population free-flying were observed at BVS. Condor activity in BVS peaked in July and slowly tapered off in conjunction with hazing and the changing of the season (Figure 2). In total, condors were observed on 28 houses in BVS with the highest density of GPS occurring in the northwest portion of BVS (Figure 3).



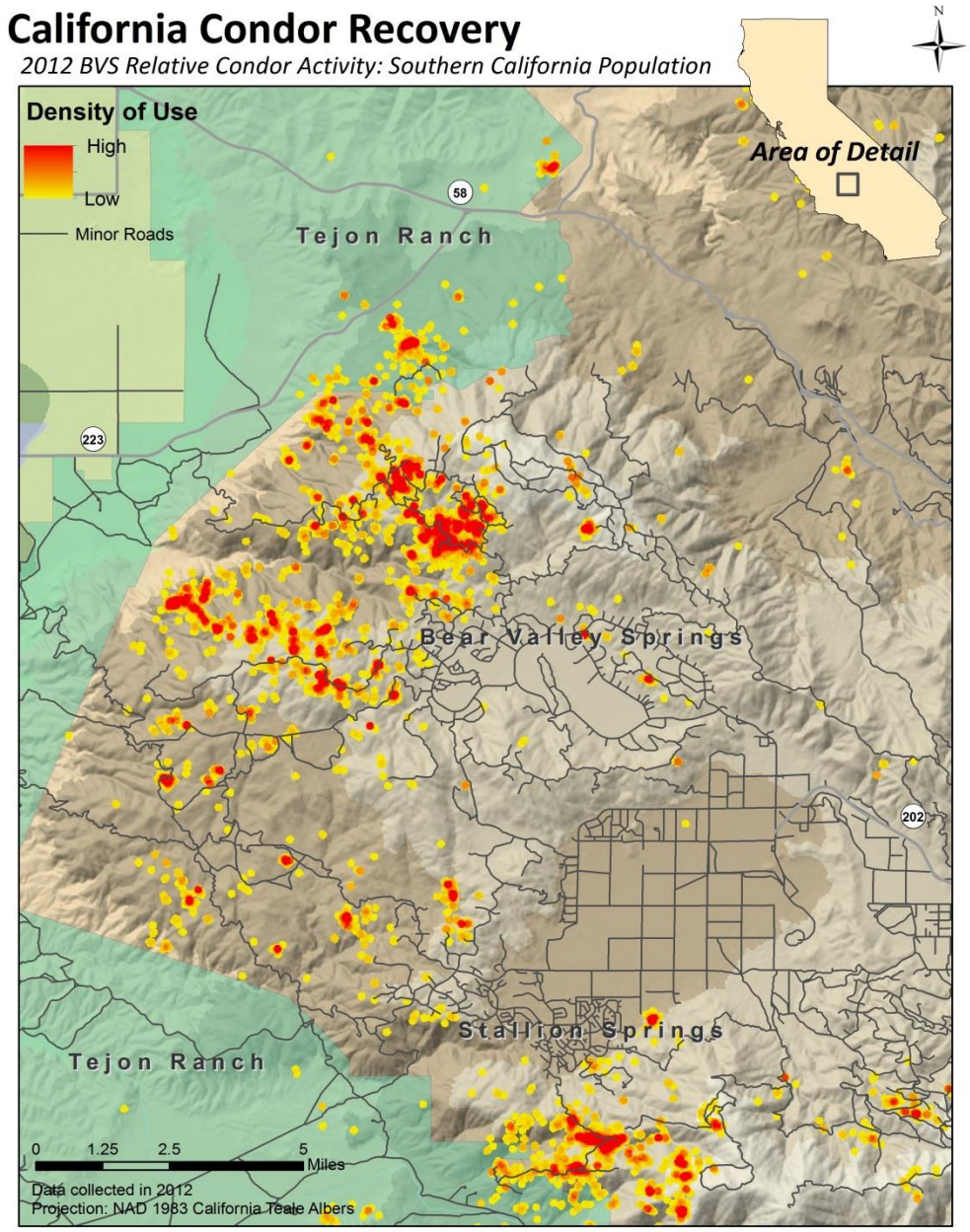


Figure 3. Relative condor activity at Bear Valley Springs and the surrounding area by California condors in 2012.

Staff Effort

The initial response to condors visiting BVS was delayed. In the recent past, we have seen similar small numbers of condors visit the outskirts of residential areas without cause for concern. As the number of condors increased in the area and we received a report of condors on homes, we deployed staff to investigate. The community is 3.5 hours from Ventura and 2.5 hours from Bitter Creek NWR, making response to the situation without a nearby base camp difficult. After making contact with the BVS Home Owners' Association, we were able to procure a

campsite without cost and subsequently stationed 1-2 people on site monitoring and hazing condors from sunrise to sunset.

Staff spent roughly 60 to 100 hours each week at BVS to monitor and haze condors from July 6th to October 18th. This level of coverage required numerous trips per week from Ventura, Bitter Creek NWR, or Hopper NWR to relieve staff members in order to avoid a single person having to work multiple 10 to 12 hour days. This effort was in addition to normal operations required for condors, including the concurrent trapping season, the monitoring and care of prerelease condors held in the flight pen at the Bitter Creek NWR, the monitoring and management of 6 active nests, and the regular weekly monitoring, maintenance, and supplemental feeding that occurs on Hopper Mountain NWR and Bitter Creek NWR.

Hazing consisted of using slingshots to shoot grapes or pieces of potatoes at the condors when they were perched on or near a house or using water guns when they were perched in closer proximity. The hazing practices have changed overtime and staff have found this technique to be effective at displacing condors while maintaining a low risk of injury to the condors. There was some discussion on whether it was appropriate to allow homeowners to haze condors on their own. We did not condone this approach because condors could be potentially injured by people who are untrained and who may exaggerate hazing methods at the expense of condor safety. In addition, many of the homes were vacant or only received periodic use, thus making staff presence a necessity. We expressed the desire to set up automated hazing devices on a few homes shown to have the most condor activity. The automated hazing system we proposed using were motion-activated sprinklers that are known as scarecrows. These devices were effective in the past in central California. Four homeowners accepted the offer and allowed such devices to be installed by staff members (Figure 4), while another household declined the offer. Some other neighbors that received condor visitation voiced interest in obtaining these devices in the future if they proved effective and the condors became a persistent issue at their property. Other systems such as motion activated alarms

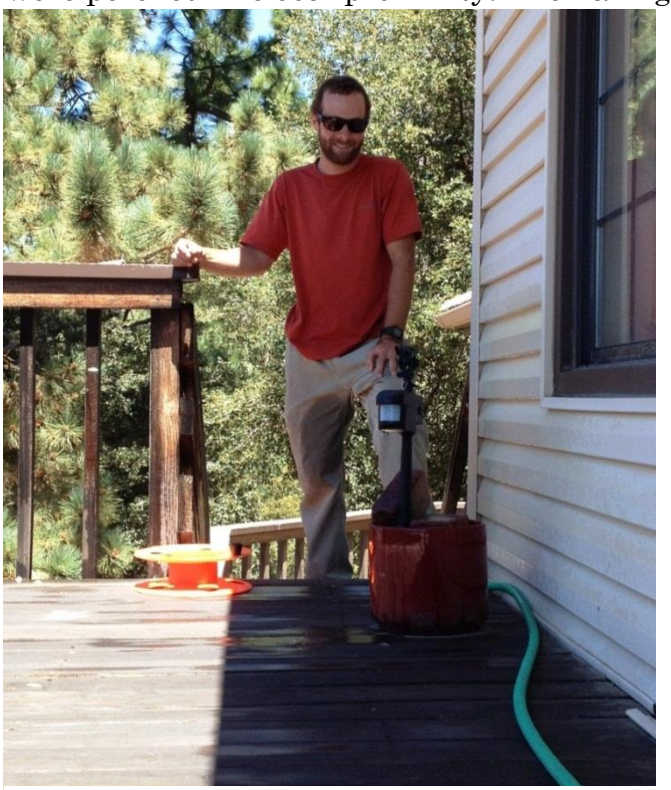


Figure 4. Newly installed scarecrow sprinkler at a BVS with high condor visitation.

and electric fencing were discussed with specific homeowners, however, these ideas were abandoned due to a condor's ability to deactivate the alarm and the low feasibility of fence installation. In both cases, scarecrow sprinklers were deployed instead.

In addition to corresponding with individual homeowners, we also performed outreach in the community at large. There were 2 public presentations to inform the residents of BVS about condor activity in the area. These presentations were focused on informing the residents about the need to keep condors away from people and homes and what actions to take and not to take if they see a condor on or near a residence. These presentations were well received with many positive comments following the reception. About 150 to 200 people attended these events in total. We also created a flyer (attached) for residents with these basic instructions if a condor is seen:

- Record wing tag # and color whenever possible
- Do not approach or feed condors
- Discourage condors from landing on your house by removing objects condors may be interested in (e.g. open trash containers, wires, seat cushions).
- Contact the USFWS California Condor Recovery Program at (805) 644-5185

The flyers were available at both public presentations and the BVS Home Owners' Association posted the flyer on their website.

Direct Costs

The direct operational costs related to this event have primarily consisted of person hours and gas to travel the 2-3 hours 10 to 15 times a week.
Other than these costs, we purchased additional hazing equipment (slingshots, additional slingshot bands, grapes/potatoes, and water guns) totaling about $200 to $250 dollars. We had 6 scarecrow sprinklers in our field equipment inventory available for use. A volunteer, Jan Hamber, donated 2 more scarecrow sprinklers to the California Condor Recovery Program.

Known property damage

In addition to the threat of injury and behavioral modification that condors face from perching on homes and being in close proximity to humans, there is also a high potential for property damage. Condors are a large species with a curious nature. They will often explore their environment with their large and powerful beak. Like many other species of wildlife, including the closely related Black Vulture (*Coragyps atratus*), condors can cause property damage by pulling on objects until they are damaged or torn apart. These exploratory activities create further risk to condors because these items can be eaten as microtrash or cause entrapment or entanglement.

The damage caused in this situation was difficult to assess because it is unclear what damage was caused by condors and what might have been caused by other wildlife in the area such as raccoons, which are also known to be a nuisance at BVS. Assuming the majority of the damage was caused by condors, damage to property consisted of torn/damaged window screens, deck furniture cushions, roofing tiles, boat and car covers, insulation around air conditioning unit pipes and water pipes, weather stripping around exterior doors and garage doors (Figure 5), grill covers, patio umbrellas, hot tub covers, tarps, wires, hoses, doormats and other small items picked at or torn apart around residences.

Figure 5. Condors congregated at a home in BVS and picking at the weather stripping around the basement

Media Coverage

The only known coverage of the condor activity in BVS is from the local newspaper, The Tehachapi News. The article was published on July 5, 2012 (http://www.tehachapinews.com/news/local/x918350531/CondorCondor-sightings-in-Tehachapi-area-expected-to-become-more-common). In the article, Joseph Brandt, the supervisory wildlife biologist for the USFWS California Recovery Program, answered a number of questions about the number of condors in the area and what residents should do in the event that a condor is seen. The article also quoted a local naturalist, Jon Hammond, who advised not to notify USFWS in the event of a condor sighting. This section prompted an immediate follow-up by Joseph Brandt in order to provide more information on why not reporting condor sightings could lead to dangerous situations for condors and property damage for home owners. It is unknown as to whether or not the author of the article printed an editorial response of Joseph's follow-up. The local community newsletter also included a write-up on the condor activity in Bear Valley Springs.

Closing comments

The condor activity in BVS is not unique. Over the years, there have been a number of situations similar to this incident where condors, after recolonizing an area, have perched on human structures and come into close proximity with people. There has been much debate and speculation in the past as to why these events have occurred and whether they will diminish or cease as the population matures. These events are likely the result of condors' innately curious nature coupled with increased human presence in their range. With the successful reestablishment of a condor population and its continued recolonization into the available habitat throughout the region, it is evident that these interactions will continue into the future. It is

likely that the situation at BVS will continue seasonally into the indefinite future as condors find food in the surrounding ranchlands and return there to roost. The expanding population and natural feedings are positive signs that the population has become more independent from the intensive management that occurs to allow the species to survive. While positive for long-term recovery goals, the movement into habitat with human civilization will present managers with more challenges prior to the recovery of the species.

Please contact Joseph Brandt, Supervisory Wildlife Biologist, for additional information.

Appendix IV. Condor Monthly Activity Reports

Condor Field Program Monthly Activity Report January 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

1/29/2012, G. Grisdale (Wildlife Biologist) promoted to GS 9 (Full Performance.)

1/16/2011, K. Chaplin (STEP Bio Sci Tech) resumed school back to working part time under new schedule.

Feb 6-17, 2012, Announcement for Wildlife Biologist (Vice Massey) will be posted on to USA Jobs. Joseph Brandt (Sup. Wildlife Biologist) worked with Jessica Clarkson (HR) to draft an announcement. Position will be advertised as a GS 7/9. Announcement was posted on to USA Jobs for two weeks

Interns

Feb 8, 2012 Angela Woodside's (Intern) last day. Angela was intern for 12 months.

Feb 17 or 21, 2012 Chris Smith (Intern) start date. Chris will intern for 3 months

PU:

1/15/2012 Vince Gerwe (Friends of Condor Wild & Free) led tour for Audubon Morrow Bay Bird Festival at Bitter Creek NWR. SUP deliverable was Condor IDs and Bird list.

1/25/2012 Joseph Brandt (Sup. Wildlife Biologist) & Devon Lang (Bio Sci Tech). Attend Condor Genetics Master Planning Meeting at LAZ. Joseph chaired meeting.

1/26/2012 Joseph Brandt (Sup. Wildlife Biologist), Geoff Grisdale (Wildlife Biologist), Josh Felch (Bio Sci Tech), Katie Chaplin STEP Bio Sci Tech), Mike Brady (Project Leader), Angela Woodside (Intern), Marian Wahl (Intern) attended the Condor program field team meeting. Joseph, Geoff, & Katie were presenters. Meeting was at LAZ.

1/27/2012 Joseph Brandt (Sup. Wildlife Biologist) attended Condor program keeper meeting. Meeting was at LAZ.

1/28 & 30/2012 "The Non-lead Hunter" was shown at SB international film festival.
This is a 23 minute film hunter education film by Anthony Prieto highlighting the benefits of using lead-free ammo for wildlife HMNWRC was a contributor.

Condors:

12/29/2011 Josh Felch (Bio Sci Tech) & Katie Chaplin (STEP Bio Sci tech) release condors 137 & 147 at Bitter Creek NWR. This was an older breeding pair most recently held at Oregon Zoo. The pair spent 6 weeks in the Bitter Creek Flight Pen prior to release. Condor 147 making good progress and becoming integrated into the wild flock after about 1 month she began feeding and roosting with other condors. 137 failed to make progress, after about 3 weeks on refuge he flew off refuge and failed to return, was trapped via net gun on 2/6/2012 by Joseph Brandt (Sup. Wildlife Biologist) and Katie in Tecuya Cyn on the Wind Wolves Preserve.

1/1/2012 Joseph Brandt (Sup. Wildlife Biologist) & Jesse Grantham (Condor Program Coordinator) were coauthors of PATTERNS OF MORTALITY IN FREE-RANGING CALIFORNIA CONDORS (*GYMNOGYPS CALIFORNIANUS*) with Rideout et al. in Journal of Wildlife Diseases 48(1).
1/15/2012 Katie Chaplin (STEP Bio Sci Tech) & Joseph Brandt (Sup. Wildlife Biologist) Flight Pen Feeding Site Camera is operational at Bitter Creek NWR. Camera will be used by field staff to improve feeding observations at flight pen feeding site and as a system proof of design for a nest camera to be installed in 2012. Footage collected will be archived and analyzed by Santa Barbara Zoo partners for behavioral research.

Maintenance:
Geoff Grisdale Setting dates with the Friend of the Condor Wild and Free to assist in repairing the floor of the flight Pen blind at Bitter Creek Flight Pen. (ETA Mid-March) The recapture of 137 will make scheduling a little more critical.

Condor Field Program Monthly Activity Report February 2012
Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:
Personnel:
Staff
Feb 17, 2012, Announcement for Wildlife Biologist (Vice Massey) closed. Currently reviewing resumes checking references. Deadline is 4/08/2012.
Interns
Feb 8, 2012 Angela Woodside's (Intern) last day. Angela was intern for 12 months.
Feb 17 or 21, 2012 Chris Smith (Intern) start date. Chris will intern for 3 months.
Geoff is posting a new announcement. Christina and Chris are leaving in leaving in the middle of April.

PU:
2/10/2012 Joseph Brandt (Sup. Wildlife Biologist) Participated in call to discuss the Los Padres NF Oil and Gas Lease project. Concerns about hazing as it relates to project.
2/6-10/2012 Geoff Grisdale attends Refuge Biological Conservation at NCTC.
2/27-3/2/2012 Joseph Brandt (Sup. Wildlife Biologist) Attended 40 hour DOI Supervisors training in Sacramento.
2/18/2012 Joseph Brandt (Sup. Wildlife Biologist) & Geoff Grisdale (Wildlife Biologist) visit the Wes Thompson Piru Shooting Range. Met Wes and discussed possibility of doing a shooting event. Will follow up next time Leland (IWS) is in town (May.)
2/21/2012 Joseph Brandt (Sup. Wildlife Biologist) Attended meeting to discuss the Barron Ridge Power line project with ES. Project is overhauling of large transmission line the runs through the western side of the Los Angeles NF.
2/23/2012 Geoff Grisdale (Wildlife Biologist), Ria Boner (SBZ) and Molly Astell (SBZ) hosted the volunteer nest observer training. 15 attendees. Alternate training date is 3/26/2012 will train an additional ~10 people.
2/27-3/1/2012 Geoff Grisdale (Wildlife Biologist) & Devon Lang (Bio Tech) Attend Intro to GIS training in Ventura.

3/29/2012 Joseph Brandt (Sup. Wildlife Biologist) is scheduled to give 20 minute talk at the Ventura Birding Club's monthly meeting.

Condors:

2012 Nests *Nest has not confirmed but strongly indicated by GPS data

Nest ID	Male	Female	Egg ID	Location	Lay Date
DG12*	206	370	FW112	Devil's Gate (Lower Sespe)	3/1/2012
RC12*	239	289	FW212	Reasoner Cyn (West of Lake Piru)	3/9/2012

2/6/2012 by Joseph Brandt (Sup. Wildlife Biologist) and Katie Chaplin (STEP Bio Tech) Net gun condor #137 in Tecuya Cyn on the Wind Wolves Preserve. Condor #480 and condor #489 trapped to allow for 137 to socialize. 137 will be held until next fall and re-released with 2012 cohort.
2/10/2011 Katie Chaplin (Bio Tech) discovers horse near Lebec, CA. Horse is suspected to have been shot. Trapped condor #107, condor #156, and condor #161 (all three fed on horse) at Hopper Mt NWRC to determine if potential lead exposure. Lead levels came back low and condors were released.

Maintenance:
Setting dates with the Friend of the Condor Wild and Free to assist in repairing the floor of the flight Pen blind at Bitter Creek Flight Pen. (ETA Mid-March) The recapture of condor #137 and training in Feb delayed project. 137 will be moved to Hopper Mt to be housed with first condors of 2012 in mid-march this should give friends group about a month to complete project.

Condor Field Program Monthly Activity Report March 2012
Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:
Personnel:
Staff
Mar 30, 2012, Selection made for Wildlife Biologist (Vice Massey.) Laura Mendenhall has been tentatively offered the position. Start date TBA (~May 21,2012.)
Interns
No changes in intern staff. All will be leaving in mid-April.

PU:
3/24/2012 Mike Clark gives talk for Friends or the CA Condor W&F
3/25/2012 Joseph Brandt (Sup. Wildlife Biologist) 30 minute talk at the Ventura Birding Club's monthly meeting.
3/16-24/2012 French Film Crew filming condor work at HM & BC.
3/30/2012 Devon Lang (Biological Technician) & Josh Felch (Biological Technician) attend San Caytano Elementary School Career day.

Condors:

2012 Nests *Nest has not confirmed but strongly indicated by GPS data

Nest ID	Male	Female	Egg ID	Location	Lay Date
DG12	206	370	FW112	Devil's Gate (Lower Sespe)	3/1/2012
RC12*	239	289	FW212	Reasoner Cyn (West of Lake Piru)	3/9/2012
TC12	374	180	FW312	Tom's Cyn	3/13/2012
SP12	247	79	FW412	South Potrero	3/15/2012
SC12	328	216	FW512	Santiago Cyn (Near Bitter Creek)	4/2/2012

3/5-6/2012 Joseph Brandt (Sup. Wildlife Biologist) & Geoff Grisdale (Wildlife Biologist) Basic Chain saw training at Tijuana Slough NWR.
3/7-8/2012 Geoff Grisdale (Wildlife Biologist), Devon Lang (Biological Technician), Josh Felch (Biological Technician), Katie Chaplin (Step Biological Technician) attend nest entry ropes training, Joseph Brandt (Sup. Wildlife Biologist) was instructor.
3/14/2012 Joseph Brandt (Sup. Wildlife Biologist) attends Sec 6 research meeting.
3/16/2012 Received two prerelease Condors form SDSP (condor #590, condor #597.)
3/20/2012 Worked up and released condor #63, condor #480, condor #489. Transferred condor #137 to HMFP.
3/24/2012 Joseph Brandt (Sup. Wildlife Biologist) and Katie Chaplin (Step Bilogical Technician) perform Fertility Check of FW112. Egg was fertile and correct age for estimated lay date.

Maintenance:

3/23 & 30/2012 Friends Group BCFP repairs. (Blind floor, Pond and Gravel)

Condor Field Program Monthly Activity Report April 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

Mar 30, 2012, Selection made for Wildlife Biologist (Vice Massey.) Laura Mendenhall will start May 28th.

Interns

Christina Varian left April 11th
Marian Wahl left April 16th
Chis Smith left April 18th
Corrine Ross April left April 25th
Matt Landever started April 30th
Sam Simmons Started May 7th
Geoff has an additional intern lined up to start on the 29th (Danny Raleigh) and is working to hire one more.

PU:

4/18/2012 Devon Lang met with Leland Brown (IWS) at the Piru shooting range. Owner agreed to host a shooting event this summer. We will also set up a both at Savage Arms demo day on May 19th and 20th.
4/24/2012 Michael Woodbridge, Josh Felch, Katie Chaplin spoke with reporter from APM about Condors in a wind energy related story.
4/16-5/4/2012 Joseph Brandt attends Refuge Managers Academy at NCTC.

Condors:

2012 Nests *Egg was swapped with foster egg; **Not yet confirmed

Nest ID	Male	Female	Egg ID	Location	Lay Date	Hatch Date
DG12	206	370	FW112	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	Reasoner Cyn	3/9/2012	5/5/2012**
TC12	374	180	FW312/12Taki1	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412/12Tene1	South Potrero	3/15/2012	4/25/2012*
SC12	328	216	FW512	Santiago Cyn	4/2/2012	Tba
KR12	125	111	FW612	Koford's Ridge	4/27/2012	Tba

4/11/2012 Geoff Grisdale met with Mona Iannelli and Robert Fenwick at Rancho del la Cruz. Area cleaner than before but still a concern.
4/12/2012 Joseph Brandt and Devon Lang enter TC12. FW312 was not viable and replaced with a dummy
4/13/2012 Joseph Brandt, Devon Lang, and Katie Chaplin enter SP12. FW412 was not viable and replaced with a dummy. Nest camera installed!
4/19/2012 Devon Lang and Mike Clark place replacement egg into TC12.
4/23/2012 Geoff Grisdale and Josh Felch place replacement egg into SP12
4/25/2012 Geoff Grisdale and Mike Clark check SC12. FW512 was fertile.
5/1/2012 Geoff Grisdale and James Rasico climb into DG12. Egg hatched there is a chick!

Maintenance:

Started mowing trails and creating fire clearings with ATV pull behind mower.

Condor Field Program Monthly Activity Report May 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

May 29, 2012, Laura Mendenhall joined the team May 29th.

Interns

Matt Landever started April 30th
Sam Simmons started May 7th
Danny Raleigh started May 29th
Caitly Bowman started June 4th

Thanks to Geoff who to on the responsibility for recruiting and hiring the most recent group of interns!

PU:

5/16-17/2012 Joseph Brandt (16th, 17th), Devon Lang (16th), and Geoff Grisdale (17th) attended the CCP public comment meetings in Ventura and Taft.
5/19-20/2012 Joseph Brandt (19th), Geoff Grisdale (19th, 20th), and Katie Chaplin (20th) helped with lead-free outreach at the Savage Arms Demo Days at Piru Shooting Range on May 19th and 20th.A booth was set up by Leland Brown and Ben Smith of IWS.
5/20/2012 Joseph Brandt led Ojai Cub Scout Troop on tour of Bitter Creek NWR. Group of 10 Cub Scouts with their parents attended.
5/21-25/2012 Devon Lang attended Basic Bird Biology at NCTC.
5/22-24/2012 Joseph Brandt attended the Condor Stewardship Outreach Workshop in Zion National Park. This event focused on teaching interpreters and environmental educators the effects of lead on condors and other wildlife and techniques and messaging for lead-free outreach. The final day explored the possibility a national wildlife lead awareness group tentatively titled Wildlife Unleaded.

Condors:

2012 Nests *Egg was swapped with foster egg

Nest ID	Male	Female	Egg ID	Location	Lay Date	Hatch Date
DG12	206	370	FW112	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312/12Taki1	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412/12Tene1	South Potrero	3/15/2012	4/25/2012*
SC12	328	216	FW512	Santiago Cyn	4/2/2012	4/28/2012
KR12	125	111	FW612	Koford's Ridge	4/27/2012	Tba

5/2/2012 Josh Felch and Molly Astell discover the location of RC12 after many weeks attempting to locate the nest.
5/14/2012 Geoff Grisdale transferred condors 137, 590, and 597 from Hopper Mountain Flight Pen to Bitter Creek Flight Pen.
5/15/2012 Geoff Grisdale received condors 591, 594, 596, and 604 from the Debbie Marlow (SDSP)
5/24/2012 Geoff Grisdale and Jenny Thule (LAZ) enter TC12 for 30 day chick exam.
5/25/2012 Joseph Brandt and Mike Clark (LAZ) enter KR12 to check fertility of FW612. Egg was fertile
5/25/2012 Joseph Brandt and Mike Clark (LAZ) enter SP12 for 30 day chick exam.
5/29/2012 Joseph Brandt and Debbie Ciani (LAZ) enter DG12 for 30 day chick exam.
5/30/2012 Joseph Brandt, Geoff Grisdale, Laura Mendenhall, Devon Lang, Josh Felch, and Katie Chaplin attend 30 day chick handling training at LAZ.

Maintenance:

K. Chaplin and Josh Felch completed mowing trails at Hopper Mt NWR.
Bitter Creek Flight Pen Area should be mowed this month and NRFS road needs to be scraped.

Condor Field Program Monthly Activity Report June 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

6/17/2012 Katie Chaplin now on a FT summer schedule: Sun off; M,Tu office; Th-Fri Field; Sat off

Interns

Matt Landever started April 30th
Sam Simmons started May 7th
Danny Raleigh started May 29th
Caitly Bowman started June 4th

PU:

6/2/2012 Joseph Brandt attended the CDFG Southern Zone Advanced Hunter Education Course with Leland Brown and Ben Smith (IWS) to man a lead-free outreach booth and perform a shooting demo
6/13/2012 Joseph Brand, Michael Glen (FWS ES), and Colleen Melberg (FWS ES) provide tour to the Bishop Paiute Tribal Youth Summer Camp. 15 students attended ranging from elementary to high school ages.
6/20/2012 Joseph Brandt hosted the BBC Kids program Natalie's Nightmare of Nature Children's Program to film a condor work up for one of their episodes.
6/25/2012 Joseph Brandt coauthored **Lead poisoning and the deceptive recovery of the critically endangered California condor** (Finkelstein et al. 2012) which was released as an early addition at the PNAS website (pnas.org)
6/27/2012 Geoff Grisdale, Laura Mendenhall, Devon Lang, Josh Felch, and Katie Chaplin attended the Wilderness First Aid/CPR/AED Training held at Hopper Mountain NWR. SB Zoo and UC Davis field staff also attended.
6/28/2012 Joseph Brandt attended a Condor/Wind Energy research meeting at the Regional Office in Sacramento.

Condors:

2012 Nests *Egg was swapped with foster egg

Nest ID	Male	Female	Egg ID	Location	Lay Date	Hatch Date
DG12	206	370	FW112	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312/12Taki1	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412/12Tene1	South Potrero	3/15/2012	4/25/2012*
SC12	328	216	FW512	Santiago Cyn	4/2/2012	4/28/2012
KR12	125	111	FW612	Koford's Ridge	4/27/2012	6/23/201

6/4-5/2012 Joseph Brandt and Josh Felch entered RC12 for 30 day exam of chick which was confirmed via the nest entry.
6/13/2012 Joseph Brandt, Geoff Grisdale, Laura Mendenhall, Devon Lang, Josh Felch, and Katie Chaplin perform condor work up day at Bitter Creek NWR 18 condors processed. Interns and SB Zoo Staff also assisted. No condors required treatment
6/20/2012 Joseph Brandt, Geoff Grisdale, Laura Mendenhall, Devon Lang, Josh Felch, and Katie Chaplin perform condor work up day at Bitter Creek NWR 14 condors processed. Interns and SB Zoo Staff also

assisted. Two condors (condor #289 and condor #360) required treatment for elevated Pb levels and were transported to LAZ.
6/21/2012 Devon Land and Mike Clark (LAZ) perform 60 day exam at TC12 nest.
6/22/2012 Joseph Brandt and Devon Lang perform 60 day exam at SP12 nest.
6/25/2012 Katie Chaplin picked up condors (condor #289 and condor #360) following chelation treatment for Pb at LAZ.
6/25/2012 Geoff Grisdale and Josh Felch perform hatch confirmation at KR12 nest.
6/25/2012 Joseph Brandt and Jenny Thule (LAZ) perform 60day exam at the DG12 nest
6/28/2012 Geoff Grisdale and Laura Medenhall perform 30 day exam at the SC12 nest.

Maintenance:
6/15/2012 Katie Chaplin mowed/weeded around Bitter Creek Bunkhouse and out buildings
6/21-22/2012 Josh Felch, Katie Chaplin, Dan Tappe (Thanks Dan) and interns mowed the Bitter Creek Flight Pen area.

Condor Field Program Monthly Activity Report July 2012
Prepared by Joseph Brandt (Supervisory Wildlife Biologist)
Categories:
Personnel:
Staff
No Changes
Interns
Matt Landever started April 30th
Sam Simmons Final Day was Aug 1st
Danny Raleigh started May 29th
Caitly Bowman started June 4th

PU:
7/7/2012 Devon Lang and Katie Chaplin attended a lead-free shoot out in Kernville with Ben Smith (IWS) to setup a lead-free outreach booth and perform a shooting demo. ~10 people attended
7/10/2012 Joseph Brandt spoke at Bear Valley Springs Town Hall Meeting about condor/human interactions and the dangers of habituation. ~150 people attended
7/14/2012 Joseph Brandt spoke at the Bear Valley Springs Women's Club monthly social. ~75 people attended.
7/14/2012 Luara Mendenhall attended a Hunter Education Class out in San Louis Obispo with Ben Smith (IWS) performed a shooting demo. ~50 people attended
7/15/2012 Joseph Brandt and Katie Chaplin attended a lead-free shoot out in Kernville with Ben Smith (IWS). Setup a lead-free outreach booth to hand out boxes of free nonlead ammo and perform a shooting demo. ~60 people attended, ~30 boxes of ammo were given out.
7/21/2012 Geoff Grisdale attended a lead-free shoot out in Visalia with Ben Smith (IWS). Setup a lead-free outreach booth to hand out boxes of free nonlead ammo and perform a shooting demo. ~60 people attended, ~30 boxes of ammo were given out.

Condors:

2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412→12Tene1	654	South Potrero	3/15/2012	4/25/2012*
SC12	328	216	FW512	671	Santiago Cyn	4/2/2012	4/28/2012
KR12	125	111	FW612	678	Koford's Ridge	4/27/2012	6/23/201

Bear Valley Springs: A large portion of the flock has been visiting Bear Valley Springs, a community in the northern Tehachapi Mountains. Many condors have been observed on and around residencies and have required day time surveillance of the area and frequent hazing activities. 1 to 2 members of the condor team have been camping at the community for most of the month. See BVS situation report for further detail.

7/11/2012 Geoff Grisdale, Katie Chaplin, Josh Felch, and Laura Mendenhall Worked up 7 condors at Bitter NWR. Two condors (#369 & #428) blood lead level tested greater than 35µg/dL and were transported to LAZ for treatment.
7/19/2012 Joseph Brandt, Devon Lang and Katie Chaplin trapped and worked up condor 627 at Hopper Mountain NWR.
7/20/2012 Joseph Brandt picks up #428 and #369 from LAZ and transports them to Bitter Creek NWR for re-release.
7/20/2012 Joseph Brandt and Katie Chaplin work up #239 at Bitter Creek NWR.
7/23/2012 Joseph Brandt and Curtis Eng (LAZ) perform 90 day exam at TC12 nest.
7/24/2012 and Curtis Eng (LAZ) perform 90 day exam at SP12 nest.
7/25/2012 Geoff Grisdale, Devon Lang, and Laura Mendenhall 30 day exam at KR12 nest.
7/25/2012 Joseph Brandt, Josh Felch, and Katie Chaplin perform 60 day exam at SC12 nest.
7/26/2012 Joseph Brandt, Chandra David (LAZ), and Karl Hill (LAZ) perform 90 day exam at DG12 nest
7/31/2012 Geoff Grisdale, Laura Mendenhall, Josh Felch, James Rasico (UCDavis) worked up 7 condors at Bitter Creek NWR. All were released

Maintenance:

Not a lot of maintenance. The Hopper Peak Trail was weed-whacked this month by condor team.

Condor Field Program Monthly Activity Report Aug 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

8/27/2012 Katie Chaplin begins school and has a new TOD. She will be working Thursday- Sunday.
8/21-9/5/2012 Devon Lang was off. She got married! Congratulations Devon!

Interns
Matt Landever started April 30th
Sam Simmons Final Day was Aug 1st
Danny Raleigh started May 29th
Caitly Bowman started June 4th
Ryane Cox started September 10th
PU:
8/2-3/2012 Joseph Brandt & Ken Convery attended California Condor Program Partners meeting in Portland Oregon.
8/9/2012 Dan Tappe & Josh Felch provided tour of Bitter Creek NWR for a minority focused career group sponsored by the FWS.

Condors:
2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412→12Tene1	654	South Potrero	3/15/2012	4/25/2012*
~~**SC12***~~	~~328~~	~~216~~	~~FW512~~	~~671~~	~~Santiago Cyn~~	~~4/2/2012~~	~~4/28/2012~~
KR12	125	111	FW612	678	Koford's Ridge	4/27/2012	6/23/201

*SC12 failed on ~16 Aug with the chick apparently falling from the nest and suffering multiple broken bones. Any underlining causes of the fall have not been determined.

Bear Valley Springs: 1 to 2 members of the condor team continue to camp at the community to monitor the condor activity in the area. We have have been successful installing motion activated sprinklers at a number of houses and are looking to expand the use of these sprinklers. We are also working to provide a presentation to the BVS PD and to look into the potential for more community involvement to assist with monitoring and hazing efforts.

8/6-7/2012 Joseph Brandt, Katie Chaplin, Devon Lang, & Geoff Grisdale participate in the temporary evacuation of the DG12 Chick in order to treat for an elevated blood lead level. Katie spent the night in the nest.
8/12-14/2012 Katie Chaplin, Molly Astell (SBZ), Vince Gerwe (FOCWF) & David Moen (VWS) travel to Boise, ID to pick up 8 condors from the World Center of Birds of Prey and transfer them to Bitter Creek NWR.
8/15/2012 Joseph Brandt, Geoff Grisdale, Katie Chaplin, Davod Moen & Interns work up condors at Bitter Creek Flight Pen
8/15/2012 Joseph Brandt & Katie Chaplin drive from Bitter Creek to LAZ to transfer 2 condors to LAZ and 2 condors to SDSP. (4 condors picked up from Bosie, ID)
8/19/2012 Joseph Brandt & Geoff Grisdale confirm the failure of SC12 and recover the chick about 200 feet below the nest.

8/21/2012 Joseph Brandt, Laura Mendenhall, & Katie Chaplin perform 120 day exam at TC12 nest. Chick is tagged! No more entries.
8/22/2012 Joseph Brandt & Laura Mendenhall perform 60 day exam at KR12 nest.
8/23/2012 Joseph Brandt & Jenny Thule (LAZ) perform 120 day exam at SP12 nest.
8/24/2012 Joseph Brandt & Chandra David (LAZ) perform 119 day exam at DG12 nest due to previous lead exposure chick is delayed and was not tagged will attempt to tag the chick next month.

Maintenance:
None

Condor Field Program Monthly Activity Report Sept 2012
Prepared by Joseph Brandt (Supervisory Wildlife Biologist)
Categories:
Personnel:
Staff
No changes
Interns
Matt Landever started April 30th
Sam Simmons Final Day was Aug 1st
Danny Raleigh started May 29th
Caitly Bowman started June 4th
Ryane Cox started September 10th
PU:
9/10-14/2012 Joseph Brandt attended training in Fort Collins: Designing a Biological Monitoring Program.
9/30/2012 Friends of the California Condor provided tour of Hopper NWR. ~20 people attended.

Condors:
2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412→12Tene1	654	South Potrero	3/15/2012	4/25/2012*
~~**SC12***~~	~~328~~	~~216~~	~~FW512~~	~~671~~	~~Santiago Cyn~~	~~4/2/2012~~	~~4/28/2012~~
~~**KR12****~~	~~125~~	~~111~~	~~FW612~~	~~678~~	~~Koford's Ridge~~	~~4/27/2012~~	~~6/23/201~~

*SC12 failed on ~16 Aug with the chick apparently falling from the nest and suffering multiple broken bones. Any underlining causes of the fall have not been determined.
**KR12 failed on 9/28 after chick died during nest entry. Chick appeared to be sick and under fed.

Bear Valley Springs: 1 to 2 members of the condor team continue to camp at the community to monitor the condor activity in the area. We have been successful installing motion activated sprinklers at a

number of houses and are looking to expand the use of these sprinklers. September has had a drop in condor activity on houses while still in area the condors have required less hazing perching in trees.

9/18-19/2012 Joseph Brandt and Geoff Grisdale Enter RC12 for 135 day exam. Chick was health and tagged. Final entry for this nest.
9/20/2012 Joseph Brandt travels to SB Zoo to train keeper staff andassist with retagging their exhibit condors.
9/21/2012 Joseph Brandt, Steve Kirkland, and Jenny Thule (LAZ) enter KR12. Chick appeared to be undersized but acting healthy and entry is planned to re-check on 9/28/2012.
9/25/2012 Joseph Brandt and Jenny Thule (LAZ) enter DG12. 150 day old chick is healthy and is tagged. Final entry for this nest.
9/28/2012 Joseph Brandt and Geoff Grisdale enter KR12. Chick is still under sized and has not been fed. Chick appeared very sick and dies during nest entry.

Condor Field Program Monthly Activity Report Oct 2012
Prepared by Joseph Brandt (Supervisory Wildlife Biologist)
Categories:
Personnel:
Staff
No changes
Interns
Matt Landever last day was Oct 30th
Marie McCann starts Nov 13th
Danny Raleigh started May 29th
Caitlyn Bowman started June 4th
Ryane Cox started September 10th

PU:
10/01-5/2012 *Geoff Grisdale* assisted with Small Mammal Trapping at Bitter Creek NWR.
10/3-4/2012 *Joseph Brandt, Steve Kirkland, & Mike Brady* attended Alta East Wind Farm VHF detection and avoidance demonstartion
10/9-11/2012 *Josh Felch* assisted with small mammal trapping at Bitter Creek NWR.
10/18/2012 *Laura Mendenhall* assisted with Friends talk in Sequoia NF headquarters ~20 people attended.
10/20/2012 *Laura Mendenhall* assisted with Friends tour at Bitter Creek NWR. ~30 people attended.
10/30/2012 *Joseph Brandt* presented to the Tehachapi Audubon Chapter. ~20 people attended.

Condors:
2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*

SP12	247	79	FW412→12Tene1	654	South Potrero	3/15/2012	4/25/2012*
~~**SC12****~~	~~328~~	~~216~~	~~FW512~~	~~671~~	~~Santiago Cyn~~	~~4/2/2012~~	~~4/28/2012~~
~~**KR12****~~	~~125~~	~~111~~	~~FW612~~	~~678~~	~~Koford's Ridge~~	~~4/27/2012~~	~~6/23/201~~

* Eggs replaces with captive laid eggs.

** SC12 failed on ~16 Aug with the chick apparently falling from the nest and suffering multiple broken bones. Any underlining causes of the fall have not been determined. KR12 failed on 9/28 after chick died during nest entry. Chick appeared to be sick and under fed.

Bear Valley Springs: Condor activity at Bear Valley Springs has waned with only a few condors visiting periodically. Staff is no longer stationed there daily. We expect the activity to resume in the spring but have many motion activated sprinklers in place.

10/03/2012 *Laura Mendenhall & Josh Felch* released condor #590 & 596.
10/05/2012 *Molly Astell (SBZ)* observed the fledge of 648 (TC12).
10/13/2012 Hunting season opened at Hopper Mt NWR.
10/24/2012 *Bill Langford (Vol)* observed fledge of 654 (SP12).
10/25/2012 *Geoff Grisdale & Devon Lang* released condor #137, 591, & 604. (Two more condors left to release.)

Condor Field Program Monthly Activity Report Nov 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff
No changes
Interns
Ryane Cox started September 10th
Matt Landever last day Nov 7th
Marie McCann started Nov 13th
Danny Raleigh last day 21th
Jerry Cole started Nov 26th
Caitlyn Bowman last day Nov 28th
Ben Teton starts Dec 6th

PU:

11/09/2012 Joseph Brandt participates on Section 6 Database call with VWS, PNM, & CDFG.
11/23/2012 Laura Mendenhall, Josh Felch, Marie McCann receive ATV/UTV training. (Thanks Dan!)

Condors:

2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012

TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*
SP12	247	79	FW412→12Tene1	654	South Potrero	3/15/2012	4/25/2012*
~~**SC12****~~	~~328~~	~~216~~	~~FW512~~	~~671~~	~~Santiago Cyn~~	~~4/2/2012~~	~~4/28/2012~~
~~**KR12****~~	~~125~~	~~111~~	~~FW612~~	~~678~~	~~Koford's Ridge~~	~~4/27/2012~~	~~6/23/201~~

* Eggs replaces with captive laid eggs.

** SC12 failed on ~16 Aug with the chick apparently falling from the nest and suffering multiple broken bones. Any underlining causes of the fall have not been determined. KR12 failed on 9/28 after chick died during nest entry. Chick appeared to be sick and under fed.

11/08/2012 Geoff Grisdale kenneled 159, 602, 606 & 626 and transferred to Pinnacles Nat'l Monument
11/11/2012 Last Day of Big Game Rifle Season for zone D-10 (Hoppper and Bitter Creek), Fall trap up begins.
11/15/2012 Laura Mendenhall and Josh Felch release 594 and 625 at Bitter Creek NWR.
11/15/2012 Josh Felch traps 21 condors at Bitter Creek NWR
11/19/2012 RC12 nest successful, 670 observed flying above nest (fledge date unknown.)
11/20/2012 All condor staff with assistance from SB Zoo and LA Zoo processed 21 condors at Bitter Creek NWR. 3 condor (98, 125, & 462) were transported to the LAZ for elevated lead levels. One condor (483) held in Bitter Creek NWR flight pen for beak maintenance.
11/21/2012 Caitlyn Bowman trapped 12 condors at the Bitter Creek NWR.
11/23/2012 Caitlyn Bowman trapped 6 condors at the Bitter Creek NWR.
11/27/2012 Condor Staff with assistance from SB Zoo worked up 18 condors. All were released.

Maitenece:

11/30/2012 Hill Top O.P. shade structure collapsed.

Condor Field Program Monthly Activity Report DEC 2012

Prepared by Joseph Brandt (Supervisory Wildlife Biologist)

Categories:

Personnel:

Staff

No changes

Interns

Ryane Cox started September 10th
Marie McCann started Nov 13th
Jerry Cole started Nov 26th
Ben Teton starts Dec 6th

PU:

12/04/2012 Geoff Grisdale, Devon Lang, and Ben Teton receive ATV/UTV training. (Thanks Dan!)
12/04/2012 Joseph Brandt presents about condors to Will Rogers Elementary School 1st Grade Class (49 Students)
12/12/2012 Devon Lang presents about condors to the Thurgood Marshall Elementary School 3rd Grade Class (90 students)
12/18/2012 The Condor Cave is published on Facebook. There were 14 posts and 296 likes in December

Condors:

2012 Nests *Egg was swapped with foster egg

Nest ID	Sire SB#	Dam SB#	Egg ID	Chick SB#	Location	Lay Date	Hatch Date
DG12	206	370	FW112	658	Devil's Gate	3/1/2012	4/27/2012
RC12	239	289	FW212	670	Reasoner Cyn	3/9/2012	5/5/2012
TC12	374	180	FW312→12Taki1	648	Tom's Cyn	3/13/2012	4/23/2012*
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~~**SC12****~~	~~328~~	~~216~~	~~FW512~~	~~671~~	~~Santiago Cyn~~	~~4/2/2012~~	~~4/28/2012~~
~~**KR12****~~	~~125~~	~~111~~	~~FW612~~	~~678~~	~~Koford's Ridge~~	~~4/27/2012~~	~~6/23/201~~

* Eggs replaces with captive laid eggs.

** SC12 failed on ~16 Aug with the chick apparently falling from the nest and suffering multiple broken bones. Any underlining causes of the fall have not been determined. KR12 failed on 9/28 after chick died during nest entry. Chick appeared to be sick and under fed.

12/05/2012 Geoff Grisdale Transported condor #483 to LAZ for beak repair and picked up and released condor #98. Both condors were released at HMNWR.

12/05/2012 Molly Astell confirmed condor #658 fledged from the DG12 Nest.

12/05/2012 Condor Field Team worked up 8 condors at Bitter Creek NWR. Kern NWR Staff and John Bradley (Deputy Project Leader at San Francisco NWR) assisted with work up. 7 condors were released. Joseph Brandt transported condor #568 to LAZ for Pb treatment.

12/07/2012 Condor Staff trapped and worked up 4 condor at HMNWR. Condor # 627 was transported to Ventura.

12/08/2012 Katie Chaplin transported condor #627 to LAZ for Pb treatment. She picked up condor #125 and #462 and released them at BCNWR.

12/12/2012 Condor staff worked up 7 condors at the BCFP. Joseph Brandt transported condor #289 to Ventura.

12/12/2012 Ben Teton trapped condor #137 for behavioral reasons.

12/13/2012 Katie Chaplin transported condor #289 to LAZ for Pb Treatment.

12/19/2012 Devon Lang picked up condor #289 and condor #568 released them at HMNWR

12/21/2012 Joseph Brandt picked up condo #627 and released him at Tar Creek Trailhead.

12/29/2012 Laura Mendenhall transported condor #137. #137 will act as a mentor for LAZ and not be returned to the wild. Bitter Creek NWR Flight Pen in now empty.

12/31/2012 Josh Felch and Joseph Brandt work up a condor at HMNWR. Condor is released. Only a single condor left to be trapped and tested for fall/winter trap up.

Appendix V. 2012 Volunteer Hours

In 2012 the California Condor Field Team at the Hopper Mountain National Wildlife Refuge Complex utilized unpaid volunteers and volunteer interns (which are provided a stipend of $42 per day). Interns and unpaid volunteers assist with condor field activities at Bitter Creek NWR and Hopper Mountain NWR. In 2012, interns also provided assistance at the Bear Valley Springs Community monitoring condors and hazing them when necessary. Sixty-five unpaid volunteers and fifteen volunteer interns were used in total during the year.

The following table summarizes the number of unpaid volunteer hours and intern volunteer hours spent at each site for each month of the year.

Month	Bitter Creek NWR Unpaid Volunteer Hours	Hopper Mountain NWR Unpaid Volunteer Hours	Total Unpaid Volunteer Hours	Bitter Creek Volunteer Intern Hours	Hopper Mountain NWR Volunteer Intern Hours	Bear Valley Springs Volunteer Intern Hours	Total Volunteer Intern Hours
January	24	48	72	450	450	0	900
February	0	32	32	504	180	0	684
March	0	112	112	360	360	0	720
April	24	144	168	270	270	0	540
May	64	240	304	360	90	0	450
June	72	136	208	360	360	0	720
July	24	104	128	360	360	90	810
August	32	128	160	90	180	270	540
September	48	96	144	180	360	180	720
October	24	40	64	180	450	270	900
November	0	56	56	351	351	0	702
December	0	24	24	387	270	0	657
Grand Total	312	1160	1472	3852	3681	810	8343

California Condor
(*Gymnogyps californianus*)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Southwest Region

June 2013

Acknowledgement:

The Service gratefully acknowledges the commitment and efforts of the California Condor Recovery Program partners for their many on-going contributions towards condor recovery. Our partners were instrumental both in ensuring that we used the best available science to craft our analyses and recommendations in this 5-year review and in providing individual feedback that was used to refine this document.

Photo Credit:

Unless otherwise indicated, all photos, charts, and graphs are products of the U.S. Fish and Wildlife Service

5-YEAR REVIEW

California condor (*Gymnogyps californianus*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act) 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). Based on the 5-year review, we recommend whether the species should be removed from the Lists of Endangered and Threatened Wildlife, changed in status from endangered to threatened, or changed in status from threatened to endangered. Our original listing as endangered or threatened is based on the species' status considering the five threat factors described in section 4(a)(1) of the Act. These same five factors are considered in any subsequent reclassification or delisting decisions. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rulemaking process, which includes public review and comment.

Species Overview:

The California condor (*Gymnogyps californianus*) is the only remaining member of its genus in the family *Cathartidae*, and is one of the rarest bird species in the world. California condors are obligate scavengers that primarily feed on large mammalian carcasses (e.g., deer (family *Cervidae*), elk (*Cervus canadensis ssp. nannodes*), feral pigs (*Sus scrofa*), livestock (domestic ungulates), horses (*Equus ferus caballus*), pinnipeds (family *Otariidae*); however, medium- to small-sized carrion (e.g., rabbit (Family *Leporidae*) and squirrel (family *Scuridae)*) also are utilized.

California condors were widely distributed in North America during the late Pleistocene era (approximately 50,000–10,000 years before present), with records from Oregon, California, Nevada, Arizona, New Mexico, Texas, Florida, New York, and Mexico (Steadman and Miller 1986, Emslie 1987). At the time of the arrival of Russian and Euro-American explorers, California condors occurred only in western North America from British Columbia, Canada, to Baja California, Mexico, and inland to the Cascade and Sierra Nevada mountain ranges, with occasional observations farther east (Figure 1) (Koford 1953, Wilbur 1973, Wilbur 1978, Snyder and Snyder 2005, D'Elia 2013). California condors were observed in the Pacific Northwest until the early 1900s, and in Baja California until the 1930s (Koford 1953, Wilbur 1973, Wilbur and Kiff 1980).

By about 1950, California condors were confined in California to a horse-shoe shaped area encompassing six counties just north of Los Angeles, California (Figure 1) (Koford 1953).

Though no definitive causes of the condors' decline during the early 1900s have been established, it was likely the result of high mortality rates due to direct persecution, collection of specimens, and secondary poisoning from varmint control efforts and 1,1,1-trichloro-2,2-bis(p-chloro-phenylethane (DDT) (Snyder and Snyder 2005, D'Elia 2013). Lead poisoning may have been a contributing factor, but was not recognized as such until after 1980. Speculation that human nest disturbance and food scarcity were factors in the decline has been largely discounted (Snyder and Snyder 2005).

Active conservation efforts began in the 1930s, largely focused on habitat preservation. Despite these efforts, the wild population of the California condor continued to decline. A captive breeding program began in 1982 using eggs and chicks removed from the wild and a single captured adult condor, leaving an estimated 21 individuals in the wild. No additional juvenile or adult condors were captured until 1986. In the winter of 1984–1985, a population crash claimed six condors (40 percent of the wild population at that time), leaving only a single breeding pair in the wild (Snyder and Snyder 2000). During 1986 and early 1987, after much controversy, all nine remaining adult and juvenile wild birds were captured in order to ensure their safety and preserve the species' genetic diversity. Along with the 13 wild eggs and four chicks from wild nests captured previously, plus Topa Topa (a California condor removed from the wild as a fledgling in 1967), a captive breeding stock consisting of 27 birds became the nucleus of the captive breeding program (Snyder and Snyder 2000, Grantham 2007).

California condors were absent from the wild until 1992 when the first eight captive-reared birds were released in southern California. The reintroduction of birds continued in Arizona in 1996, central coastal California in 1997, northern Baja California, Mexico, in 2002, and Pinnacles National Monument, California, in 2003. At the end of December 2012, there were 404 condors in the world; 235 of these were free-flying wild birds distributed among the five release sites. The remaining 169 birds are used for captive breeding, inappropriate for release, or undergoing medical treatment (Service 2012).

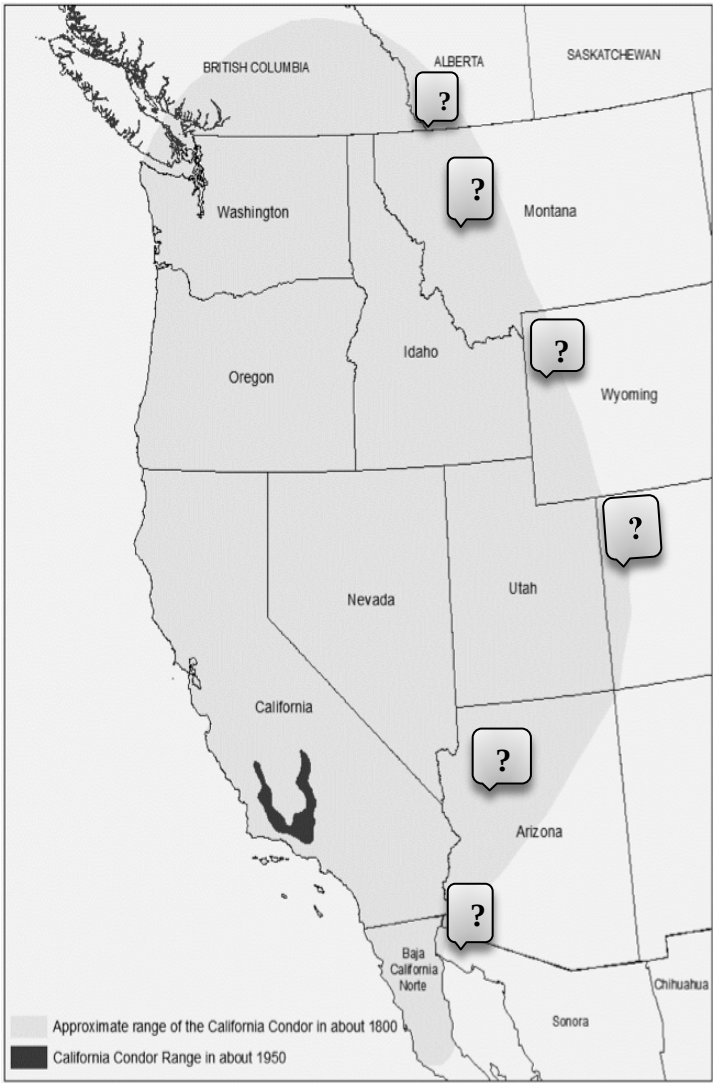

Figure 1. Range map of free-flying California condors in about 1800 (Snyder and Snyder 2005) and in about 1950 (Koford 1953)

Methodology Used to Complete This Review:

This review was prepared by the Hopper Mountain National Wildlife Refuge Complex (NWRC) and the Regional Office in Sacramento, California, and follows Service Region 8 guidance. In addition, a preliminary draft of this review was circulated among the California condor partners at their meeting in August 2012. All of the partners were invited to provide individual comments on the draft document, and those comments were incorporated, as appropriate, into the final review.

Our primary sources of information were the existing adopted Service recovery plans (Service 1975, 1979, 1984, 1996), scientific literature, written reports from the Service and partner organizations, data from the captive breeding and release programs, and records and personal communications from Service and other biologists who have been involved with the recovery of the California condor. We received no information from the public in response to our Federal Register notice initiating this 5-year review (74 FR 12878). This 5-year review contains updated information on the species' biology and threats, summarizes progress toward recovery, clarifies some listing-related issues, and includes a recommendation regarding status. Finally, the report recommends additional conservation actions to be completed or initiated within the next 5 years.

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Federal Register Notice Citation Announcing Initiation of This Review: A Federal Register notice initiating the 5-year review and opening a 60-day comment period was published on March 25, 2009 (74 FR 12878). During this period, the Service received no comment letters that provided information for use in this 5-year review.

Listing History:

<u>Original Listing under Endangered Species Preservation Act of 1966:</u>
FR Notice: 32 FR 4001; March 11, 1967
Entity Listed: California condor (*Gymnogyps californianus*)
Classification: Endangered
Portion of the Range where Threatened or Endangered: Entire

Revised Listing under Endangered Species Act of 1973:
CFR Notice: 50 CFR 17.11 (1975)
Entity Listed: California condor (*Gymnogyps californianus*)
Classification: Endangered
Portion of the Range where Threatened or Endangered: Entire
(see section "Application of the 1996 Distinct Population Segment (DPS) Policy" below for a discussion of inconsistencies in Code of Federal Regulations (CFR) language due to a textual error that began in 1987)

Listing of Nonessential Experimental Population:
FR Notice: 61 FR 201 54043
Entity Listed: California condor (*Gymnogyps californianus*)
Classification: Nonessential experimental population
Special Rule: 50 CFR Part 17.11 and 17.84
Portion of the Range where Threatened or Endangered: Specified portions of Arizona, Nevada, and Utah

State Listing:
The California condor was protected under California law in 1901 (Wilbur 1978), and specifically protected from take in California's Fish and Game Code (section 1179.5) in 1953. The condor was listed under the California Endangered Species Act as endangered on June 27, 1971, and is fully protected pursuant to California Fish and Game Code section 3511.

Mexico Listing:
The California condor is listed in Mexico under the NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo. The NOM-059 is Mexico's equivalent to the U.S. List of Endangered and Threatened Wildlife and Plants. It was revised and updated in 2010. The current version lists the California condor as "En Peligro de Extincion," which is the equivalent to "endangered status" in the United States.

Associated Rulemakings:

- **September 24, 1976** (41 FR 41914): Determination of Critical Habitat for American Crocodile, California Condor, Indiana Bat, and Florida Manatee (American crocodile, *Crocodylus acutus*; California condor, *Gymnogyps californianus*; Indiana bat, *Myotis sodalis*; Florida manatee, *Trichechus manatus*)

- **September 22, 1977** (42 FR 47840): Final Correction and Augmentation of Critical Habitat Reorganization

Review History:
No previous 5-year reviews or formal status reviews of this taxon have been conducted.

Species' Recovery Priority Number at Start of 5-Year Review: At the start of this review, the recovery priority number for the California condor was 4C. As defined in the Endangered and Threatened Species Listing and Recovery Priority Guidelines (Table 1), the recovery priority number is based on a 1 to 18 ranking system where 1 is the highest rank and 18 the lowest (48 FR 4309, as corrected in 48 FR 51985). The existing 4C designation indicates that the California condor is a monotypic genus that faces a high degree of threat and has a low potential for recovery. The "C" indicates conflict with construction, development projects, or other forms of economic activity. The designation shown in the Services' third revision to the Recovery Plan for the California Condor (Recovery Plan) in 1996 was 1C, which indicates a monotypic genus that faces a high degree of threat and has a stable or increasing population and a high potential for recovery. However, that designation was not reflected in subsequent listing documents maintained by the Service.

Degree of Threat	Recovery Potential	Taxonomy	Priority	Conflict
High	High	Monotypic Genus	1	1C
		Species	2	2C
		Subspecies/DPS	3	3C
	Low	*Monotypic Genus*	*4*	*4C*
		Species	5	5C
		Subspecies/DPS	6	6C
Moderate	High	Monotypic Genus	7	7C
		Species	8	8C
		Subspecies/DPS	9	9C
	Low	Monotypic Genus	10	10C
		Species	11	11C
		Subspecies/DPS	12	12C
Low	High	Monotypic Genus	13	13C
		Species	14	14C
		Subspecies/DPS	15	15C
	Low	Monotypic Genus	16	16C
		Species	17	17C
		Subspecies/DPS	18	18C

Table 1. Ranking system for determining recovery priority.
The above ranking system for determining Recovery Priority Numbers was established in a September 21, 1983 Federal Register notice (48 FR 43098, as corrected in 48 FR 51985).

Recovery Plan

Name of Plan: Recovery Plan for the California Condor, Third Revision
Date Approved: 25 April, 1996
Dates of Previous Revisions: Original Plan Approved: 1975; First Revision: 1979; Second Revision: 1984

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy

The Act defines "species" as including any subspecies of fish or wildlife or plants, and any DPS of any species of vertebrate wildlife. This definition limits listing as DPSs to species of vertebrate fish or wildlife. The 1996 Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Endangered Species Act (61 FR 4722; February 7, 1996) clarifies the interpretation of the phrase "distinct population segment" for the purposes of listing, delisting, and reclassifying species under the Act.

In the original 1967 pre-Act list (under the Endangered Species Preservation Act of 1966), California condor is listed as a native endangered species (32 FR 4001, see also 35 FR 16047). The first combined domestic and foreign list under the Endangered Species Act listed the California condor as endangered across its entire range (50 CFR 17.11) (1975). In the republished list in the 1980 CFR (reformulated like the current one) the historical range is shown as "U.S.A. (OR, CA), Mexico (Baja California)," and the "Vertebrate Population where Threatened or Endangered" shows the species as listed across its entire range.

In 1987, the range of the listed entity stated "USA only" for the first time (50 CFR 17.11) (1987). Though it has been republished in this manner since 1987, no narrative explanation of this change in either the Federal Register or any other documentation can be found. A brief survey of leaders in the California Condor Recovery Program from that era also revealed no known reason why the range would be limited to "USA only." Because the 1987 language in the CFR (which persists to the present day) is a textual error, the species remains listed across its entire range. This review recommends the publication of a Federal Register notice that explicitly states that the 1987 language does not accurately reflect the listed entity.

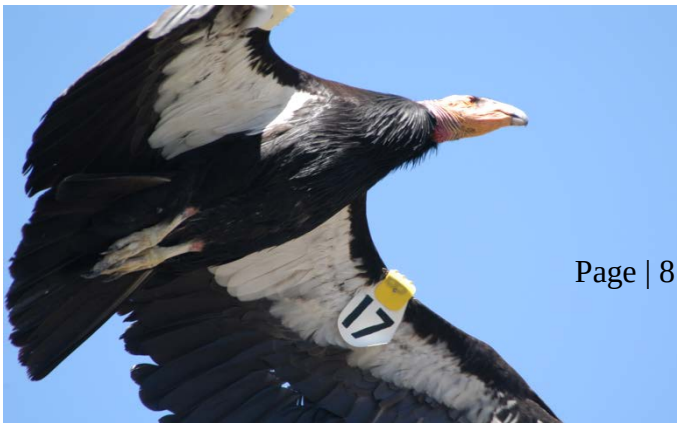
Information on the Species and its Status

Taxonomy

The California condor was originally classified in the same genus as its closest living relative, the Andean condor (*Vultur gryphus*), but due to the Andean condors slightly different markings, slightly longer wings, and tendency to kill small animals for food (Lint 1959, Gailey and Bolwig 1973), the California condor has now been placed in its own monotypic genus (Amadon 1977). The California condor is a member of the family *Cathartidae*, or New World vultures, a family of seven species, including the closely related Andean condor and the sympatric turkey vulture (*Cathartes aura*). This family has traditionally been placed in the Order *Falconiformes*, but more recently there has been a proposal to reassign it, along with other New World vultures, to order *Accipitriformes*, which includes hawks, eagles, ospreys (*Pandion haliaetus*), and the secretary bird (*Sagittarius serpentarius*) (Hackett et al. 2008). In the 1996 Recovery Plan, reference was made to a close relationship between New World vultures and storks (*Ciconiidae*) (Service 1996), but more recent studies have found no affinity to storks and support the newly proposed order (Hackett et al. 2008).

Species Biology and Life History

California condors are among the largest flying birds in the world, with wingspans measuring up to 9.5 feet (2.9 meters).



Adult condor males and females are identical in size and plumage, weigh between 17–24 pounds (7–11 kilograms), and are predominantly black with prominent white underwing linings. The head and neck are mostly naked, and the bare skin is gray, grading into various shades of red, yellow, and orange. The heads of juveniles (1–3 years) are grayish-black, and their wing linings are variously mottled or completely dark. During the third year, the head begins to develop yellow coloration and wing linings become gradually whiter. Adult plumage is attained between 5 and 6 years of age (Service 1996, Snyder and Snyder 2000).

California condor life history can be categorized into nesting, foraging, and roosting components (Service 1975). Courtship and nest site selection typically occur during winter (November–March), with a single egg clutch produced between late January and early April. Both parents are involved in incubation and hatching occurs after approximately 56 days. Both parents also feed and care for the offspring. Chicks fledge at 5.5 to 7 months of age, but may not become fully independent until the following year (Service 1996). Due to the long period of parental care, it was assumed successful condor pairs nested every other year (Koford 1953, Service 1979); however, this pattern seems to vary depending on the time of year the prior nestling fledges (Snyder and Hamber 1985). If a nestling fledges relatively early (in late summer or early fall), its parents may nest again the following year (Snyder and Hamber 1985).

While longevity has not been determined, Andean condors (*Vultur gryphus*), which are closely related to California condors, have been known to reach 60–70 years in captivity. Topa Topa, a California condor removed from the wild as a fledgling in 1967, is still an active breeder at the Los Angeles Zoo at 46 years of age. California condors are slow to mature and will typically begin to breed at 6 to 8 years of age, although a few birds have been known to breed at 5 years (Snyder and Snyder 2000, California Condor Studbook 2011). In captivity, both males and females typically begin breeding at 6 to 8 years (Kuehler et al. 1991).The historical (pre-1987) wild California condor population successfully fledged young from approximately 30–50 percent of eggs laid (Snyder 1983, Snyder and Snyder 1989), which is consistent with other solitary nesting New World and Old World vultures (Jackson 1983, Mundy et al. 1992, Meretsky et al. 2000).

California condors are primarily a cavity nesting species and typically nest in cavities located on steep rock formations or in the burned out hollows of old-growth conifers (coast redwood (*Sequoia sempervirens*) and giant sequoia trees (*Sequoiadendron giganteum*)) (Koford 1953,

Snyder et al. 1986). Less typical nest sites include cliff ledges, cupped broken tops of old-growth conifers, and in several instances, nests of other species (Snyder et al. 1986, Service 1996).

California condors are obligate scavengers that feed only on carrion (Service 1996). It appears that they do not use smell, but instead locate food by sight or by following other scavenging birds (Snyder and Snyder 2000). Condors may feed individually or in large numbers at a carcass. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling over a carcass, and hours of waiting at a perch or on the ground near a carcass, possibly watching for predators (Service 1996). Condors maintain wide-ranging foraging patterns throughout the year, an important adaptation for a species with unpredictable food supplies (Meretsky and Snyder 1992). Condors at interior locations feed on mule deer (*Odocoileus hemionus*), tule elk, pronghorn antelope (*Antilocapra americana*), feral hogs, domestic ungulates, and smaller mammals, while the diet of birds on the coast includes whales (Order *Cetacea*), sea lions (*Zalophus californianus*), and other marine species (Koford 1953, Service 1984, Emslie 1987, Service, unpubl. data).

Currently, California condors predominately forage in open terrain of foothill grassland and oak savanna habitats, and at coastal sites in central California (birds released from Big Sur and Pinnacles National Park), but have also been observed feeding in more wooded areas, though this is less common (J. Grantham 2010 pers. comm.).

California condors have relatively heavy wing-loading (mass per wing area) and have a difficult time becoming and remaining airborne over flat terrain (Snyder and Snyder 2000). Over such terrain, condors are almost exclusively dependent on the uplift provided by thermal cells, a less consistent motive force than breezes blowing over hilly terrain (Snyder and Snyder 2000). During periods of inclement weather a condor may remain at a roosting location for an entire day or longer until better weather conditions occur (Snyder and Snyder 2000). However, in good weather it is common for birds to cover great distances over the course of a day. One California condor traveled 141 miles (mi) 225 kilometers (km) in a single day, from the northeast corner of Tulare County south through the Sierra Nevada mountain range and Tehachapi Mountains to a roost just north of the Santa Barbara nesting area (Snyder and Snyder 2000). Telemetry data and Global Positioning System (GPS) devices on some birds have documented other long-distance flights, including flights from southern Utah to Flaming Gorge, Wyoming (over 400 mi (643 km)) and from Sierra de San Pedro Martir in Baja California to Imperial County, California (approximately 155 mi (250 km) (Service, unpubl. GPS telemetry data).

California condors repeatedly use roosting sites on ridgelines, rocky outcrops, steep canyons, and in tall trees or snags near foraging grounds (Service 1984). While at a roost, condors devote considerable time to preening, sunning, and other maintenance activities. Similar to other vulture species, condor roosts also may serve in social interaction and as assembly points for group activities; it is common for two or more California condors to roost together and leave the roost at the same time (Service 1984, Buckley 1996). Cliffs and tall trees, including dead snags, are generally utilized by breeding pairs as roosting sites in nesting areas (Service 1996).

Spatial Distribution

Our knowledge of the prehistoric and historical range of the California condor comes from a variety of sources, such as fossil records, Native American feather regalia, and written records. Archaeological evidence suggests that during the Pleistocene era condors existed on both coasts of North America, but primarily occupied the west coast (Snyder and Snyder 2000, D'Elia 2013). Fossil evidence from New Mexico, Arizona, Utah, a single site in New York, sections of northern Mexico, and southern Canada support this hypothesis (Hansel-Kuehn 2003, Brasso and Emslie 2006).

By 1800, California condors were restricted to their west coast range, which stretched from British Columbia, Canada, to Baja California, Mexico, with small inland populations in regions such as the Grand Canyon (Snyder and Snyder 2000, D'Elia 2013). Condors were in the Pacific Northwest until the beginning of the 20th century and found in the southern segment (Baja California) until the 1930s (Koford 1953, Wilbur 1973). By the middle of the 20th century, condors were confined to a small horseshoe-shaped region in southern California (Figure 1). They occupied this area from the time of Federal listing in 1967 under the Endangered Species Preservation Act of 1966, until all California condors were removed from the wild in 1987 (Meretsky and Snyder 1992).

The captive breeding program begun by the Los Angeles Zoo and San Diego Wild Animal Park (now the San Diego Safari Park) had its first successful hatch of a wild-laid egg taken into captivity in 1983 and its first captive-laid egg in 1988. The captive breeding program allowed reintroduction of California condors back into the wild beginning in 1992. Subsequently, the World Center of Birds of Prey in Boise, Idaho (1993) and the Oregon Zoo in Portland, Oregon (2003) also developed and currently operate captive breeding facilities that support the reintroduction program.

Reintroduction projects started in 1992 in California, 1996 in Arizona, and 2002 in Baja California. These reintroductions brought free-flying birds back into portions of the species' historical range. Populations of California condors now exist in central and southern California, northern Arizona and southern Utah, as well as northern Baja California (Figure 2).

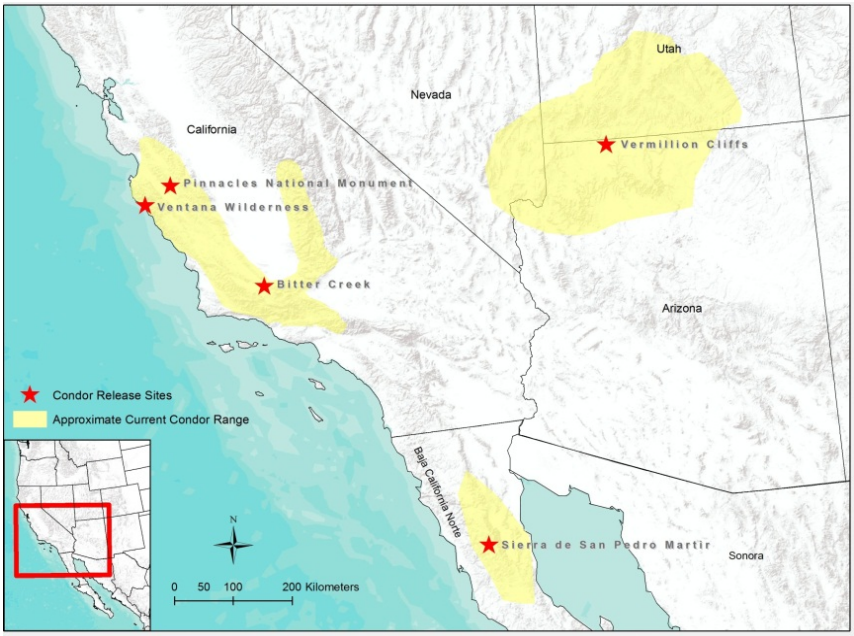


Figure 2. California condor range and active release sites 2012.

Very little is known about how California condors previously used the regions they currently inhabit in Arizona, Utah, and Baja California, but in southern California the reintroduced population has resumed its use of many historical areas. Most recently, the expanding population in southern California utilized the Tehachapi Mountains and resumed use of a number of traditional roosting sites (Johnson et al. 2010). The distribution of each of these populations continues to expand as release efforts persist and the current wild population matures and becomes more aware of the available food resources within their respective ranges. While some preliminary analysis regarding foraging habitat in southern California has been conducted as a part of the Tehachapi Multispecies Habitat Conservation Plan, additional research on conserved and available lands needs to be conducted. Telemetry and GPS records reveal condors currently exceed the boundaries of the occupied habitat that was known and defined at the time of the initial field reviews conducted by the Service in the late 1960s, and take advantage of food opportunities at increasingly farther distances from release or other management sites (Service, unpubl. data, 2009–2012). California condors do not make long-distance seasonal migrations. The available information indicates that they make use of various portions of their range at different times of the year, and seek out distinct habitats for each of their primary needs of foraging, nesting, and roosting (Meretsky and Snyder 1992, Hunt et al. 2006).

The need to trap and closely monitor California condor wild populations, test blood samples, and inoculate for West Nile Virus persists. To carry out these activities, carrion is supplied at release or trap sites throughout the year for all wild populations. Supplemental feeding can lead to a restricted range due to the restraint of their natural wide-ranging foraging (Snyder 2007). This constricted range may also result in underestimating the severity, intensity, and number of threats that would occur in a more widely distributed population (Meretsky et al. 2000, Mee et al. 2007a). Despite the ongoing presence of proffered food, condors are still expanding their range (Johnson, et al. 2010).

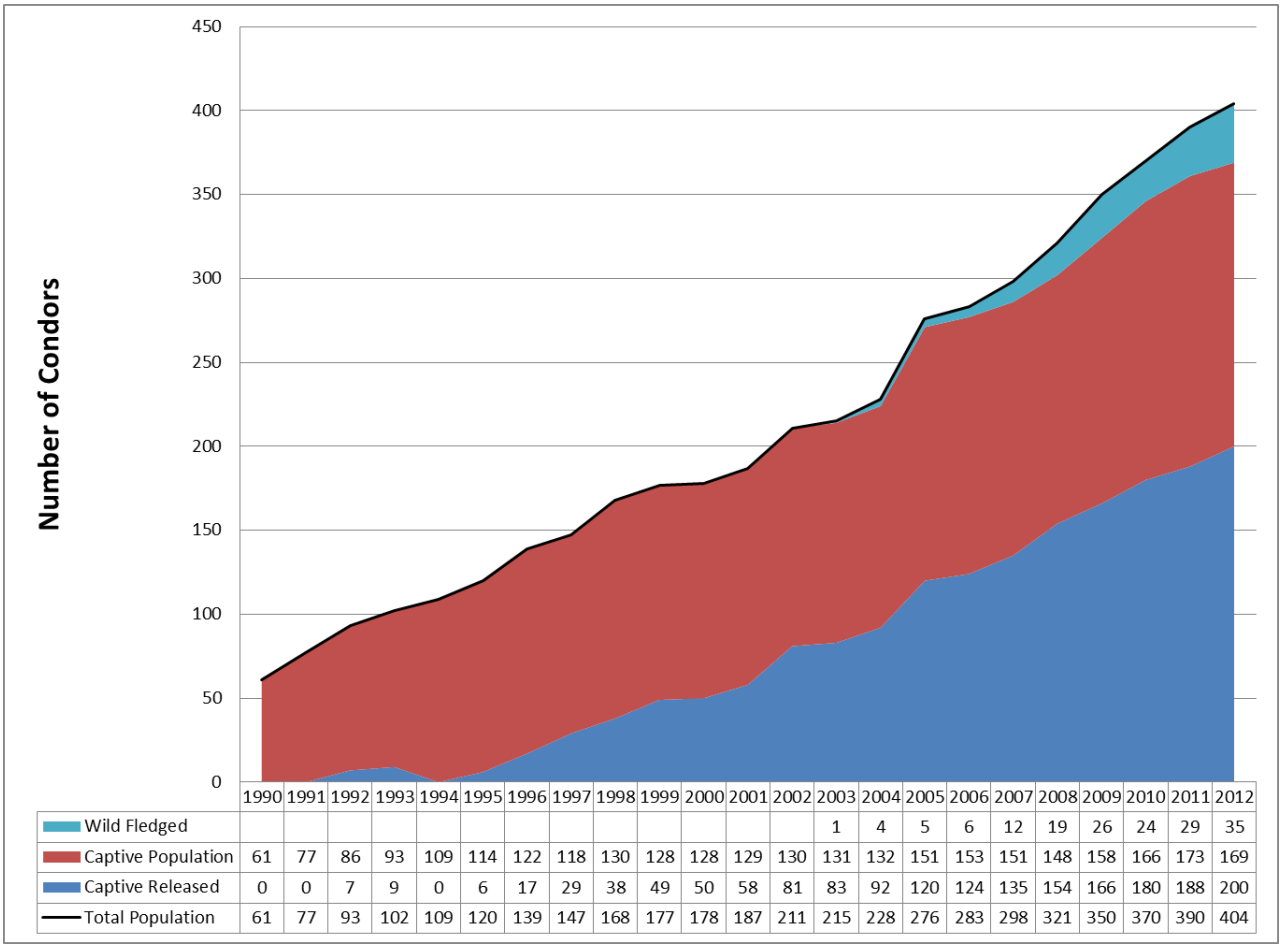
Abundance

California condor population size estimates suggest that there were 50–60 birds in 1968 and 25–35 birds in 1978, all confined to the horseshoe-shaped region shown in Figure 1 (Wilber 1980, Service 1984). The wild population continued to decline with an estimated 25–30 individuals in 1980, 21 in the fall of 1982, 19 in the summer of 1983, and 15 birds in 1984 (Snyder and Snyder 2000). A captive breeding program was authorized in 1980, successfully initiated in 1982, and by 1984 for the first time, the number of condors in captivity (16) exceeded the number in the wild (15) (Snyder and Snyder 2000). By 1985 only nine birds remained in the wild, and by April 1987 all of the remaining birds had been trapped and taken into captivity (Service 1996, Snyder and Snyder 2000).

Population growth has been steady over the last two decades, and in late 2008 the wild California condor population exceeded the captive population for the first time since 1983. As of December 31, 2012, the total California condor population was 404 individuals: 235 in the wild and 169 in captivity. Of the wild birds, 129 were in California, 78 in Arizona, and 28 in Baja California (Service 2012). These figures reflect the continued growth of the population shown in Figure 3. The end-of-year numbers were selected for comparison purposes.

The California condor wild-fledged population is growing (Figure 3). This trend is a result of subsequent breeding of captive-released birds in the wild. The first wild-fledged chick was produced in Arizona during the summer of 2003. Since then, the wild population has continued to produce additional offspring, numbering 35 survivors (14.8 percent of the wild population) at

the end of December 2012.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Fledged														1	4	5	6	12	19	26	24	29	35
Captive Population	61	77	86	93	109	114	122	118	130	128	128	129	130	131	132	151	153	151	148	158	166	173	169
Captive Released	0	0	7	9	0	6	17	29	38	49	50	58	81	83	92	120	124	135	154	166	180	188	200
Total Population	61	77	93	102	109	120	139	147	168	177	178	187	211	215	228	276	283	298	321	350	370	390	404

Figure 3: Year-end population figures

The captive breeding program produces an average of 60 California condor eggs per year (2009, 2010, and 2011) with a 74 percent hatch rate, resulting in 45 new hatchlings on average each of the past three years. Managers at the five field release sites have indicated concern that they are not able to continue to release and manage a growing number of birds each year without changes in the management strategies utilized by the field teams. In some cases, this is because the number of person-hours required to track, feed, capture, treat, and release birds exceeds the capacity of the local field management teams. In every case, the cost of field management has grown significantly, and the various organizations engaged in condor recovery have not identified sufficient ongoing resources to continue to expand, or even maintain, what they have in field management capacity. This imbalance could be an indicator that additional planning effort to ensure the balance of the various program elements is necessary.

Habitat

Photo courtesy Gavin Emmons

Little is known about the specific range use of California condors prior to the 1980s, a period when the population was in steep decline (Snyder and Snyder 1989). As a large soaring scavenger that relies on sparsely distributed carrion for food, the condor was assumed to have a very large home range. Based on studies during that time, condors were believed capable of traveling 50–100 mi (30-60 km) in a single day, but little was actually known about condor range use or population distribution (Koford 1953, Wilbur 1978), especially when compared to the closely monitored reintroduced population. In 1980, the Condor Research Center (Center) was established by the Service and National Audubon Society to provide a more systematic approach to research on condor habitat use. The Center developed telemetry tracking and photographic censuses that allowed for a better understanding of how California condors utilized their range (Meretsky and Snyder 1992) as it was occupied at the time. It should be noted that while observations were possible in the southern California habitat, habitat types elsewhere in the known historical (pre-1987) range were unoccupied at the time due to the rapidly declining condor population. As a result, the Center's evaluation only allows a partial understanding of condor habitat use. A full understanding of habitats used by condors—which has included desert, conifer forest, temperate rainforest, coastal areas, and mid-elevation northwestern plains—was not possible. Although the condor population at that time was very small and on the verge of extinction, a number of insights into condor habitat use were made through intensive study of the remaining wild condors.

For example, the Center's work indicated that California condor nesting habitat was found in steep remote mountainous or canyon terrain on rock or cliff escarpments. These areas tended to be separate from foraging areas, which were typically open grasslands and oak savannas (Meretsky et al. 1992). Roosts, found in or near both foraging and nesting habitat areas consisted of large trees or snags with open lateral branches or cliff faces and rock spires with available perches. California condors have also been known to nest in the cavities of old-growth giant sequoias in the southern Sierra Nevada mountain range or coast redwoods along the central coast of California (Koford 1953). In all cases, condors do not build nests, but move sand, twigs, rock, and other materials around in nest sites to create the appropriately shaped substrate required for egg laying (Snyder and Snyder 2000). Nesting habitat is used year round by breeding pairs as they spend an 8-month period tending to their egg or chick in the nest (Snyder, 1983).

California condor nesting habitat is quite different from foraging habitat. Use of various foraging locations tends to be seasonal, with areas of high activity at different locations at different times of the year (Meretsky et al. 1992). Foraging habitat of California condors has

been characterized as open foothill grasslands and oak savanna foothills that support populations of deer, elk, and cattle. Condors foraging along the coast in central California also feed on carrion from coastal environments, which include fish, marine mammals, and marine birds (Snyder and Snyder 2000, Chamberlain et al. 2005). California condors require great expanses of foraging habitat, as feeding opportunities are often widely distributed across their range. Adaptations to this include their highly efficient soaring ability, as well as the capacity to go many days between feedings. Condors will travel great distances to locate carrion. While foraging habitat is expansive, not all is usable at any given time due to inaccessible terrain and weather conditions that limit visibility or soaring. Condors may be restricted when the air currents necessary for soaring are absent or when fog inhibits visibility (Snyder and Snyder 2000).

Genetics

Although there were 27 individuals in captivity after all wild California condors were captured in 1987, the existing condor population is descended from only 14 individuals (Ralls and Ballou 2004). Some of these 14 founders were never brought into captivity, but were known to be the parents of individuals taken into captivity. DNA fingerprinting indicates that the captive condors fall into three basic groups or clans (Geyer et al. 1993).

The California condor population is covered under one of over 100 Species Survival Plans sponsored by the Association of Zoos and Aquariums. These captive populations are managed to preserve, as far as possible, the genetic diversity present in the founding individuals. The California condor population is being managed to retain 90 percent of its heterozygosity (one measure of genetic diversity) for 100 years, which is accomplished by minimizing mean kinship (the average relatedness of each individual to all individuals) within the population (Ballou and Lacy 1995, Ralls and Ballou 2004). Although preserving genetic diversity can reduce adaptation to the captive environment, in the long term it can minimize possible deleterious effects of inbreeding and facilitate a population's ability to adapt to environmental changes in the wild after reintroduction (Ballou et al. 2010). Another objective of the genetic management program is to ensure that the full complement of genetic diversity is represented in each segment of the California condor population (captive, wild Arizona, wild California, and wild Baja) to guard against loss of overall diversity in the event of a catastrophic loss of any one of the population segments. Finally, genetic management aims to minimize the expression of chondrodystrophy, a lethal form of dwarfism, in the population (Ralls et al. 2000).

Records of each individual's sire and dam, along with its birth and death dates, are recorded in the International California Condor Studbook, which provides the data for annual genetic and demographic analyses using both custom and standard software programs such as PMx (Lacy et al. 2012). The studbook contains data on both captive and wild-born individuals and is maintained by the studbook keeper, Dr. Michael Mace of San Diego Zoo Global. Annual genetic and demographic analyses are carried out by the population managers, Katherine Ralls and Jonathan Ballou of the Smithsonian Conservation Biology Institute. These analyses take the clan structure into account and result in annual recommendations to the Service regarding the best geographical placement for chicks hatched in captivity, new pairings, and which pairs to double-clutch if possible (Ralls and Ballou 2004).

It is likely that the wild California condor population lost genetic diversity during its long decline prior to being taken into captivity and molecular genetic studies of museum specimens have been initiated to examine this possibility (J. D'Elia, 2012 pers. comm.). Genetic management has successfully maintained genetic diversity in the population, measured as heterozygosity, since the birds were taken into captivity (Ralls and Ballou 2004). As of December 31, 2011, the population retained about 91 percent of its heterozygosity, the mean inbreeding level was about 3 percent, and genetic diversity was evenly distributed across the four segments of the population: captive, wild Arizona, wild California, and wild Baja (K. Ralls and J. Ballou, 2012 pers. comm.).

However, it is well known that population bottlenecks of short duration have a greater effect on the number of alleles (alternative forms of a gene) present than on heterozygosity (Allendorf 1986), so it is probable that the population has lost some rare alleles since the California condors were taken into captivity. Studies of mitochondrial DNA have documented the loss of several maternal lineages since the captive population was founded (Chemnick et al. 2000, Adams and Villablanca 2007). By the time all the remaining birds were taken into captivity, these maternal lineages were represented only by males, which do not pass their mitochondrial DNA to their descendants. Because genetic management minimizes mating between closely related individuals, expression of deleterious alleles has also been minimized. Thus, it is likely that chondrodystrophy is not the only deleterious allele segregating in the population and that others will be discovered. Nevertheless, the genetic situation in condors compares favorably to that in several other endangered species, such as black-footed ferrets (*Mustela nigripes*) and Guam rails (*Gallirallus owstoni*) (Ralls and Ballou 1992), and genetic problems do not appear to present a major impediment to the recovery of the species.

Current Species-specific Research and Grant Funded Activities

An extensive listing of current research efforts by several of the California condor partners is presented in Attachment I. Studies include genetic sequencing and mapping of all condor variations to enhance management of the range of genetic variations, and genetic analysis of preserved samples of condors from various times and places to assess the quality of the conserved population. The impact of contaminants on the population is a key area of research, including nutritional options for condors to counteract lead contamination from carcasses in the wild, the continuing impact of lead following California's ban on the use of lead ammunition in the condor's range, and the impact of 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene (DDE) exposure through marine mammals, including the impacts on condor eggshells. Outreach to hunters and tribal members are being conducted through various media and by various partners with a goal of reducing lead exposure in the condor population. A number of partners are looking at the potential impact of wind energy, including efforts to identify predictive models on condor space use and develop early warning systems for wind turbines. The goal of all this research is to improve condor survival and conservation by extending our understanding and knowledge of the species and educating the recovery program and others.

Five-Factor Analysis

The California condor was among the earliest species listed as endangered in the United States. At the time of its original listing, a five-factor analysis was not performed. Potential causes of California condor population decline were numerous and possibly varied through time (Wilber 1978, Snyder and Snyder 2000). Despite decades of research, it is not known with certainty which mortality factors have been dominant in the overall decline of the species. It is likely that a combination of factors had a compound effect on this species, which has a slow rate of maturity and naturally low reproductive rate. Aside from numerous individuals killed for collections or simply shot for target practice or no reason at all, relatively few dead California condors were found prior to the 1990s and definitive conclusions on the causes of death were made in only a small number of these cases (Miller et al. 1965, Wilbur 1978, Snyder and Snyder 1989).

Although the information regarding California condor mortality (outside of individuals killed for collections or through wanton shooting) is not based on necropsies, there is evidence to suggest that two anthropogenic factors, lead poisoning and shooting, contributed disproportionately to the decline of the species in the years just prior to its extirpation from the wild (Snyder and Snyder 2000, Snyder 2007). There is also considerable circumstantial evidence that condors may have experienced population declines due to secondary poisoning from predator elimination campaigns during the early settlement of the west coast of North America (Snyder and Snyder 2005). The effects of eggshell thinning are also thought to be a serious factor in the decline of the species during the 1950s–1960s (Wilber 1978b, Kiff et al. 1979, Wiemeyer et al. 1988). Other factors that contributed or may have contributed to the decline of the species prior to its extirpation from the wild were egg and specimen collecting and Native American ceremonial use. These activities are no longer considered threats to California condors.

Since reintroduction began in 1992, causes of California condor mortality have been closely documented. While not all have been identified, the great majority of deaths in the reintroduced population have been anthropogenic (Rideout et al. 2012). Figure 4 shows the various causes of death in the three reintroduced wild populations of condors from the time of reintroduction through 2012, as reflected in the records of the Service. (Note that the level of lead mortality is considerably understated due to the extraordinary management measures taken to ensure condor survival.) Some of these factors may have contributed to the species' decline prior to extirpation, but it is difficult to determine to what extent the current limitations on the population were a factor in the decline. These recent causes of mortality provide a better understanding of current limitations on the reintroduced populations and species recovery. However some factors, such as predation and starvation, are likely the result of the challenges of reintroducing captive-bred individuals into the wild (which has been a necessary step towards reestablishing wild populations), rather than factors that will have a large effect on a self-sustaining population.

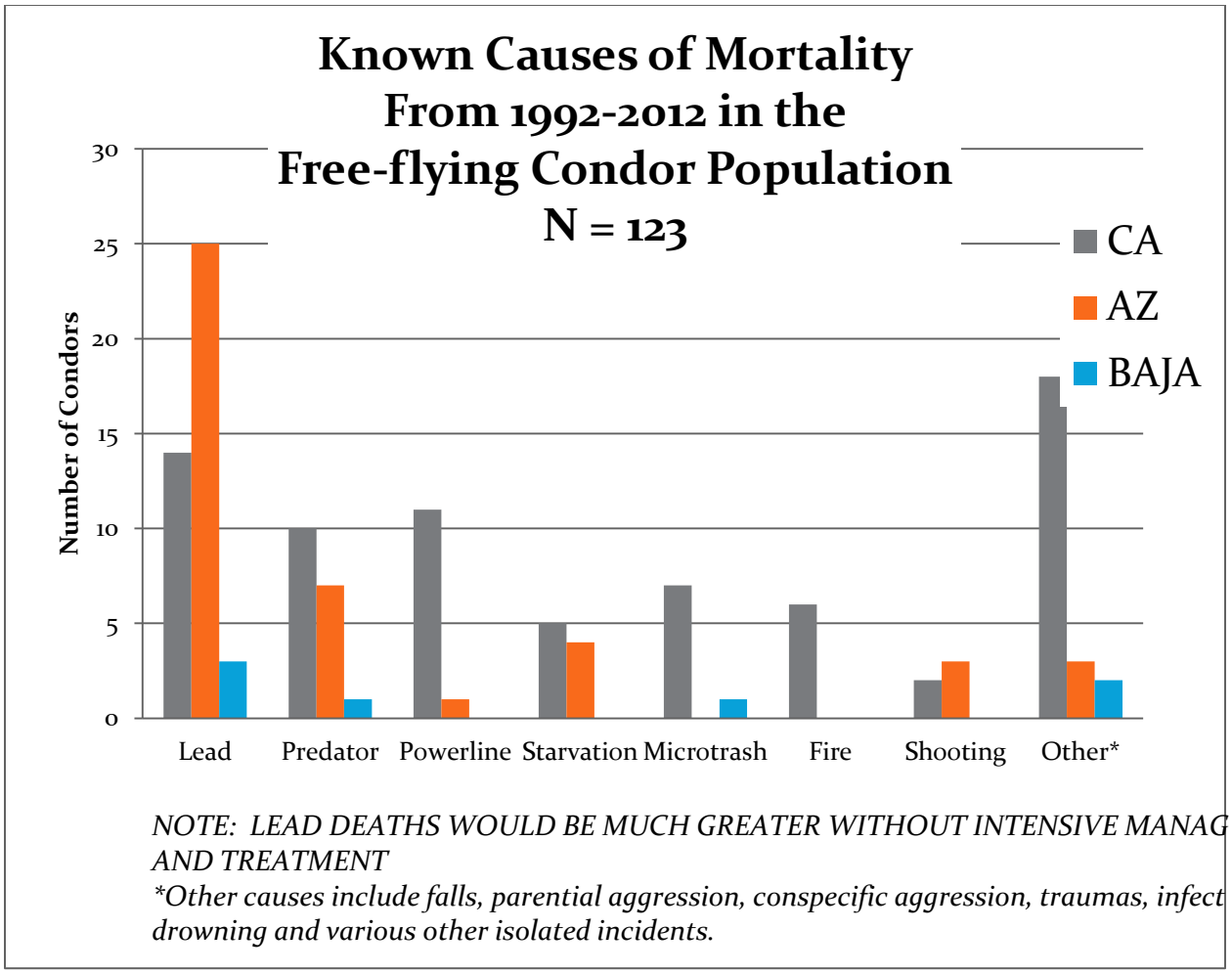


Figure 4. Known causes of mortality among free-flying flock since reintroduction into the wild in 1992 until 2009 (Rideout et al, 2012) and through 2012 (Service 2012).

The following five-factor analysis describes and evaluates threats to the current population attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

The loss and modification of California condor foraging, roosting, and nesting habitat has been identified as a threat to the continued recovery of the species. As noted in the 1979 Recovery Plan, adequate nesting sites, roosting sites, and foraging habitat with adequate food are the basic habitat needs of the condor. Human encroachment in the form of permanent development or disturbance may cause condors to avoid nesting in otherwise suitable sites, and may cause nest failure (Koford 1953), though there are no records of condors deserting a nest due to human encroachment (Snyder and Snyder 2005). Finally, retention of adequate carrion may become more difficult as rangelands, oak woodlands, and grasslands are developed, because developed sites support fewer mammals, which translate to fewer opportunities for condors to obtain carrion.

While hypotheses about condor decline during the 1960s included suppositions about food scarcity, no documentation of inadequate food sources has been identified in the California condor's range (Snyder and Snyder 2005). During the same period of population declines, there was no apparent lack of nesting and roosting sites, and significant conserved lands were available for condors (Snyder and Snyder 2000).

About 570,400 acres (ac) (230,842 hectares (ha)) have been designated as critical habitat by the Service (41 FR 41914). The Service, U.S. Forest Service, Bureau of Land Management, California Department of Fish and Wildlife, and others have set aside thousands of acres of habitat, largely within the designated critical habitat of California condors. As early as the 1930s, the U.S. Forest Service set aside the Sisquic Condor Sanctuary (1,198 ac (484 ha)). Following field studies, the Sespe Condor Sanctuary was established in 1947 and expanded in 1951 (53,000 ac (21,448 ha)). The Hopper Mountain National Wildlife Refuge (2,471 ac (100 ha)) in Ventura County was acquired in 1974. The Blue Ridge National Wildlife Refuge (897 ac (363 ha)) in Tulare County in 1982, and the Bitter Creek National Wildlife Refuge (14,097 ac (5,704 ha)) in Kern and adjacent counties in 1985 were established with the primary purpose of preserving habitat for California condors.

Tejon Ranch Company, with the technical assistance of the Service, has developed the Tehachapi Uplands Multispecies Conservation Plan (TU MSHCP) in support of a section 10(a)(1)(B) incidental take permit application under the Act. The take permit would allow for nonlethal take of up to four California condors associated with ongoing ranch activities and limited land development on a portion of Tejon Ranch for the life of the project. The TU MSHCP includes numerous measures intended to reduce and, if possible, eliminate potential threats to condors, such as those posed by powerlines, as well as measures to further the conservation of the species. The plan, if adopted, will conserve in perpetuity approximately 129,318 ac (52,333 ha) of open space, including important condor foraging and roosting habitat. Overall, the TU MSHCP, in combination with a separate Tejon Ranch Conservation and Land Use Agreement executed in 2008 by Tejon Ranch Company, Audubon California, the Endangered Habitats League, Natural Resources Defense Council, Planning and Conservation League, Sierra Club, and Tejon Ranch Conservancy, will result in the permanent conservation of approximately 240,000 ac (97,124 ha), or 90 percent of Tejon Ranch.

Protected lands are important for California condors in Mexico and a portion of the California condor range in Arizona, Utah, and California. Sierra de San Pedro Martir is a designated protected land similar to a national park in the United States, with the exception that full human communities thrive within the boundaries of the Mexican national park. In the United States, condors have utilized Zion and Grand Canyon National Parks, and a major release site is located in Pinnacles National Park in California.

Rangeland Conversion: Activities such as urban development, oil and gas extraction, farming, and wind energy development have transformed formerly suitable foraging habitat into areas that may not be compatible with California condor recovery. Domestic livestock carcasses currently provide an important source of food free from lead contamination. In some areas, the replacement of grazing land with more intensive uses has reduced the availability of domestic livestock to foraging condors, though improved market conditions for cattle operations have expanded cattle grazing in some portions of the range. When condors are recovered, continued

population growth may at some point become limited by available forage, though no definitive scientific analysis of the carrying capacity of condor foraging habitat has been conducted. However, as noted above, nothing in the historical record indicates that condors currently lack adequate food or foraging opportunities. While agricultural conversion to more intensive uses and the corresponding increased human activity has caused speculation about the lack of adequate forage, no impact on the current population has been identified.

Further, the availability of appropriate habitat could be restricted by limitations in connectivity of suitable areas for California condor foraging, nesting, and roosting. Once again, no such limitations have been noted aside from natural landscape features, and condors have been observed utilizing areas with roads, housing, gas and oil fields, and similar human features.

Suitable conservation of significant California condor habitat is an important tool to ensure the long-term availability of roosting, nesting, and foraging habitat. While rangeland conversion is potentially a concern for the long-term expansion of a recovered condor population, it is not currently a substantial threat to the species or its roosting, nesting, or foraging habitat due to the extensive network of protected lands utilized by the species and the relatively small population of condors dependent, at least in part, on these lands.

Wind Energy: In March 2009, Secretarial Order 3285A1 created a national policy encouraging the production, development, and delivery of renewable energy as one of the Department of Interior's highest priorities. In April 2011, California increased its State renewable energy portfolio standard to 33 percent of all retail electricity sales by 2020 with the signing of Senate Bill 2X; wind power is an important component of California's renewable energy portfolio. As a result of these two policies, interest in wind energy development has greatly increased.

A number of proposed 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, Sierra Nevada mountain range, and Salinas River valley. Wind energy facilities pose a lethal threat to condors from collisions with wind turbine blades. This threat is magnified by the fact that the rotating turbines create a continuous potential for fatality events during standard facility operations. Explorations by individual birds often lead to range expansion or re-colonization. Therefore, the Service anticipates that if a single (or several) condor enters the risk zone (rotor swept area) within a wind energy facility, the same wind currents would promote similar movements by other individuals during the life of the project, resulting in ongoing fatality events. Furthermore, because of their communal feeding strategy, a single feeding event within a facility could kill many individuals. The increase in energy production will also prompt the construction of additional transmission lines, which could also pose a collision or electrocution threat to condors.

To date, 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 2008, 2009, 2011, unpubl. data). In addition, there are records of condors on the ground within or near proposed project sites. It is anticipated that as condors continue to reoccupy their prior range and wind energy facilities encroach on the currently occupied range, an increasing number of condors could be exposed to the turbine strike hazard. The relative fatality risk to condors from any wind energy facility will be dependent on siting and specific avoidance measures proposed to prevent mortality. The Service is aware of the wind energy industries' efforts to develop techniques to successfully identify approaching condors and avoid potential collisions, though the viability of those techniques has not been proven.

To address this newly identified potential threat to California condors, the Service convened the California Condor Wind Energy Work Group, a subgroup of the California Condor Recovery Team. The goal of the work group is to assess the risks of wind energy development and provide the Service's Regional Director, Pacific Southwest Region, science-based recommendations of actions that can be taken to minimize those risks. Efforts from the work group include a U.S. Geological Survey analysis of condor locations, movement, and wind usage designed to evaluate potential areas of conflict. Recommendations to the Regional Director are anticipated during 2013. The development of wind energy facilities in or adjacent to the expanding range of condors is potentially a significant threat and will be addressed as the recommendations from the work group are received.

Powerlines: During the first several years of releases, four California condor deaths occurred (31 percent of released birds in the first 2 years) from blunt trauma from hitting powerlines or from electrocution from perching on powerlines or poles. Pre-release powerline aversion training of captive-reared birds began in 1995. The powerline aversion technique has proven successful in reducing a propensity for condors to associate with power poles. Seven additional deaths in the free-flying population occurred through 2007, or 4 percent (n=174) of released birds since the aversion training began. In many but not all cases, death occurred in close proximity to release sites and involved young birds, which led to the formation of a subcommittee of condor partner organizations to identify problem areas. Some remediation of potential problem areas was conducted and no powerline-associated deaths, from either trauma or electrocution, have occurred since 2007. Although the most recent death occurred in 2007, it was a 4-year-old bird and the third death in association with the Anderson Tap line, which stretched approximately 3 miles from Highway 1 to Anderson Peak in Big Sur, California. This and several other powerline-related condor mortalities in and around Big Sur, California, including the two others from the Anderson Tap line, were actually documented to have resulted from electrocution following mid-air collisions (San Diego Zoological Society 2001, 2002, 2003, 2006, 2007 (Cite - Necropsy reports SB#212, 230, 254, 301, 376)). Pacific Gas and Electric (PG&E) placed the Anderson Tap line underground in 2011. In 2012, a recently fledged condor nearly collided with another powerline that spans Partington Canyon in Big Sur, California (J. Burnett and S. Kirkland, 2012 pers. obs.). PG&E has committed to work with the Service and Ventana Wildlife Society to minimize the threat of collision and avoid the threat of electrocution from this powerline by replacing the existing line with insulated tree wire.

Other projects undertaken to eliminate powerline collisions include an undergrounding project in southern California by Southern California Edison, powerline retrofitting in Big Sur and Pinnacles National Park, and projects at various other locations where California condor use of power poles has been documented. Powerlines have had significant impacts on the population in the past, but aversion training has been successful in developing avoidance behaviors. Continued aversion training of the captive-reared population is important in order to ensure that released condors do not perch on power poles. As discussed above, the potential for electrocution or blunt trauma following collisions with powerlines remains a threat.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Utilization for commercial, recreational, scientific, or educational purposes does not appear in the literature as a current risk factor for the California condor. There is considerable discussion of egg collecting in the late 19th and early 20th century being a factor in the decline of the species (Koford 1953, Service 1996). However, there are no known commercial uses of condors at this time (Service 1996). From the beginning of the release program in 1992 through 2011, four condors died as a result of gunshot and one from an arrow wound (Rideout et al. 2012, Service 2012). Several poachers have been prosecuted and convicted of killing condors; these are seen as isolated shooting incidents rather than systemic threats to the species.

FACTOR C: Predation and Disease

Both disease and predation are threats to the species and are described separately below.

Predation: Based on mortality data collected by the Service from January 1992 through December 2012, predation by terrestrial mammals (such as black bears (*Ursus americanus*) and coyotes (*Canis latrans*) and golden eagles (*Aquila chrysaetos*) accounted for or is suspected in 18 of 123 (14.6 percent) free-flying California condor deaths in the wild where a cause of death has been established (Rideout et al. 2012, Service, unpubl. data 2009–2012). Newly released condors are far more susceptible to predation, with 12 of the 18 predated condors having been in the wild less than a year. Older, more experienced condors are known to be more vigilant to predators than young naïve condors (West 2009). Further, overall increases in vigilance may be expected when many condors feed in a group due to the higher number of individuals alert to threat at any one time (West 2009).

In the winter of 2010, three mortalities were discovered at a roost site just off the Bitter Creek National Wildlife Refuge on Bureau of Land Management (BLM) property. These deaths were all attributed to mountain lion (*Puma concolor*) predation and occurred within 32 days of one

another. The first mortality occurred in November 2010 and the third in December. After the remains of the second condor were discovered, a game camera was set at the site of the cached remains. This camera confirmed the presence of a mountain lion visiting the cache three days after the initial discovery of the remains. The first condor was cached about 50 meters away from the cache site where the other two condors were found. While mountain lions are considered a natural predator to condors and have preyed upon them in the past, the rate at which condors were taken in this particular case was unprecedented. These mortalities are considered a result of a lion exploiting a situation where novice condors are concentrated due to the ongoing release of captive reared condors on the Refuge. Field managers are developing standard protocols in the form of predation management plans to respond to instances of predation such as this example.

California condors in nests are also vulnerable to predation. Nests are sometimes situated in cavities accessible to mammals such as bobcats (*Lynx rufus*), mountain lions coyotes, and bears. The eggs and/or nestlings in these easily accessible nests are at risk of predation, particularly from ravens (*Corvus corax*). When condors are attending their eggs they are generally competent in defending the nest from ravens; however, occasionally the egg is left unattended and vulnerable to predation (Snyder et al. 1981).

Disease: Diseases of concern include West Nile Virus and Highly Pathogenic Avian Influenza (HP H5N1). West Nile Virus was first documented in the United States in 1999 and has caused deaths in both captive and wild California condor populations (Rideout et al. 2012). Two types of vaccines have been used since the threat was identified. The first was developed by the Centers for Disease Control and Prevention (CDC) specifically for condors (Chang et al. 2007). This vaccine is no longer being produced so the program has switched to RECOMBITEK® Equine West Nile Virus Vaccine. To ensure efficacy, an annual booster is required. To date, all captive and free-flying condors are vaccinated for West Nile Virus and provided with a booster annually or opportunistically. The efficacy of the vaccine is thought to be high, which is demonstrated by the low rate of infection in the population. There has been one death of a vaccinated flying bird; another appeared to be infected but recovered from the disease. Condor chicks are also susceptible to West Nile Virus. Although believed to be protected by maternal immunity, one wild chick died of West Nile Virus prior to being vaccinated. As a result, any chick that is handled in the nest is vaccinated. Chicks that are not handled are vaccinated the first time they are trapped.

HP H5N1 has yet to enter the country, but would be a serious threat to California condors. According to the CDC, HP H5N1 is highly contagious, particularly among birds, and often fatal. It has been found in wild bird populations in Asia, the Middle East, Europe, and Africa. The potential for mortality from this disease was significant enough to warrant some discussion in the American Ornithological Union evaluation of condors (Walters et al. 2010). Vaccines are available to immunize avian populations, especially to protect captive zoo collections and endangered species such as condors. To date, poultry and zoo birds have not been vaccinated in the United States and vaccinations are not planned unless HP H5N1 is discovered here (Walters et al. 2010).

Disease and predation are both threats to California condor survival. Predation continues to be a significant cause of mortality among juvenile condors. Mentoring of juvenile condors by older

adults in the wild is a useful strategy to partially address this issue, and development of predator management plans to govern the actions of field managers will enhance the response to predation threats. Continuation of the inoculation protocols to prevent additional West Nile Virus occurrences, with the vaccine available for HPH5N1 outbreaks if they occur, is the current strategy for addressing disease. However, if the populations were not as aggressively managed by biannual trapping, testing, and inoculation/booster, alternative strategies would have to be developed. It should be pointed out that continuing the existing management practice of inoculation comes with associated risks. Namely, repeated human handling of condors increases the likelihood that habituation to humans. Habituation is discussed in more detail under Factor E below.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

Several State and Federal laws and regulations pertinent to federally listed species may contribute to the conservation of California condors. The Act is the primary Federal law that has provided protection since the species' listing as endangered in 1967. Additional Federal protections include the National Environmental Policy Act (NEPA), National Forest Management Act (NFMA), Federal Land Policy and Management Act of 1976 (FLPMA), Migratory Bird Treaty Act (MBTA), Lacey Act and National Wildlife Refuge System Improvement Act of 1997.

Protections for California condors in the State of California include the California Endangered Species Act (CESA), California Environmental Quality Act (CEQA), Natural Community Conservation Planning Act (NCCPA), and the California Coastal Act. The species is fully protected pursuant to Fish and Game Code Section 3511, which prohibits take of the species. Recently enacted legislation carves out an exception to section 3511, and allows take of condors authorized under an NCCPA permit. These laws, most of which were enacted in the past 30 to 40 years, have protected native species from being killed, taken, captured, or pursued and have attempted to protect and preserve habitat.

In 1996 the Service, in cooperation with the Arizona Game and Fish Department and the U.S. Bureau of Land Management, established a plan to reintroduce California condors into an anticipated range that included northern Arizona, southeastern Nevada, and southern Utah. These birds were designated as a nonessential experimental population under section 10(j) of the Act. The establishment of a second noncaptive population, spatially disjunct from the noncaptive population in southern California, is one criterion under the Recovery Plan. Nonessential experimental populations located outside National Wildlife Refuge System or National Park System lands are treated as if they are proposed for listing, but not listed. Thus, all Federal agencies are required to use their authorities to conserve listed species and section 7(a)(4) requires Federal agencies to informally confer with the Service on actions likely to jeopardize the continued existence of a proposed species.

In 2007, the California State Legislature passed the Ridley-Tree Condor Preservation Act (AB821), which prohibits the use of lead ammunition for big game hunting or varmint control in an area described as California condor habitat (See Figure 5). Effective July 1, 2008, this law declared the Legislature's intent to protect vulnerable wildlife species, including the California

condor, from ongoing threats of lead poisoning. Education and enforcement are critical to successfully reduce (or eliminate) lead-related condor mortalities. Unfortunately, enforcement of lead-free hunting regulations is problematic due to budget constraints, the resulting lack of enforcement personnel to enforce the law, and the difficulty of determining if lead ammunition was used to harvest an animal (Walters et al. 2010).

In adopting the associated regulations, the California Fish and Game Commission (Commission) developed a list of certified non-lead projectiles, which is now maintained by the California Department of Fish and Wildlife. Some other uses of lead projectiles in the California condors' range remain, including depredation (though strongly discouraged), farm and ranch management activities, and poaching. The Commission is reconsidering some of these regulatory issues as of August 2012, though no action has yet occurred. Within the pre-historical and historical range of the condor in California (statewide), but outside the designated range under State statute, no regulatory provisions for reducing or eliminating lead in big game, varmint, and depredation shooting are yet in place. In 2013, a California legislator introduced proposed legislation (AB711) which would, if adopted, eliminate the use of lead ammunition in any hunting activity in California, including varmint control and depredation. The lack of such protections could be a limiting factor for expansion of the condor population out of the currently identified designated range and for the identification of other appropriate release sites within their historical range. Similarly, very limited or no restrictions or limitations on the use of lead ammunition in other parts of the historical range, including Oregon, Washington, Nevada, and British Columbia, are in effect at this time.

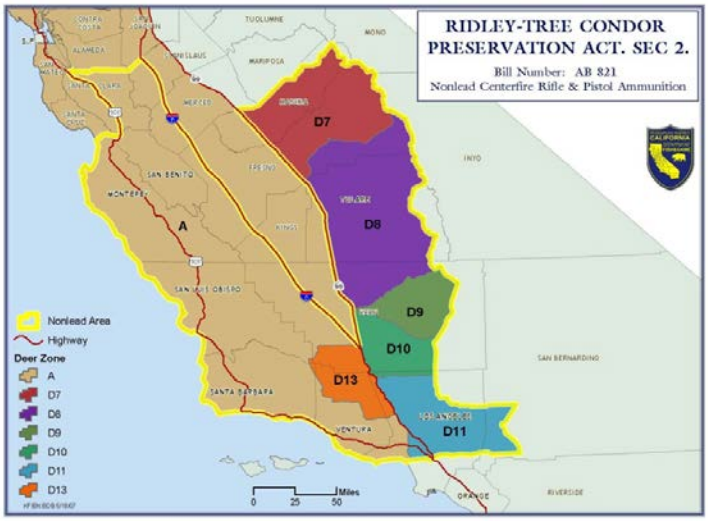


Figure 5. California condor range as described by the Ridley-Tree Condor Preservation Act (CA Dep't of Fish and Wildlife)

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

Lead: Lead poisoning in waterfowl has been well documented, as has lead poisoning in raptors, notably the bald eagle (*Haliaeetus leucocephalus*), feeding on waterfowl. The recognition of this problem led the Federal government to enact a ban on the use of lead shot for most waterfowl hunting in wetland areas in 1991. Further, there is substantial evidence in the scientific literature that the problem of lead poisoning extends to upland birds, particularly those that are partial or obligate scavengers. Tranel and Kimmel (2009) summarized available literature regarding ingestion of lead shot, bullets, and fragments by wildlife species and impacts of lead poisoning on wildlife, the environment, and humans from over 500 citations. In the literature, 24 percent of the bird species reported as affected by lead ammunition were raptors and scavengers.

Lead has detrimental effects on wildlife and humans (Tsuji et al. 2009). The impacts of ingested lead on wildlife include decreased survival, poor body condition, behavioral changes, and impaired reproduction (Finkelstein et al. 2012). Lead causes a decrease in the amount of hemoglobin in the red blood cells by obstructing heme synthesis, which causes critical anemia. Moreover, lead poisoning disrupts normal liver and kidney functioning and causes adverse impacts on the central and peripheral nervous systems.

Lead poisoning from ingestion of spent ammunition in carcasses and offal (gut piles) is the most severe impediment to California condor recovery (Church et al. 2006, Chesley et al. 2009, Hunt et al. 2009, Stroud and Hunt 2009, Finkelstein et al. 2012). There is strong evidence that increased mortality from lead poisoning was a serious factor that contributed to the California condor's precipitous decline at the time condors were brought into captivity (Meretsky et al. 2000, Snyder 2007).

All of the reintroduced California condor populations have been monitored for lead exposure over time. Each bird is trapped annually or semiannually so that a blood sample can be tested for lead. This requires supplemental feeding in order to attract and capture condors, which may affect the foraging behavior by constricting their range use (Snyder 2007). Repeated monitoring for signs of lead exposure, chelation, surgical removal of lead particles in the digestive system, and other emergency actions can reduce the harmful impacts of lead exposure on condors; however, frequent capture and exposure to humans may have detrimental effects on behavior (Cade 2007).

The results of the annual testing are an indication of the extent to which lead exposure occurs within the California condor population. In a study of the reintroduced population in Arizona from 1999 through 2004, annual blood tests showed 40 percent of the samples with higher than background lead levels (greater than 14 micrograms per deciliter (ug/dL)). During this period, more than half (28 of 50) of the birds in the population were treated for high lead exposure. In the same study, from 2002 to 2004, the majority of the population had above-background lead levels each year (Parish et al. 2007).

Similarly, in California condors are exposed to lead at levels that cause population effects. From 1997 through 2010, 150 condors were trapped and tested collecting 1,154 discreet blood samples, with an average 30 percent of the samples showing levels greater than 20 ug/dL, levels that are known to have physiological effects on condors (Finkelstein et al. 2012). Over the same period, 48 percent of the condor population in California had lead exposure greater than or equal to 45 ug/dL; all were treated or would have been treated under current protocols. Many birds have been treated multiple times across years. Condors would not survive in the wild if they were not regularly trapped, tested, and treated for lead exposure. Without treatment and the continued release of captive-reared birds into the California population, it is projected that the population would decline to 1984 levels (22 birds) in 11 to 61 years, depending on the blood lead level assumed for mortality (Finkelstein et al. 2012).

Even with the high level of monitoring and treatment, lead exposure remains the leading cause of death in wild California condor populations. Of the 135 condor deaths from 1992 to 2009, biologists were able to establish a definitive cause in 76 individuals. In juveniles and adults, lead

caused 26 and 67 percent of the deaths, respectively (Rideout et al. 2012). Overall, from the first releases in 1992 until the end of 2012, 42 of the 123 condors deaths (34 percent) where a cause of death is known were as a result of lead poisoning, more than twice the next single highest cause of death, which is predation.

Sublethal lead exposure may also pose a barrier to condor recovery; lead is well known to damage multiple physiological systems in vertebrate species (Bellinger 2011). Recent evidence suggests that condors are as sensitive to sublethal lead exposure as other vertebrate species (Finkelstein et al. 2012), yet the impact of chronic lead exposure on condor reproduction or long-term survival is not known.

In California condors specifically, acute exposure to lead initially results in lethargy and reduced activity and, progressively, loss of appetite, loss of muscular coordination, neurological impairment, diarrhea and bile-stained feathers around the vent, wing droop, inability to stand and eventually death (Walters, et al. 2010). These symptoms may occur within a few days of exposure or may progress over several weeks.

Blood lead levels and mortality rates demonstrate only a portion of the impacts of lead on wild California condor populations. Lead persists in the blood of condors for only a short period of time, making it a poor measure of the overall exposure history. Even when blood is tested twice over the course of the year, only about 10 percent of the actual exposure for that year is ascertained (Finkelstein et al. 2012). Feathers provide a much wider window of detection, allowing a more accurate understanding of the duration and severity of lead exposure in condors (Finkelstein et al. 2010). Using feather samples collected from both living and dead birds, severity of exposure was found to be 1.4 to 14.4 times greater than that indicated by blood lead levels (because blood tests are rarely performed at the peak of exposure). Feathers also revealed that elevated blood lead levels are sustained for much longer periods of time than indicated by blood alone (Finkelstein et al. 2012).

When a California condor ingests lead it is slowly dissolved by stomach acid, enters the blood stream and is distributed to other tissues including liver, muscle, kidney, brain, bone, and growing feathers (Walters et al. 2010). The isotope ratio of the lead (Pb^{207}/Pb^{206}) in these tissues reflects the isotope pattern of the lead ingested in objects or food (Church et al. 2006, Chesley et al. 2009, Finkelstein et al. 2012). In order to identify sources of lead exposure in California condors, researchers have been characterizing the lead isotope patterns in blood and feather samples, and comparing them to ingested fragments of lead, commercial lead bullets, environmental lead background sources, and other known lead sources (Walters et al. 2010). In most cases, the lead isotope ratios in blood and/or feathers matched lead bullet fragments recovered from carcasses upon which the birds were feeding, and differed from background lead isotope ratios. Fragments recovered from the gastrointestinal tracts of exposed birds were also identified as ammunition through isotopic comparison (Church et al. 2006, Chesley et al. 2009, Finkelstein et al. 2010, Finkelstein et al. 2012).

Isotopic ratios were also used to successfully identify one other source of lead. An old fire tower in Pinnacles National Park covered with lead-based paint was found to be the source of lead poisoning in five condors. The lead paint had an isotopic signature that differed from

ammunition and background lead and matched the blood of some birds observed to be perching in the vicinity of the tower (Finkelstein et al. 2012). Once identified as a source of contamination, the lead paint was remediated. This unique incident demonstrates how isotopic methodology can inform management actions to protect condor health.

The basic materials available to manufacture bullets include lead alloys, lead with external copper wash, lead core with a copper jacket, copper with zinc alloys, pure copper, and bismuth. Lead and bismuth bullets often fragment upon impact, whereas pure copper bullets typically remain intact (Stroud and Hunt 2009).

Bullet fragmentation (Figure 6) increases the degree of lead contamination in tissue ingested by scavengers feeding on hunter-killed animal remains (Stroud and Hunt 2009). Researchers investigating bullet fragmentation in deer remains found that all whole or eviscerated deer killed with lead-based bullets contained fragments; 74 percent contained more than 100 visible fragments (Hunt et al. 2009). In comparison, the study counted a total of only six fragments in four whole deer killed with copper expanding bullets (Hunt et al. 2009). The density and distribution of lead fragments within the carcasses suggest a high potential of exposure to scavengers (e.g., California condors, golden eagles, turkey vultures, ravens, coyotes) (Bloom et al. 1989, Craighead and Bedrosian 2008, Bedrosian et al. 2009, Hunt et al. 2009).

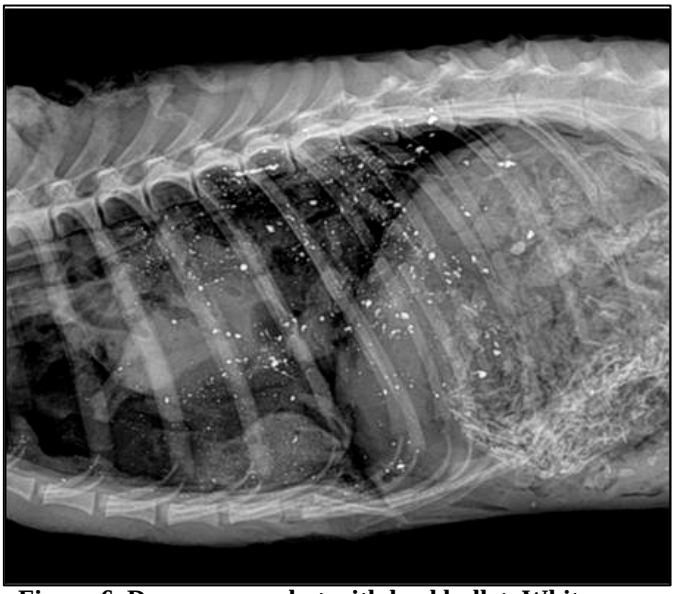


Figure 6. Deer carcass shot with lead bullet. White particles are lead fragments.

As noted under Factor D, in July, 2008 the Ridley-Tree Condor Preservation Act went into effect in the range of condor as defined by Commission action. Thus far there has been no discernible change in condor blood lead levels from a period prior to the regulation (2006–2007) to a period following its implementation (2009–2010) (Finkelstein et al. 2012). However, in the year following the ban a significant reduction in blood lead concentration was observed in turkey vultures and golden eagles, which have feeding strategies similar to, though not identical to condors (Kelly et al. 2011). Further study on the effects of this law is currently underway, and a report is due to the Commission in mid-2013.

There are a number of plausible explanations for why these restrictions have not yet had an effect on California condor blood lead levels. The law is limited in that it controls the use of lead ammunition only for big game and nongame hunting activity. Upland game hunting, nuisance animal depredation, dispatching domestic livestock, and poaching also have the potential for creating lead-contaminated carrion available to condors; these are not addressed by this law. Comprehensive bans that address these additional sources of lead poisoning on private lands, such as the ban on lead ammunition implemented by Tejon Ranch in January 2008, can assist in reducing this threat to condors. Animals that survived after being shot with lead ammunition

prior to the change in the law also have the potential to expose condors once they die. Further studies may be warranted to determine the extent to which these animals persist in the environment. Enforcement and compliance are a concern in the State; game wardens must cover very large areas and face a diversity of wildlife issues.

In Arizona since 2003, and more recently in Utah (2012), voluntary efforts have been developed to reduce California condor exposure to lead-affected carrion. Activities include education and marketing outreach to hunters and free nontoxic high-performance ammunition for those hunting in condor range. While these efforts have been successful in changing the ammunition used by the majority of hunters, particularly in Arizona, the continued occurrence of lead poisoning in the condor population in those states continues to significantly impact the condor population. The most recent information on condor deaths indicates that nearly fifty percent of known deaths in that population resulted from lead toxicity. As a result, the Service has provided a grant to Utah to enhance their lead outreach efforts. The Section 10(j) rule and underlying agreements that established the experimental, nonessential population provide that no Federal regulatory action will be taken to restrict hunting or other shooting activities due to the presence of condors.

Lead ingestion by California condors and the subsequent behavioral and physiological effects of lead poisoning, including both mortality and morbidity events, is the single most significant threat to the species. Failing to adequately address this factor makes it difficult to progress towards sustainability.

Shooting: Shooting remains a potential additional threat to free-flying California condors. Since reintroduction, there have been four condor deaths attributed to shooting. Two of these were in California and two in Arizona (Rideout et al. 2012). In addition, one condor was shot and killed with an arrow. Other nonlethal shooting events have been documented in California. In southern California, an adult female condor (studbook #155) required capture and permanent detention after being shot. Additionally, two other birds radiographed during treatment for elevated lead levels were found to have shotgun pellets embedded in the soft wing tissue and other areas of the body. Several prosecutions have resulted from these incidents**.**

Microtrash Ingestion: Breeding California condors sometimes ingest small man-made materials (microtrash) and feed these items to their nestling (Grantham 2007, Mee et al. 2007b, Rideout et al. 2012). Trash items recorded include nuts, bolts, washers, copper wire, plastic, bottle caps, glass and spent ammunition cartridges (Figure 7) (Mee et al. 2007a, Walters et al. 2010). While nestlings are able to tolerate these items in small amounts, large quantities can result in digestive tract impaction, evisceration, internal lesions, and death (Grantham 2007, Snyder 2007, Rideout 2012). Of the known causes of death in wild nestlings, eight out of eighteen (44 percent) have been as a result of microtrash ingestion (Table 2).

Nestling Cause of Death	California Population	Arizona/Utah Population	Baja California Population	Total Population
Microtrash	7		1	8
Unknown/Missing	4	6	2	12
Fall	2			2
Infection	2			2
Parental Trauma	2			2
Handling	1		1	2
Pending	1			1
Predator	1			1

Table 2: Microtrash ingestion has predominantly impacted nestlings in California, where it is the leading cause of death in nestlings and has been the major cause of nest failure in the breeding population (Mee et al. 2007a, Rideout et al. 2012).

Mee et al. (2006) compared the number and mass of foreign trash items collected from pre-1987 nests to those from nests of reintroduced California condors and found that trash was significantly more prevalent and numerous in the latter. Trash items also tend to be more common in the California population, with the most impacted nests in the southern California region. Two documented deaths of adult condors in Arizona were caused by the ingestion of coins or washers, which led to zinc toxicosis (Rideout et al. 2012).

Trash ingestion appears to be common and problematic in some populations of Old and New World vulture species other than California condors (Mundy et al. 1992, Snyder and Snyder 2000, Mee et al. 2006, Grantham 2007), and in a variety of other avian species. The reason California condors ingest trash items is unknown; however, Snyder and Snyder (2000) suggest it might be related to a misdirected search for calcium and food sources needed for egg-laying and chick growth and development, as documented in other vultures. Other researchers propose that trash ingestion may fill a need for roughage that aids in digestion, a function found in other species (Wings 2007). Overall, the presence of trash is a reflection of increased human use and impact within condor range, particularly in southern California (Mee et al. 2006).

Figure 7: Objects surgically removed from chick.

The effects of microtrash are currently being mitigated through various methods. The first, known as nest guarding, involves periodically climbing into each California condor 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 gastrointestinal impactions from forming. Chicks that are found to have impactions despite the nest cleaning can be treated by temporarily removing them from the nest to surgically remove the impaction. Nestlings can be absent from the nest for 24 hours and successfully returned. While the nestling is absent, a human presence is maintained to keep the parent from accessing

the nest until the chick can be returned. Temporary nest evacuation is rarely required, but has been used successfully on three occasions, though it is not always successful (Service, unpubl. data).

The second method for reducing microtrash is to identify and clean locations where microtrash is collected by parent birds. Many of the actively breeding California condors have been fitted with GPS transmitters that broadcast hourly locations and speed during daylight hours. It is possible to identify potential sources of trash by investigating the locations where parent birds spend time on the ground. Microtrash sites tend to be roadside pullouts or overlooks where people discard bottles or other refuse that eventually break into coin-sized pieces, which are then ingested by condor parents and transported to the nest. There is some anecdotal evidence that cleanups have reduced the amount of trash collected by pairs with a propensity to use a particular site for collecting microtrash (J. Brandt and J. Burnett 2012, pers. comm.).

Another method used to mitigate the impact of microtrash on California condors has been to litter bait stations with bone chips. The practice of establishing boneyards has helped alleviate microtrash ingestion in Old World vulture species (Mundy and Ledger 1976, Menge et al. 2008). Breeding condors have been observed collecting these chips and bone is regularly found in the nests during cleaning.

While microtrash impaction has been a significant source of California condor mortality in the past, particularly in the southern California population, the aggressive program of nest guarding and cleanup has significantly ameliorated the problem. Nesting success in the southern California population has increased to approximately 65 percent with the nest guarding and cleanup programs, as compared to a 30–50 percent estimated nesting success rate in the natural population, based on both condors and other New World vulture populations (Snyder and Snyder 2000). As long as the extraordinary efforts of the staff involved with the program continue, this is no longer perceived as a significant current threat to the species. However, without continual management to prevent problems associated with microtrash, this could again become a significant threat.

Organochlorines: California condor eggshells collected in the late 1960s had severe thinning and structural abnormalities. These abnormalities were attributed to the effects of DDE, a breakdown metabolite of the pesticide DDT. DDT is thought to have contributed to the species' decline in the 1950s and 1960s (Kiff 1979). Significant eggshell thinning was also reported for the turkey vulture within the region of sympatry with the California condor (Wilbur 1978b, Kiff et al. 1979, Wiemeyer et al. 1988). These compounds (DDT/DDE) have been detected regionally in the reintroduced population. DDT was banned in the United States in 1972 (Kiff et al. 1979) and nearly all condor eggshell samples collected after 1975, prior to the population being extirpated from wild, were of normal thickness (Snyder and Meretsky 2003). However, two eggs laid in 1986 by the last female California condor (studbook #12) to breed in the wild were very thin (44 percent thinner than the historical mean thickness) and contained inexplicably high levels of DDE and DDT (Kiff 1989). Snyder and Meretsky (2003) conducted a reevaluation of DDE and condor eggshell thinning, and found that the available evidence did not indicate strong support for the hypothesis that DDE was causing significant eggshell thinning. However, current studies in Big Sur, California, suggest that thinning was induced by DDE

contamination (K. Sorenson, 2012 pers. comm.). Recent low productivity of the central California portion of the California population has once again raised concern about DDT and DDE exposure in central California.

California condors, whose range includes the central California coastline, are known to regularly feed on marine carrion, particularly California sea lions (Sorenson and Burnett 2007). Despite DDT having been banned in 1970s, it continues to persist in California sea lions along the coast of California at very high levels as a result of past illegal disposal of a large amount of DDT in the ocean off southern California (LeBoeuf et al. 2002, Debier et al. 2005, Ylitalo et al. 2005). Due to the marine component of their diet, condors nesting in central California are susceptible to organochlorine exposure, DDT being of most concern. Investigators in central California reviewed the plausibility of DDE-induced thinning in the Big Sur population and found a correlation between eggshell thinning and weight loss rates, an absence of the outer crystalline layer of eggshells (characteristic of DDE contamination), and a significantly different eggshell thickness in condor eggs between southern California and central California birds (K. Sorenson, 2012 pers. comm.). Eggshell thinning and reproductive failure due to the consumption of organochlorine-contaminated marine animals has also been observed in reintroduced bald eagles on Santa Catalina Island, California (Garcelon et al. 1989).

The Service concluded that the effects of DDT/DDE exposure on California condors are a significant threat to the portion of the population that forages on marine mammals. Several ongoing research projects are evaluating the negative impacts on the population, as well as attempting to identify strategies to mitigate or address those effects.

Habituation: 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. These undesirable habituation behaviors were exhibited at a much higher frequency during the early years following the establishment of a release site and now persist to a lesser degree in each of the wild populations. These types of behaviors are also known in similar species. Wild populations of black vultures (*Coragyps atratus*) are known to exhibit similar behaviors, which caused the destruction of property and prompted control measures (Lowney 1999). Habituation increases the risk of injury to condors (or the people they approach) and the likelihood of associating food with humans, possibly resulting in reduced reliance on natural foraging behavior.

Cade et al. (2004) grouped undesirable behavior into three categories, increasing in level of severity:

- Type I behavior is characterized by birds landing no closer than 45 feet (15 meters) from people, by investigative fly-bys no closer than 45 feet (15 meters), occasional investigation of manmade objects, perching on manmade structures that resemble natural objects or provide safe vantage points, and not repeating undesirable behavior after being hazed once or twice.
- Type II behavior is an intermediate category that represents tolerable though not ideal behavior toward humans. It is characterized by birds landing or flying closer than 45 feet (15 meters) to humans, but maintaining an individual distance when approaching or being approached by humans and circumventing humans when investigating their

belongings, allowing close human approach only when a clear escape route is present, and fleeing when hazed.

- Type III behavior is dysgenic and consists of birds allowing close human approach when no escape route is present (no fear of being boxed in), seeking out and initiating contact with humans, allowing touching and handling (including capture), not responding to hazing, and showing no fear of humans.

Condors are extremely social animals. The presence of a single bird can attract others to the area; therefore, habituated birds within the population can put other individuals at risk. Condors are also very inquisitive animals and, like many other opportunistic species, will explore their environment as a means to discover potential food items, as well as keying in on the activities of other condors or other species to find food.

The age of the individual California condor can be a factor in terms of habituation. Younger birds tend to be more susceptible to the threat of habituation, especially when released from captive rearing programs without older birds to mentor them, as was the case early in the release effort. However, even young wild-fledged birds have been reported to be much more approachable than older individuals (J. Hamber 2012 pers. comm.).

Figure 8. Photo of condor (studbook #412) entangled and hanging from a communications tower. The injuries from this incident were so severe the bird was euthanized.

Prior to release, captive California condors are held for many weeks in remote isolated flight pens with a mentor bird. They are assessed and released only if they exhibit appropriate behaviors, including fear of humans. However, the social nature of condors makes all individuals at risk of habituation. While younger, naïve birds are more likely to exhibit Type I or II behaviors, that behavior may cause other individuals to exhibit the same behavior, regardless of age or breeding status.

Type I and II are considered normal exploratory and play activities that may be adaptations related to the foraging and social nature of California condors. However, these behaviors may lead to an increased potential for the development of Type III behaviors. In turn, case studies have shown that Type III behavior can be changed to Type I or II through the use of hazing or temporarily removing the offending bird from the population, though this is not effective in every situation (Cade et al. 2004).

Even Type I behaviors involve risks to California condors. While this category is not associated with approaching humans, it does include condors approaching or landing on human structures. In many cases these structures are inherently hazardous to condors, which can become entangled

or entrapped on or in structures or ingest poisonous household or industrial items, leading to injury or death. The first death in the reintroduced population was after a condor (studbook #66) was exposed to ethylene glycol, a substance commonly used in hydraulic fluids and antifreeze; the source of this exposure is unknown (Rideout et al 2012). Another example occurred in 2010 when a wild-fledged condor in southern California became entangled in a line attached to a communication tower (Figure 8). This resulted in an injury so severe that the condor was euthanized. In yet another case, a condor approached a structure and became oiled after finding a bucket filled with motor oil. Fortunately, this bird was trapped and the oil cleaned from its head, feet, and feathers.

The field managers at each release site employ hazing as a means to manage Type I and II behaviors and prevent Type III behaviors or injury to California condors. The attitude toward hazing as an effective deterrent has changed over time (Grantham 2007). In some instances hazing in combination with removing any potential attractants has been effective at discontinuing condor activity at certain locations. In other instances condor activity has persisted for longer periods of time and only ceased when there was a change in foraging patterns (possibly seasonal in nature). In these cases, field staff found that hazing was only effective in temporarily keeping birds away from structures or people when it was done immediately and consistently. When placed properly, automated hazing devices, such as motion-activated sprinklers, are the most effective technique for persistent situations.

Climate Change: The warming climate and its effects or potential effects on wildlife has been well documented (Inkley et al. 2004, Hansen et al. 2006). According to the Intergovernmental Panel on Climate Change (IPCC) (2007, p. 1) "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the last 1300 years (IPCC 2007). Over the past 50 years, cold days, cold nights, and frosts have become less frequent over most land areas and hot days and hot nights more frequent (IPCC 2007). In addition, the frequency of heat waves and heavy precipitation events has increased over most land areas (IPCC 2007). The IPCC (2007) predicts that changes in the global climate system during the 21st century are very likely to be larger than those observed during the 20th century. Warming of about 0.4 degrees Fahrenheit (°F) per decade is projected for the next 2 decades (IPCC 2007).

Climate change may or may not affect the prevailing winds that California condors rely upon for soaring. Ungulates and ranching operations that condors rely upon for food may be impacted by a changing climate. The increased frequency of wildfires has the potential to destroy roosts and directly harm condors caught in the path of fast-moving fires. Finally, hotter summer temperatures and a smaller snowpack may reduce the availability of water sources that condors rely upon for drinking and bathing. However, condors have a very wide historical range, from the Pacific Northwest to the southwest desert, indicating an adaptability that may assist their survival in a changing climate.

A recent study by California Department of Fish and Wildlife and Point Reyes Bird Observatory (Gardali et al. 2012) of California's at-risk bird species determined that California condors were not one of the species most vulnerable to climate change, based on the sensitivity (intrinsic characteristics of an organism that make it vulnerable) and exposure (the magnitude of climate change expected) anticipated for each species. No specific observations about condors were made in the published study. Based on what we know about the species and the known and likely effects of climate change, we do not consider climate change as a significant threat to the species.

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance we may determine that, overall, the threats have been minimized sufficiently and the species robust enough to downlist or delist. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent to which criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management and assessing a species' degree of recovery is an adaptive process that may or may not fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) in eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

The Recovery Plan for the California Condor (Service 1996) did not specify criteria for removing the condor from the List of Endangered and Threatened Wildlife. At that time, there were too few condors in existence to anticipate all the actions that would be necessary to bring about full recovery. The Recovery Plan does outline one minimum criterion, along with five conditions that need to be achieved before reclassifying the species to threatened. The minimum criterion is the maintenance of at least two non-captive (wild) populations and one captive population. The five conditions that must be met, in addition to the minimum criterion, are that these populations:

(1) must each number at least 150 individuals;
(2) must each contain at least 15 breeding pairs;
(3) must be reproductively self-sustaining with a positive rate of population growth.

Furthermore, the non-captive (wild) populations

(4) must be spatially disjunct and noninteracting; and
(5) must contain individuals descended from each of the 14 founders.

One of the purposes of the 5-year review is to assess our achievements toward meeting the criteria as established in the Recovery Plan. The 1996 Recovery Plan anticipated that these criteria would be met by 2010, though this has not yet occurred. Each of the California condor populations continues to grow, though largely based on contributions from captive-bred birds.

The California condor population in California, with its 2012 population size of 129 condors and 12 active breeding pairs, will likely be the first to achieve the numerical Recovery Plan goals. Arizona had six active breeding pairs with a population of 78 free-flying condors in 2012. The Baja population was not considered at the time of the 1996 Recovery Plan and no goals have been established for that population.

None of the three free-flying (wild) populations are reproductively self-sustaining. Recovery of the California condor is constrained by the current anthropogenic causes of mortality, primarily lead contamination from prey shot with lead ammunition (Rideout et al. 2012). Further, reproductive success has been hampered by the presence of microtrash in the environment and the effects of DDT/DDE in coastal populations. Additionally, exposure to lead in breeding adults may cause nest failure. With natural reproductive rates already low in this long-lived and slow-to-mature species, the high rate of mortality and depressed reproduction have prevented growth in the wild population except through captive breeding.

The genetic representation of the 14 founders in the wild California condor 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. All 14 founders are represented in the captive flock, which has a current population of 180 condors. About 60 breeding pairs are active each year. These pairs are periodically split and re-formed to maximize the genetic diversity of the captive offspring. Condors have been highly successful breeding in captivity and great care is taken in proper rearing techniques to allow for the successful release of captive-reared juveniles (Clark et al. 2007). A portion of the captive population must be retained as breeders to maintain the genetic diversity of the population, and space is required to hold these individuals until they mature and can reproduce. Exhibits serve the dual purpose of providing space for immature condors assigned to the captive breeding effort and promoting education and outreach.

IV. SYNTHESIS

At the time of Federal listing in 1967, one population of California condors, comprised of approximately 50–60 birds, was known in California. In 1982 it was decided to take eggs and nestlings produced by wild California condors into captivity to form a captive flock at the San Diego Wild Animal Park and Los Angeles Zoo. By 1985, due to the significant loss of wild birds, it was decided to capture all remaining wild birds in order to ensure the genetic viability of the species and enhance the chances of success in the captive breeding program. The first releases of captive-reared birds occurred in 1992 in southern California, but behavioral problems exhibited by these birds led to a decision to return them all to captivity in early 1995. Releases of captive-reared and formerly wild birds were reinitiated in southern California in 1995 and additional release sites were established in Arizona in 1996, central California in 1997 and Baja California in 2002. Currently, there are three condor populations (a blended population in

central and southern California, and independent populations in Arizona and Baja California), however the California condor still remains absent from the northern portion of its historical range. The California Condor Recovery Program has achieved remarkable success with steadily increasing wild and captive populations. Condors raised in captivity are routinely released in California, Arizona, and Baja California to expand the wild populations. There are now chicks fledged from natural nests by breeding pairs that formed on their own after release. Despite these efforts, the status of the species remains endangered due to the continued high mortality rates that cannot be naturally offset due to the low numbers of individuals and naturally low reproductive rate of the species. At this time, the wild populations of California condors have yet to exhibit a positive rate of growth without captive releases and annual mortality has surpassed productivity in these populations. It is expected that releases and intensive management will be required to sustain and grow the populations into the future until the leading cause of mortality, lead contamination, is resolved in all three of the wild populations (Finkelstein et al. 2012).

Therefore, the California condor still meets the definition of endangered, and this review recommends no status change at this time.

V. RESULTS

Recommended Listing Action:

___Downlist to Threatened
___Uplist to Endangered
___Delist
_X_No Change

Recovery Priority Number and Brief Rationale: The existing 4C designation indicates that California condors are a monotypic genus that face a high degree of threat, have a stable or increasing population, and have a low potential for recovery. The "C" indicates conflict with construction, development projects, or other forms of economic activity, in this case largely hunting and the resulting exposure to lead. The conclusion of this assessment indicates a monotypic genus that faces a high degree of threat, has a stable or increasing population and continues to have a low potential for recovery. According to the Recovery Priority Guidelines, "priority will be given to those species and projects that offer the greatest potential for success" and recovery potential of a species will be determined by consideration of the following (Table 3):

Table 3: Recovery Potential Guidance

	High Recovery Potential	**Low Recovery Potential**
Biological and Ecological Limiting Factors	Well understood	Poorly understood
Threat to Species Existence	Well understood easily alleviated	Poorly understood or pervasive and difficult to alleviate
Management Needed	Intensive management not needed, or techniques well documented with high probability of success	Intensive management with uncertain probability of success, or techniques unknown or still experimental
From 48 FR 43098, as corrected in 48 FR 51985 (1983)		

The biological and ecological limiting factors for California condors, such as slow reproductive rate, long period until sexual maturity, and the impact of condor habituation are to be considered in designating the recovery potential. These factors are well understood and have been documented to various degrees through four recovery planning efforts and in this 5-year review. While additional scientific research would benefit the recovery of the species and is suggested with this report, these biological and ecological factors are considered in the recovery criteria established for the program and are not in themselves the cause of a low recovery potential.

The threats to the California condor's existence are also well understood, both in the scientific community and among policymakers. The primary threats, as documented in this report and demonstrated in many scientific references, is the ingestion of lead introduced into the environment, and, to a somewhat lesser degree, the presence of other contaminants such as DDT/DDE and microtrash. These and other threats to condor survival are the subject of active avoidance and minimization programs and statutory and regulatory changes, though they continue to be subject to ongoing scientific and policy debate. Lead is pervasive throughout all California condor ranges, and has proved very difficult to alleviate. Particularly because of the presence of lead in the environment, intensive management of California condors will continue in the foreseeable future. Also because of the mortality associated with lead and other mortality factors, continued operation of captive breeding facilities will be required. California condors have a low recovery potential because their limiting factors and threats, while well understood, are both difficult to alleviate and require continuing intensive management both of the wild and the essential captive population. Therefore, the Recovery Priority Number for the California condor should remain as 4C.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

The California Condor Recovery Program involves a complex partnership of diverse organizations located over a large geographic area. The program's current structure makes each partner instrumental to future efforts and continued success will require proper coordination and communication. Previous management of the California condor has demonstrated that adaptive decision-making is often necessary due to unforeseen and changing circumstances. Therefore, although recommendations in this review are presently regarded as important over the next 5 years, future conditions may lead to updated management strategies that diverge from the current recommendations.

Audubon California and the American Ornithologists' Union (AOU) developed a report entitled Status of the California Condor and Efforts to Achieve its Recovery (Walters et al. 2010), which contained a number of organizational recommendations; some of these have been implemented and some considered in the context of the report. The Service has placed the Condor Recovery Coordinator, who reports to the Deputy Regional Director as suggested in the AOU Report, in the Regional Office (Region 8).

In 2010 the California Condor Recovery Team was disbanded; management of the flock continues to be performed by the Service and partner organizations. The last recovery plan revision, written in 1996, focused on captive propagation, appropriate sites for roosting, nesting and feeding, release techniques, subsequent individual bird management, and recordkeeping.

Over 90 partners in California condor recovery met together in August 2012 in Portland, Oregon, to review a draft of this 5-year review document, and to provide suggestions for improvements in the California Condor Recovery Program. Recommendations from partners have been incorporated, as appropriate, to add local perspectives to various issues identified in the review.

The four prior recovery plans, the AOU report, and this 5-year review provide an impressive body of information to use as a basis to update and improve recovery management. At the California condor recovery partners meeting in August 2012, many suggestions were made to develop focused, issue-specific work groups to engage the partnership that manages condor recovery, and to assist in resolving specific issues, such as contaminants, rather than to develop another large comprehensive plan. To the degree that the Service concurs with those recommendations, they have been incorporated into this document or will be considered in subsequent planning efforts.

Of particular importance is recognition that virtually all the recommended actions in this section are now dependent on private, non-Federal funding that cannot likely be sustained, and that the funding situation for the partners as a whole is now critical. In a separate communication with the Service, a number of partners indicated the current pressing need for approximately $3.5 million per year for the next 5 years in order to sustain the existing level of effort, and additional funds to address the lead issue identified as essential in this report.

Below, we present our specific management and research recommendations.

Priority Needs:

1. Develop a 5-year needs assessment to assess the need for resources to implement recommended organizational changes and for a State-based non-lead outreach and education effort.

2. Continue development of specific workgroups as part of a larger California Condor Recovery Team with narrowly drawn, time-limited responsibilities to address significant pending issues, including:

    a. Developing programmatic responses to contaminants in the environment, including lead, DDT/DDE, and microtrash;
    b. Planning for additional release sites if found feasible and desirable;
    c. Managing program growth and recordkeeping that results from the continued captive breeding, release, and management of condors in the wild;
    d. Developing consistent and structured health, veterinary and animal management protocols and standards.

3. Develop and publish a Federal Register notice that corrects the 1987 and subsequent listing of the non-experimental California condor population to reflect the actual listed range.

Captive Breeding Program

The California condor captive breeding program partners include the Zoological Society of San Diego/San Diego Zoo Global, Los Angeles Zoo, Oregon Zoo, and World Center for Birds of Prey. The anticipated participation of the Chapultepec Zoo as a captive breeding partner would include support by Mexican agencies, including the Instituto Nacional de Ecología, Comisión Nacional de Áreas Naturales Protegidas, Centro de Investigación Científica y de Educación Superior de Ensenada, and Dirección General de Zoológicos y Vida Silvestre, among others. A Memorandum of Understanding with Mexican authorities is under development as a near-term action to facilitate creation of a potential additional breeding program in Mexico in support of the existing release site in Baja California, and to ensure integration of the Mexican program into the overall recovery effort. Ongoing management of the captive breeding effort is managed by the partners pursuant to State and Federal recovery permits.

Field Restoration Activities

California condor field restoration activities include efforts by the Service, Ventana Wildlife Society, National Park Service, The Peregrine Fund, Zoological Society of San Diego, Los Angeles Zoo, and Santa Barbara Zoo. Mexican partners include the Instituto Nacional de Ecología, Comisión Nacional de Áreas Naturales Protegidas, Centro de Investigación Científica y de Educación Superior de Ensenada, Dirección General de Zoológicos y Vida Silvestre, and others. Contributions to field management efforts are also made by the U.S. Forest Service and Bureau of Land Management. Field research efforts are supported by

academic institutions with expertise in ecotoxicology and population ecology. A primary area of concern of the field teams managing the populations is the continued population growth without a corresponding growth in resources available to manage those populations. Field team meetings provide opportunities to discuss management techniques, critical concerns, and data consistency across programs. A formal annual Service-developed meeting of representatives of each of the field sites is an essential component of the California Condor Recovery Program.

Data Analysis and Management

Data analysis and management efforts are conducted by all California condor captive breeding and field restoration partner organizations. The Condor Studbook is managed by the San Diego Zoo Global based on Association of Zoos and Aquariums standards. Appropriate ecological and toxicological investigations have and will be conducted by University of California (UC) Davis and UC Santa Cruz. Pursuant to a section 6 grant through the State of California, an online database project is in development to track post-ban lead exposure in the California population of condors. Efforts are underway to expand the database to provide a California Condor National Database to manage essential condor population information. The coordinated effort is a high priority for the program in the next several years.

Outreach and Education

Outreach and education efforts include all California condor captive breeding and field restoration partner organizations. Additional efforts have and will be conducted by Arizona Department of Game and Fish, Utah Department of Natural Resources, California Department of Fish and Wildlife, the Service, National Park Service, Yurok Tribe, and Institute for Wildlife Studies. These efforts include outreach to hunters, hunting and shooting organizations, landowners, and the general public, as well as development of other public information portals such as kiosks and display materials at museums and zoos featuring condor exhibits and online information. Increased penetration of the hunting and shooting sports communities is seen as the primary goals of these outreach activities.

Research Recommendations

Based on issues presented in this document and throughout the California Condor Recovery Program, the following research needs have been identified for the consideration of the partners. Proposals addressing these information and research needs will be evaluated through the recovery program as the scientific capacity, funding, and program priorities require.

The California Fish and Game Commission will receive a report from the California Department of Fish and Wildlife in summer 2013, developed to assess the effectiveness of the lead ban in California. The Service will assist in the development of the report, which provides an opportunity to compare the effectiveness of the lead ban in California with other State voluntary programs and outreach efforts. Additional proposals may result from that

analysis, including development of other approaches to minimize the impacts of lead on the California condor population.

Several priority research projects are emerging from efforts currently underway relating to wind energy development, including recording and analysis of condor flight patterns on a fine scale, further development of alternatives to telemetry-based detection and avoidance systems in the California condor's range, and additional modeling of feeding behavior based on GPS telemetry information. Additional focus in these areas will assist in the evaluation of wind-energy permitting and siting proposals and help to ensure the long-range compatibility of wind-energy development with an expanded and expanding condor population.

Several proposals focused on the health protocols utilized in managing California condor populations have been discussed among the partners, including evaluating the efficacy of the current protocol for treating lead-exposed condors. Chelation therapy is the standard treatment for toxic levels of exposure, but there may be alternatives based on the timing of exposure and the level of chronic, as opposed to episodic, exposure. Further, greater understanding of the survivorship of untreated individuals may assist in evaluating specific incidents of exposure. Also in the health arena, an evaluation of the importance of West Nile Virus vaccine in maintaining the population compared with the survival rates under natural conditions of exposure to West Nile Virus will inform the program, leading towards a self-sufficient, unvaccinated population.

Also to facilitate independent self-sustaining populations, evaluations of the availability of sufficient carrion and other potential natural food sources will be valuable information. Field crews have looked at the use of food subsidies (proffered sources) to encourage range expansion, though additional research in this area has been suggested. Research on the efficacy of various hazing techniques would assist field crews in managing the various flocks, particularly as a mechanism to avoid habituation as the flocks expand their ranges. Better understanding of the behavioral motivations that promote the use of microtrash would assist in developing strategies to avoid this source of mortality.

In addition, a better understanding of habitat loss in the California condors' ranges and the development of models to evaluate habitat needs for a future self-sufficient population will be important to the long-range independence of the population. Integral to understanding the habitat needs will be a better, more thorough, species-specific evaluation of the potential impacts of climate change.

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Personal Communications

Jesse Grantham, California Condor Coordinator for the U.S. Fish and Wildlife Service (now retired) to Joseph Brandt, Supervising Biologist, U.S. Fish and Wildlife Service, 2010.

Jesse D'Elia, Candidate Species Conservation Coordinator, Endangered Species Division, Pacific Regional Office, U.S. Fish and Wildlife Service and Principle Investigator in referenced study, in conversation with Katherine Ralls, Portland, OR. August, 2012.

Katherine Ralls, Senior Research Zoologist, Smithsonian Institution and Genetic Coordinator for the Condor Recovery Program, and Jonathan Ballou, Smithsonian Institution, via email to John McCamman, California Condor Coordinator on August 8, 2012.

Joseph Brandt, Supervising Biologist, Condor Recovery Program and Joe Burnett, Supervising Field Biologist, Ventana Wildlife Society, 2012.

Kelly Sorenson, Executive Director of the Ventana Wildlife Society, discussing with John McCamman, California Condor Coordinator, studies he has conducted which have been accepted for publication, 2012.

Kelly Sorenson, Executive Director of the Ventana Wildlife Society, discussing with John McCamman, California Condor Coordinator, studies he has conducted which have been accepted for publication, 2012.

Jan Hamber, Condor Biologist, Santa Barbara Natural History Museum, in conversation with Joseph Brandt, 2010

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
California condor (*Gymnogyps californianus*)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

___Downlist to Threatened
___Uplist to Endangered
___Delist
_X_No change needed

Review Conducted By: Hopper Mountain National Wildlife Refuge Complex Office & John McCamman, California Condor Coordinator, Region 8

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region (Region 8)

Approve _____ Date 6.4.2013

COOPERATING REGIONAL OFFICE APPROVAL:

Cooperating Regional Director, Pacific Region (Region 1)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Southwest Region (Region 2)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Mountain-Prairie Region (Region 6)

_____Concur _____ Do Not Concur

Signature_____ Date_____

U.S. FISH AND WILDLIFE SERVICE
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California condor (*Gymnogyps californianus*)

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Recommendation Resulting from the 5-Year Review:

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Review Conducted By: Hopper Mountain National Wildlife Refuge Complex Office & John McCamman, California Condor Coordinator, Region 8

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region (Region 8)

Approve _____ Date _____

COOPERATING REGIONAL OFFICE APPROVAL:

Cooperating Regional Director, Pacific Region (Region 1)

✓ Concur _____ Do Not Concur

Signature Robyn Thorson Date MAY 28 2013

Cooperating Regional Director, Southwest Region (Region 2)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Mountain-Prairie Region (Region 6)

_____Concur _____ Do Not Concur

Signature_____ Date_____

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
California condor (*Gymnogyps californianus*)

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Review Conducted By: Hopper Mountain National Wildlife Refuge Complex Office & John McCamman, California Condor Coordinator, Region 8

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region (Region 8)

Approve _____ Date _____

COOPERATING REGIONAL OFFICE APPROVAL:

Cooperating Regional Director, Pacific Region (Region 1)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Southwest Region (Region 2)

_✓_Concur _____ Do Not Concur

Signature_____ Date 5/29/13

Cooperating Regional Director, Mountain-Prairie Region (Region 6)

_____Concur _____ Do Not Concur

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
California condor (*Gymnogyps californianus*)

Current Classification: Endangered

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Review Conducted By: Hopper Mountain National Wildlife Refuge Complex Office & John McCamman, California Condor Coordinator, Region 8

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region (Region 8)

Approve _____ Date _____

COOPERATING REGIONAL OFFICE APPROVAL:

Cooperating Regional Director, Pacific Region (Region 1)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Southwest Region (Region 2)

_____Concur _____ Do Not Concur

Signature_____ Date_____

Cooperating Regional Director, Mountain-Prairie Region (Region 6)

_X_Concur _____ Do Not Concur

Signature_____ Date 5/10/13
Acting ARD ES

Appendix I

Current Species Specific Research/Grant Funded Activities

Genetic map and whole genome sequences of California condors
Years: 2006–present
Study Objective: Utilize robust genetic and genomic approaches to construct a complete genome-based database of genetic variation in California condors, and make findings available for population management and recovery. Anticipated findings include detailed analysis of kinship among founder California condors, detailed characterization of variation at the single nucleotide polymorphism (SNP) level, assessment of retention of genetic variation in the species' pedigree, identification of the mutation causing chondrodystrophy, and identification of carriers of the chondrodystrophy allele.
Principal Researchers: Oliver A. Ryder, PI. Stephan C. Schuster, Webb Miller, Michael Romanov
Sponsors: California Condor Recovery Program, San Diego Zoo Global
Funding Sources: San Diego Zoo Global, Seaver Institute, John and Beverley Stauffer Foundation, other private foundations
Results to Date: A genetic map for California condors based on comparison to chicken and zebra finch genomes has been published. A microsatellite-based linkage map is in development. Sequencing of 30 California condor genomes, utilizing Illumina technology, has been proposed and funding is pending. This study would identify all extant genetic variation at the nucleotide level and affords the opportunity to identify the mutation associated with heritable chondrodystrophy.
Anticipated Completion: If current funding proposals are approved, the reference genome and initial descriptions of species variation would be completed within 1 year. More detailed analyses of demography and evolutionary population genetics would follow. Priority will be given to reporting recovery-relevant findings.

California condor West Nile Virus (WNV) vaccination study
Years: 2009–2012
Study Objective: Determine the range of serological responses in chicks to a commercial canary-pox vectored recombinant West Nile Virus vaccine.
Principal Researchers: Donald L. Janssen, Michael Mace
Sponsor: San Diego Zoo Global
Funding Sources: San Diego Zoo Global, Los Angeles Zoo, Oregon Zoo, Service Hopper Mountain NWRC
Results to Date: Three zoos (Oregon Zoo, Los Angeles Zoo, San Diego Zoo Safari Park) and one field site combined efforts in 2011 and 2012 to vaccinate 21 (2011) and 22 (2012) California condor chicks with a canary-pox vectored WNV vaccine. The Cornell University WNV

laboratory analyzed the serum samples from the 2011 and 2012 chick seasons. Statistical analysis performed on the 2011 cohort showed significant maternal antibodies that persisted for up to 75 days. Follow-up samples at about 5 months of age showed that up to 94 percent of birds were immune to WNV. No birds became sick or died from the disease during this study. In the 2012 season, post-vaccine titers were generally higher than in 2011, but statistical analysis is still pending.
Anticipated Completion: June 2012

Assessment of the biological impact of contaminants and management actions that influence the long-term persistence of the California condor
Years: 2011–2016
Study Objectives: Synthesize existing data and collect new data on the risks of contaminant exposure to California condors. Identify the suitability of existing and proposed future habitat with respect to changes in contaminant exposure, human demographics, and climate. Quantify baseline measures of individual California condor performance (e.g., survival, reproductive success) and how these rates are influenced by contaminants (e.g., lead, organochlorines, microtrash) and future habitat suitability from changes in human demographics and climate. Develop demographic modeling approaches that allow estimation of how contaminants, global climate change, future habitat suitability, and management efforts will impact recovery of each condor population in California.
Principal Researchers: Donald R. Smith, Daniel F. Doak, Myra Finkelstein, Vickie Bakker
Sponsors: Department of Environmental Toxicology University of California (UC) Santa Cruz; Hopper Mountain NWRC; Pinnacles National Monument, National Park Service; Forest and Rangeland Ecosystem Science Center, US Geological Survey; Water Pollution Control Laboratory, Service; Office of Spill Prevention and Response, CA Dept. of Fish and Game; University of Wyoming; Ventura Ecological Service Office, Service;
Funding Sources: Montrose Settlement Restoration Funds, Service Environmental Contaminants Program
Anticipated Completion: 2016

Examining the long-term transport of Montrose DDE via marine mammals: Evaluating risks to California condors
Years: 2011–2013
Study Objective: Examine the risk to scavenging California condors from DDE discharged from the Montrose site in the Southern California Bight and transported via marine mammals along the California coast.
Principal Researchers: Myra Finkelstein, Don Smith, Carolyn Kurle
Sponsors: UC Santa Cruz, Service California Condor Recovery Program, UC San Diego
Funding Source: Montrose Settlement Restoration Funds
Results to Date: Manuscript "Stable nitrogen and carbon isotope discrimination factors for blood and feathers from California condor (*Gymnogyps californianus*) chicks and juveniles" has been submitted to the journal Condor, and is currently in revision.
Anticipated Completion: 2013

California condor movement and space use relative across the annual cycle with relevance to wind energy potential

Years: 2009–2012
Study Objectives: Determine current California condor space use and movement patterns across the annual cycle, including home range size and habitat selection based on vegetation and atmospheric properties.
Principal Researcher: James Rivers
Sponsors: Service; US National Park Service, Pinnacles National Monument; US Geological Survey, Forest and Rangeland Ecosystem Science Center; Ventana Wildlife Society
Funding Sources: Service Hopper Mountain NWRC, Ventura Ecological Services Office
Results to Date: Development, maintenance, and distribution of condor movement .kmz files (Google Earth) for use by condor managers in California.
Anticipated Completion: 2012

History of California condors in the Pacific Northwest
Years: 2008–present
Study Objective: Document the history of California condor in the Pacific Northwest through a review of anthropological, archeological, paleobiological, and observational records, and assess plausible reasons for the decline and extirpation of the condor from the region.
Principle Researchers: Jesse D'Elia, Susan Haig
Sponsors: Service, U.S.G.S.
Funding Sources: Service, U.S.G.S.
Results to Date: Manuscript completed and accepted for publication.
Anticipated Completion: Published in June, 2013 Oregon State University Press, Corvallis, OR.

mtDNA variation in the California condor (*Gymnogyps californianus*) across space and through time
Years: 2008–present
Study Objective: Assess historical mtDNA variation in California condors (pre-1900) across space and through time, from the Columbia River to Baja California and from the early 1800s to the present using museum specimens.
Principle Researcher(s): Jesse D'Elia, Susan Haig, et al.
Sponsors: Service, U.S.G.S.
Funding Sources: Service, U.S.G.S.
Results to Date: Over 100 genetic samples collected from the early 1800s to 2000s and from the Columbia River to Baja California from museums around the world. Currently in the process of sequencing mtDNA.
Anticipated Completion: 2013

Ecological niche modeling for California condor (*Gymnogyps californianus*) reintroduction planning in the Pacific Northwest
Years: 2008–present
Study Objective: Develop and test spatially explicit niche models of California Condor nesting, roosting, and foraging habitat, and overlay these empirical models with threats and opportunities to identify areas in the Pacific Northwest that are likely to provide suitable reintroduction sites.
Principle Researchers: Jesse D'Elia, Susan Haig, et al.
Sponsor: Service, U.S.G.S.

Funding Source: Service, U.S.G.S.
Results to Date: Occurrence data and environmental predictor variables have been compiled and models are in development.
Anticipated Completion: 2013

Monitoring avian health and disease on the Pacific Coast in support of California condor reintroduction planning in the Pacific Northwest
Years: 2011–2015, pending funding
Study Objectives: Document lead and organochlorine (OC) contaminant concentrations in tissues of marine mammal carcasses and the avian scavenger community feeding in the same coastal marine environments, including bald eagles, turkey vultures, and common ravens. Use eagles, vultures, and ravens as surrogate species to estimate potential risks to California condors from exposure to lead and OC contaminants from consuming marine mammals. Screen for the presence of avian disease (viruses, bacteria and parasites) in avian scavengers feeding in the coastal marine environment, and determine whether there is a relationship between contaminant concentrations and disease agents in avian scavengers.
Principle Researchers: Dan Varland (Coastal Raptors and Hamer Environmental, L.P.), Scott Ford (Avian Veterinary Specialty Services), Tom Hamer (Hamer Environmental, L.P.), and Glenn Johnson (Hamer Environmental, L.P.)
Sponsor: None.
Funding Sources: Service, Migratory Birds Avian Health and Disease Program; Oregon Zoo; and American Association of Zookeepers, Puget Sound Chapter.
Results to Date: Captured and sampled tissue for contaminants and disease (10 turkey vultures, 6 bald eagles and 2 common ravens); tissue sampled for contaminants and disease (3 common ravens shot for the predator control program at snowy plover nest sites on the Oregon coast); tissue sampled for contaminants (3 harbor seals and 3 California sea lions). Report on first year of study filed by August 31, 2012.
Anticipated Completion: 2015

Assess the risk of non-lead environmental contaminant exposure to California condors
Years: 2012–2015
Study Objective: Provide critical information on contaminant threats to federally endangered California condors, determine the nutritional adequacy of condor food (wild found vs. proffered), and evaluate current management. Objectives are: 1) quantify condor exposure to toxic, bioaccumulative contaminants, 2) determine the relative contributions of condor diets derived from different sources, 3) determine the nutritional composition of wild and proffered foods eaten by condors, and 4) assess condor health and nutritional status. This project represents a major opportunity to integrate complementary efforts of multiple partners and implement a science-based management program.
Principal Researcher: Collin A. Eagles-Smith, Ph.D., Research Ecologist, U.S.G.S., Forest and Rangeland Ecosystem Science Center (FRESC), Corvallis, Oregon.
Sponsor: U.S.G.S. , National Park Service
Funding Source: U.S.G.S. in partnership with National Park Service
Results to Date: Just beginning
Anticipated Completion: 2015

Get the lead out: Gain support for non-lead hunting practices
Years: 2010–2013
Study Objective: Outreach will reduce lead (Pb) threats to wildlife of several Intermountain, Midwest, and Pacific West Region NPS units. The primary outcome will be heightened awareness among visitors and surrounding communities about their power to reduce unintended impacts. Workshops will transfer consistent messaging tools and elevate NPS staff understanding, thereby expanding agency capacity to confront this issue.
Principal Researchers: Scott Scherbinski, David Garcelon, Denise Louie
Sponsor: National Park Service, Institute for Wildlife Studies
Funding Source: National Park Service Natural Resource Preservation Program
Results to Date: Quarterly reports available; final report due September 2013.
Completed non-lead ammunition education workshops at Grand Canyon NP and Zion NP; educational video and training materials with Theodore Roosevelt NP; conducted non-lead shooting demonstrations in Utah, southern California, central coast of California; set up informational booths at International Sportsmen Expositions in Las Vegas, Denver, and Sacramento; participated in numerous hunter education workshops in California; developed extensive educational materials and website clearinghouse www.huntingwithnonlead.org; provided non-lead information for NPS websites; gave numerous presentations to rancher education workshops, scientific symposia, and citizen groups.
Anticipated Completion: 2013

Monitoring post-ban lead exposure in the California condor
Years: 2010–2012
Study Objectives: Monitor lead exposure in California condors over a 3-year period during various hunting activities, and evaluate the effectiveness of the lead ammunition regulations by comparing historical lead exposure to lead exposure following the July 2008 ban on lead ammunition in the condors' range. Investigate sources of continued lead exposure in condors by 1) using satellite and radio telemetry to track condors and identify habitat use, foraging patterns, movements, and behaviors associated with lead exposure; 2) evaluating stable isotope composition of lead in condor samples; and 3) evaluating lead availability in hunted animal carcasses recovered in condor range and microtrash recovered from condor nests. Evaluate the health effects of ongoing lead exposure on condors by assessing individual animal clinical outcomes and survival. Develop an online data management system for the California Region of the Condor Recovery Program.
Principal Researcher: Christine Johnson
Sponsors: Wildlife Health Center, UC Davis; Department of Environmental Toxicology, UC Santa Cruz; US Geological Survey, Forest and Rangeland Ecosystem Science Center; Service Hopper Mountain NWRC; Pinnacles National Monument, California Department of Fish and Wildlife, Ventana Wildlife Society
Funding Source: Service Endangered Species Act (section 6) Grant-in-Aid Program
Results to Date: Pending
Anticipated Completion: 2013

Turbine early warning system for approaching California condors and other large birds
Years: 2012–2013
Study Objective: Development of Global System for Mobile Communications (GSM)/GPS

transmitter to communicate condor distances to wind turbine array managers to stop blades as a bird approaches to nearest turbines.
Principal Researchers: Mike Wallace, Paul Howey
Sponsor: Institute for Conservation Research, San Diego Zoo Global
Funding Sources: San Diego Zoo Global, SEMPRA Corp., Microwave Telemetry
Results to Date: Preliminary tests with the GSM component are positive. One prototype GSM/GPS transmitter deployed on a Baja California condor is functioning adequately, and an upgrade transmitter is currently being programmed.
Anticipated Completion: 2013

California condor nest guarding project
Years: 2007–2016
Study Objective: Analysis of nest success in southern California's reintroduced population of California condors. Assess the trends of breeding effort and nest success in response to changes in foraging, demographics, and management strategy.
Principal Researchers: Estelle Sandhaus, Joseph Brandt
Sponsors: Santa Barbara Zoo, US Fish & Wildlife Service Hopper Mountain NWRC, Los Angeles Zoo
Funding Sources: Hopper Mountain NWRC, Santa Barbara Zoo
Results to Date: 6 percent nesting success (2001–2006) increased to 60 percent nesting success (2006–2011); (Brandt et al. 2008 (presentation)), Brandt et al. 2010 (poster), Wynn and Stringfield 2011, Sandhaus et al. 2012)
Anticipated Completion: 2016

California condor movement and space use relative to wind energy potential
Years: 2009–2012
Study Objectives: Determine historical and current California condor space use and movement patterns. Develop a metapopulation model for condors throughout their historical range.
Principal Researcher: Jim Rivers
Sponsors: US Fish & Wildlife Service; US National Park Service, Pinnacles National Monument; US Geological Survey, Forest and Rangeland Ecosystem Science Center; Ventana Wildlife Society
Funding Sources: USFWS Hopper Mountain NWRC, Ventura Ecological Services Office
Results to Date: Development, maintenance, and distribution of condor movement .kmz files (Google Earth) for use by condor managers in California.
Anticipated Completion: 2012

Assessing reintroduction potential and planning for management of California condors in the Greater Yurok Ancestral Region
Years: 2011–2012
Study Objectives: Complete avian sampling to assess contaminant threats in proposed California condor release range within the Yurok Ancestral Region. Tribal member and public outreach and education on the progress of the condor reintroduction assessment, and the impacts of spent lead ammunition as a serious threat to wildlife and human health and to condor reintroduction efforts. Build and/or sustain partnerships related to condor reintroduction efforts. Participate in

onsite training at current condor release facilities to increase tribal capacity and expertise. Draft Yurok Tribe California Condor Management Plan
Principal Researcher: Chris West
Sponsors: Yurok Tribe Wildlife Program; National Parks Service, Redwood National Park; California State Parks; US Fish and Wildlife Service Hopper Mountain NWRC; Ventana Wildlife Society
Funding Sources: US Fish & Wildlife Service Tribal Wildlife Grant Program, The Peregrine Fund
Results to Date: Pending
Anticipated Completion: 2013

Hunters as stewards: Effecting positive change in the perception of non-lead ammunition for increased human, wildlife, and habitat health
Years: 2012–2013
Study Objectives: Conduct public and private shooting demonstrations. Exchange non-lead for lead ammunition. Increase program capacity via new employee hires and participation in hunter outreach trainings. Participate in hunter-oriented events and provide informational outreach to regional sporting goods stores.
Principal Researcher: Chris West
Sponsor: Yurok Tribe Wildlife Program
Funding Source: US Fish & Wildlife Service Tribal Wildlife Grant Program
Results to Date: Pending
Anticipated Completion: 2014

Analysis of California condor activity using satellite telemetry data
Years: 2005–2012
Study Objectives: Predict different types of behaviors in California condors through the analysis of GPS transmitter data.
Principal Researchers: Chris Cogan, Jesse D'Elia, Joseph Brandt, Ken Convery
Sponsors: California State University, Channel Islands (CSUCI)
Funding Sources: Service, CSUCI
Results to Date: Manuscript submitted for publication
Anticipated Completion: Published 2012

Eggshell thinning and depressed hatching success of California condors reintroduced to central California.
Years: 2006–2012
Study Objective: Compare condor hatching success and eggshell thickness of reintroduced populations of California condors in central and southern California. Evaluate the cause of egg failure in wild-laid eggs. Assess the potential sources of organochlorine contamination and determine its impact on the condor population in central California.
Principal Researchers: Joe Burnett, Kelly Sorenson, Joseph Brandt, Bob Risebrough
Sponsors: Ventana Wildlife Society, Service Hopper Mountain NWRC, The Bodega Bay Institute, Los Angeles Zoo and Botanical Gardens, Santa Barbara Zoo
Funding Sources: Ventana Wildlife Society, Service Hopper Mt NWRC

Results to Date: Burnett et al. 2009 (presentation); manuscript has been submitted to *Condor* and is currently in revision.
Anticipated Completion: 2012

Predictive models of California condor spatial behaviors and habitat use
Years: 2008–1013
Study Objectives: Calculate high-resolution, multidimensional predictive models of condor spatial behaviors and patterns of habitat use at landscape scales and determine how climate modifies condor movements. Create a conservation management toolbox to assist with the identification of important existing and future condor habitat, and to predict and mitigate the risk of wind energy development collision mortality.
Principal Researcher: James Sheppard, PhD, San Diego Zoo Global's Institute for Conservation Research
Sponsor: San Diego Zoo Global
Funding Sources: San Diego Zoo Global, Sempra Energy, Inc. Ellen Browning Scripps Foundation
Results to Date: Final design and calibration of novel 3D home-range estimator with manuscript and free software package ready for submission
Anticipated Completion: 2013

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EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

August 11, 2014

Cedric Perry, Project Manager
Bureau of Land Management
California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553

Subject: Draft Environmental Impact Statement (Draft EIS)/ Plan Amendment (PA) Tylerhorse Wind Project SCH No. 2014044002

Dear Mr. Perry:

The California Department of Fish and Wildlife (Department) has reviewed the Draft EIS/PA submitted by the Bureau of Land Management (BLM) for the Tylerhorse Wind Project (Project). Project approval of a right-of-way (ROW) grant would allow the construction, operation, maintenance, and decommissioning of a maximum 60-mega-watt (MW) wind energy facility and associated interconnection transmission infrastructure on a total of 1,207-acres of BLM-administered land and the amendment of the California Desert Conservation Area Plan 1980, as amended. Major components of the proposed Project include up to 60 wind turbine generators (WTGs) (not to exceed 500 feet in height), 9.2 miles of new access roads, an energy collection system, communication cables, overhead and underground transmission and collection lines, and perimeter security fencing. Existing operations and maintenance buildings, substations, materials storage/staging/laydown areas, and concrete batch plant that were previously approved and are located on adjacent wind energy sites will be used by this Project. The Project site is located 15 miles west of Highway 14, 12 miles south of Highway 58, and 8 miles north of State Route 138, approximately 16 miles northwest of the unincorporated community of Rosamond, California.

The Department is concerned that the Project individually on a continuous and long-term basis and cumulatively with surrounding and other nearby wind and solar projects may significantly impact special-status species, including but not limited to the following: Swainson's hawk (*Buteo swainsoni*, SWHA), which is listed as threatened under the California Endangered Species Act (CESA); California condor (*Gymnogyps californanus*), which is a State fully protected species and listed as endangered under CESA and the federal Endangered Species Act (ESA); peregrine falcon (*Falco peregrinum anatum*), golden eagle (*Aquila chrysaetos*), and white-tailed kite (*Elanus leucurus*), which are State fully protected species; desert tortoise (*Gopherus agassizii*, DT), which is listed as threatened under CESA and ESA; Mohave ground squirrel (*Spermophilus mohavensis*, MGS), which is listed as threatened under CESA; burrowing owl (*Athene cunicularia*, BUOW), Vaux's swift (*Chaetura vauxi*), northern harrier (*Circus cyaneus*), loggerhead shrike (*Lanius ludovicianus*), Le Conte's thrasher (*Toxostoma*

lecontei), coast horned lizard (*Phrynosoma coronatum blainvillii*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis*), western small-footed myotis (*Myotis ciliolabrum*), American badger (*Taxidea taxus*), southern grasshopper mouse (*Onychomys torridus*), and San Joaquin pocket mouse (*Perognathus inomatus*), which are all State Species of Special Concern; Bakersfield cactus (*Opuntia basilaris var. treleasei*), which is listed as endangered under CESA and ESA; other special-status plant species with the potential to occur in the habitat types found on the Project site; and desert kit fox (*Vulpes macrotis ssp. macrotis*), which is protected under Title 14, California Code of Regulations (CCR), Section 460, which prohibits "take" of the species at any time. The Department cannot authorize the take of desert kit fox; therefore, full avoidance of desert kit fox or potential desert kit fox dens is necessary.

Because the species listed under CESA included above are known to occur or have the potential to occur on the Project site, an Incidental Take Permit (ITP) from the Department may be warranted prior to starting Project-related activities. The Department would need to assume the role of Lead Agency for the purposes of complying with the California Environmental Quality Act (CEQA) for the issuance of our ITP because no CEQA document has been prepared for the Project. This will significantly increase the time necessary to issue an ITP, if one is warranted, and may result in a delay in Project construction. As described below, a Notification of Lake or Streambed Alteration (LSAA Notification) is also warranted because of the presence of blueline streams on the Project site. As with the ITP, the Department would need to assume the role of Lead Agency for the purposes of complying with CEQA. This would significantly increase the time required to issue an LSAA if the Department determined an LSAA was warranted to comply with Fish and Game Code 1600 *et seq.* The Department cannot authorize take of state fully protected species such as the California condor, peregrine falcon, golden eagle, or white-tailed kite. Complete avoidance is necessary to comply with Fish and Game Code section 3511.

Our jurisdictional comments that apply to private entities conducting activities on federal lands follow.

Department Jurisdiction and Project Comments

Incidental Take Permitting: The Department has regulatory authority over projects that could result in take of any species listed or is a candidate for listing by the State (State-listed) as threatened or endangered, pursuant to CESA. If the Project could result in the take of any State-listed species, the Department may need to issue an ITP for the Project. As stated above, the Department is required to comply with CEQA in the issuance of an ITP.

Lake and Streambed Alteration Agreement (LSAA): The Department also has regulatory authority with regard to activities occurring in streams and/or lakes that could adversely affect any fish or wildlife resource, pursuant to Fish and Game Code Section 1600 *et seq.* If the proposed Project would substantially divert water and/or alter the bed, bank, or channel of a lake and/or stream or associated riparian vegetation, an LSAA Notification would be warranted. The Department is required to comply with CEQA in the issuance or the renewal of an LSAA.

Fully Protected Species: The Department has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code sections 3511, 4700,

5050, and 5515. Take of any fully protected species is prohibited and the Department cannot authorize their take for purposes of development.

Bird Protection: The Department has jurisdiction over actions that may result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Sections of the Fish and Game Code that protect birds, their eggs and nests include sections 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

The Draft EIS/PA included mitigation measures that would reduce potential Project-related impacts to wildlife species from construction, operation and maintenance and decommissioning activities. However, the Department has concerns with the adequacy of the analyses and that the proposed mitigation measures are not sufficient to reduce Project-related impacts to less than significant levels. Our Project specific comments follow.

The second paragraph on **Page 2-8** of the Draft EIS/PA states that construction laydown areas will be cleared of vegetation and graded. However, a subsequent paragraph under the heading Material Storage, Staging and Laydown Areas states that the Project site would not be used for these purposes, but the Project would use existing areas in adjacent previously approved wind projects. Please ensure the language on this page is consistent with proposed Project impacts.

Construction of Project roads is discussed on **Page 2-9** of the Draft EIS/PA. There is a distinction made between the 20-foot permanent travel width and the 16-foot temporary "shoulders" that are needed for crane movement. Because crane movement can occur during construction, operation and maintenance (O&M), and decommissioning, the Department considers the entire width of the roads as permanent impacts to the habitat. The Department recommends that the entire width of new roads be included in the analysis for and mitigation measures proposed in the Final EIS.

Page 2-9 also mentions use of spray-on dust palliatives and sealants, such as synthetic polymer or chipseal. Pursuant to Section 5650 of the California Fish and Game Code, it is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of this state any substance deleterious to fish, plant life, mammals, or bird life. Therefore, the Department recommends that BLM include an additional Mitigation Measure that prohibits use of any dust palliative within 150 feet of all streams, including ephemeral and intermittent streams, swales, or washes.

The Department also assumes that the crane pad established at each wind turbine generator (WTG) location would also be used during construction, O&M, and decommissioning and would therefore also be considered permanently disturbed areas. The Department recommends that the entire crane pad dimension be included in the analysis for and mitigation measures proposed in the Final EIS.

Page 2-15 indicates that if blasting of rock will be required, a Blasting Plan would be developed. The Department recommends that if blasting is a proposed Project activity, that it be fully described and analyzed in the Draft EIS/PA document and the potential impacts of noise and vibration on biological, cultural, and air resources and human health and safety are appropriately minimized and/or mitigated.

Page 3.17-5 states there are 4.6 miles of blueline streams mapped by the United States Geological Survey on the Project site. These streams reportedly are to be avoided so that an LSAA pursuant to California Fish and Game Code sections 1600 et seq. will not be required. How these blueline streams will be avoided is not provided in the Draft EIS/PA. There is no minimum avoidance distance described. Based on the topographic map provided in Appendix C-1 – The Biological Resources Technical Report (BRTR), there are blueline streams that have not been further delineated for the Project and it does not appear that on-the-ground delineation occurred in locations where topographic lines indicate the presence of additional streams or in areas where there is no evidence of a stream on the topographic map because the feature is too fine, but where there is evidence of flow, bed, bank, channel, etc on the ground. Department jurisdiction extends to streams that are not identified as blueline on any topographic map. Based on the locations of blueline streams identified on the topographic map but that were not delineated on the Project site map, Project roads would cross Department jurisdictional streams in at least 3 locations. The Department recommends the Project applicant submit an LSAA Notification to the Department before starting Project-related activities at the site. The Department recommends the Project applicant complete a field investigation to determine the locations of and delineate all potentially jurisdictional surface water features and include those additional jurisdiction streams that may be impacted through implementation of the Project in the LSAA Notification as well. As stated above, the Department would be the Lead agency for purposes of complying with CEQA if it is determined that an LSAA is warranted to comply with Fish and Game Code 1600 *et seq.*, because no CEQA document has been prepared for this Project.

Pages 3.17-6 and 3.17-7 describe surveys conducted for special-status plants. Surveys were conducted on 319 acres of the Project site in May and October 2010. It is not clear from the information provided in the Draft EIS/PA which areas of the proposed Project site are included in these 319 acres. In October 2011, 100 percent of the Project site was surveyed for plants in conjunction with DT surveys. However, DT surveys were completed only in suitable habitat, which was not defined. Additional plant surveys were conducted in April and May 2012 in areas directly impacted by the proposed Project. It is unclear if the 2012 impact area is the same impact area as described in the Draft EIS/PA. No special-status plant species were detected. However, beavertail cactus (*Opuntia basilaris* var. *basilaris*) is listed as a plant observed during surveys. There is no detail provided in the survey reports as to how cactus found on the Project site were determined to be beavertail cactus as opposed to the listed as endangered under CESA and ESA Bakersfield cactus (*Opuntia basilaris* var. *treleasei*). Recent genetic sampling has revealed cactus located along the southeastern slopes and toes of the Tehachapi Mountains to be Bakersfield cactus (Smith, 2013). If a cactus possesses a diagnostic characteristic of Bakersfield cactus or its characteristics are inconclusive, the Department recommends it be inferred as the Bakersfield cactus for the purposes of Project permitting and compliance with the CESA and CEQA. The Department recommends BLM include an additional Mitigation Measure requiring the Project applicant to reevaluate all cacti within the Project disturbance areas and if any cacti are inferred to be Bakersfield cactus, avoid them during construction, operation and maintenance, and decommissioning activities by at least 25 feet. If impacts to Bakersfield cactus, including translocation, cannot be completely avoided, acquisition of an ITP is warranted prior to Project construction to remain in compliance with CESA. The Department recommends BLM require the Project applicant to obtain a State ITP and to consult with the United States Fish and Wildlife Service (USFWS) prior to encroaching into the 25-foot no-disturbance buffers, which would also apply to translocation activities.

Table 3.22-1 on **Page 3.22-4** provides a summary of avian surveys conducted in the Project site vicinity. These were conducted in 2004 through 2006 and in 2011 to 2012. While the results of these surveys may be useful for general bird count information and species known to occur in the Project site vicinity, none of the results for nest searches would be valid after a lapse of so many years. No more than 10 days before starting Project-related activities during the general bird breeding season (January 1 through September 15), the Department recommends a qualified biologist conduct intensive visual surveys to locate active nests of any bird. We recommend conducting surveys on the Project site and in a sufficient area around the Project site to identify any nests that are present and to determine their status. A sufficient area means any nest within an area that could potentially be affected by the Project. In addition to direct impacts, such as nest destruction, nests might be affected by noise, vibration, odors, and movement of workers or equipment. We recommend continuously monitoring identified nests for the first 24 hours prior to any Project-related activities to establish a behavioral baseline. Once work commences, we recommend continuously monitoring all nests to detect any behavioral changes as a result of the Project. If behavioral changes are observed, we recommend stopping the work causing the change and consulting with the Department for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, the Department recommends delineating a minimum no-disturbance buffer of 250 feet around active nests of non-listed, non-raptor bird species, 500-feet around the nests of unlisted raptors, and 2,640 feet around the nests of listed or fully protected bird species until the breeding season has ended, or until a qualified biologist has determined that the young have fledged and are no longer dependent upon the nest or parental care for survival. Variance from these no-disturbance buffers may be implemented when there is compelling biological or ecological reason to do so. Any variance from these buffers is advised to be supported by a qualified wildlife biologist and it is recommended the Department be notified in advance of implementation of a no-disturbance buffer variance.

Table 3.22-2 on **Pages 3.22-8 through 3.22-12** provides a list of special-status wildlife species with the potential to occur within the Project site or its vicinity. The peregrine falcon is identified as being present on the Project site. The species was observed flying or foraging at the adjacent Manzana project site and summer residents are known to occur in close proximity to the Project site. The Department concurs that peregrine falcon are likely to occur within the Project site. The peregrine falcon is a State fully protected species; therefore, the Department cannot authorize take of this species. Full avoidance is necessary to remain in compliance with California Fish and Game Code. The Department recommends BLM include the State fully protected status in Table 3.22-2 for the peregrine falcon and include avoidance measures in the Final EIR/PA.

Page 3.22-13 of the Draft EIS/PA states that DT surveys were conducted according to acceptable protocols during the fall of 2011. While the survey results were negative, it was concluded that the potential for DT to occur on-site was low due to the potential of other nearby DT moving onto the Project site. The negative findings of the DT surveys are valid for one year after the surveys are completed. Therefore, to conclude that DT are still absent from the Project site, additional surveys conducted to acceptable protocol would need to be undertaken. The Department recommends that BLM include a mitigation measure in the Final EIS/PA that requires the Project applicant to hire qualified biologists to conduct DT surveys following the

United States Fish and Wildlife Service 2010 "Preparing for any Action that may occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*)". If DT is found on or within 600 meters of the Project site, the Department recommends consultation with the Department to determine appropriate avoidance measures or if avoidance is infeasible, to obtain an ITP pursuant to California Fish and Game Code section 2080. If an ITP is warranted, the Department may need to become the Lead Agency to comply with CEQA, which may delay the start of construction.

Page 3.22-19 through Page 3.22-21 describes California condor potential use of the site. The Draft EIS states that the condor's potential to use the Project site is low because the Project site contains marginal foraging habitat, lacks nesting sites, and lacks traditional and temporary roost sites. The Project would place WTGs within approximately five (5) miles of where California condors have been detected either regularly roosting and/or feeding and within 1.3 miles of a point captured from a radio tagged condor this past year. Several factors limit knowledge of condor spatial use of the area. Only one-half of the condors in this area have been tracked in a given year (2010-2011), and the data points from these individuals are collected only hourly. The hourly locations of most of the birds are not tracked. For those that are tracked, long-distance movements and feeding events that occur between the hourly data collections go undetected. Thus, the data points represent only where some of the condors are located some of the time.

Individual condors regularly fly hundreds of miles in a day and have home ranges of hundreds or even thousands of square miles. A distance of five miles from known high activity areas, combined with the data limitations, affords little confidence that the birds are not currently using the Project area or that they would avoid the Project area over the next 30 years when WTGs are proposed to be operating.
The Department has concluded that condors are likely to utilize the Project site and may be at risk of colliding with WTGs. Because the California condor is a State fully protected species, the Department cannot authorize their take. The Department recommends BLM include appropriate avoidance measures in the Final EIS/PA to avoid take of California condor.

Page 3.22-22 of the Draft EIS/PA concludes that the Project site does not contain suitable habitat for MGS, and therefore, surveys were not conducted on the Project site. However, in the paragraph above on the same page, it describes MGS habitat as all major desert scrub habitats including Mojave creosote scrub and Joshua tree woodland, both of which are found on the Project site. The Project site is located within suitable habitat and contains no barriers in which to preclude this species from occurring on the Project site. The California Natural Diversity Database identifies three historical occurrences of the species within 16 miles northeast and east of the Project site.

Additionally, Appendix C, Attachment 4 of the Draft EIS/PA is a document titled Mohave Ground Squirrel Trapping Results dated September 3, 2012, which indicates that MGS trapping did occur on the Project site. However, some of the methodology differed from that recommended in the Department's "Mohave Ground Squirrel Survey Guidelines" (DFG, 2010). First, the visual and audio survey was conducted only in suitable habitat within the areas where the trapping grids were being placed instead of covering the entire area of suitable MGS habitat, including marginal habitat. Second, because the Project will result in ground disturbance on greater than

180 acres, the guidelines recommend developing special survey protocol(s) in consultation with the Department prior to implementing the trapping sessions, which did not occur.

The Department recommends BLM include a Mitigation Measure requiring that qualified biologists conduct surveys following the Department's "Mohave Ground Squirrel Survey Guidelines" (DFG, 2010), which would require the Project applicant to develop special survey protocols in consultation with Department. As an alternative, the Project proponent may choose to assume presence of MGS and obtain an ITP from the Department prior to starting Project-related activities. The ITP will likely require habitat compensation and establishment of a non-wasting endowment to fund the management of the compensation lands in perpetuity.

Pages 4.19-11 and 4.19-12 provide a list of Mitigation Measures for construction of at-grade drainage crossings and installation of culverts. As stated above, the Department believes the Project will require crossing Department-jurisdictional streams in at least three locations per identified blueline streams on topographic maps. Based on the information provided in the Draft EIS/PA, it does not appear that a thorough on-the-ground delineation of all state waters has occurred; therefore, the Department recommends the Project applicant delineate all potential Department-jurisdictional streams and submit an LSAA Notification to the Department before starting Project-related activities that may impact any Department-jurisdictional streams.

Page 4.21-1 states that temporary Project impacts are restricted to those activities conducted during the construction phase that result in ground disturbance. The Department does not concur with this impacts assessment. Often it is very difficult to reestablish desert habitat once it has been disturbed. Even if the habitat is reestablished, it often takes tens of years to do so, not several months. The Draft EIS/PA indicates that temporarily disturbed areas will be available for use during maintenance and decommissioning/re-energizing the WTGs. Because of the temporal loss of habitat and continued periodic use of habitat even if re-vegetation is attempted, the Department considers these impacts to be permanent and recommends BLM adjust the impact assessment and impact acreages accordingly.
Page 4.21-3 states that based on negative survey findings on-site and at an adjacent wind facility, no potential direct or indirect effects on DT are anticipated from implementation of the proposed Project. As stated above (**Page 3.22-13**), the Department disagrees with this assessment. The Project site is located within the range of DT and contains suitable DT habitat. Previous negative survey results are no longer valid due to the length of time that has passed since surveys were concluded and it does not appear as though the protocol was followed because perimeter surveys does not appear to have been conducted based on the methodology and map provided in Appendix C of the Draft EIS/PA. The Department recommends BLM require additional DT surveys be conducted following USFWS protocol (see above paragraph) or assume DT presence and include appropriate avoidance, minimization, and mitigation measures in the Final EIS/PA. Assuming presence would warrant obtaining an ITP from the Department, which would likely require habitat compensation and establishing a non-wasting endowment fund for management purposes.

Page 4.21-3 states that Cooper's hawk and prairie falcon were both detected in low numbers during the winter raptor surveys and the spring and fall migratory surveys with resident raptors known in the Project site vicinity. The Draft EIS/PA concludes that construction-related mortality impacts on these two species is unlikely. The Department cannot concur with this conclusion if construction activities are to occur during the breeding season. Construction activities will

directly impact Joshua tree woodland and Mojavean juniper woodland and scrub, which may provide suitable nesting habitat for these species. Prairie falcons typically nest on cliffs, but they have been documented using trees and electrical lines as nest habitat, and Cooper's hawks primarily nest in trees. If nest structures are removed during the breeding season, this could lead to direct mortality of eggs or fledglings. Indirect impacts could result from increased noise, vibration, equipment movement, vehicle travel, and human presence, which could result in altered behavior of or nest abandonment by the adults, which could lead to mortality of eggs or fledglings. The Department recommends that BLM require qualified biologists conduct intensive visual surveys for active nests of all bird species if Project-related activities occur during the breeding season, defined as January 1 through September 15. These surveys combined with appropriate nest buffers will reduce the potential for construction activities to impact these species. Please see additional comments provided above under **Page 3.22-4**.

In addition, the Department recommends BLM analyze the impacts on avian species resulting from operation of 60 WTGs for 30 years in an area with known resident populations of Cooper's hawk and prairie falcon. The Department also recommends including appropriate minimization measures to be employed during operations of the WTGs to reduce impacts to these species to a less than significant level.

Page 4.21-10 states that there is a resident population of golden eagles that were observed flying at an altitude that corresponds to the rotor swept area of the proposed WTGs. Additionally, it is reported that there is an increase in golden eagle observations during the spring and fall migratory periods and with golden eagle moving in during the overwintering period. Seventy-five golden eagles were observed during the fall 2005 bird surveys, some of which were obtained from adjoining wind facilities. However, BLM used the results of the 2011-2012 bird use counts in which zero golden eagle minutes were recorded to estimate the number of golden eagles expected to be taken yearly during the thirty years of Project operations, which resulted in 0 to 7 eagle mortalities during the operational life of the Project. The Department does not concur that zero is the appropriate number to be used as the basis for the estimation of golden eagle take with golden eagle use known from past survey efforts being discounted and because the bird use counts effort conducted in winter 2011 to fall 2012 was less than half that recommended by the "California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development" (CEC 2007) (24 survey days as opposed to the recommended 52 survey days). The Department recommends BLM use a more conservative number taking into consideration migration patterns, resident use, and overwintering use for the take estimation. As stated above, golden eagle is a State fully protected species and the Department cannot authorize their take. The Department recommends BLM provide sufficient avoidance measures in the Final EIS/PA to prevent take of golden eagles.

Page 4.21-24 of the Draft EIA/PA states that Project-related activities are not anticipated to significantly contribute to cumulative effects on the California condor. This conclusion is based on the location of the proposed Project, which is allegedly in an area with no documented recent or historical use by condor. As stated above, the Department does not concur with this conclusion. Take of only one condor would be considered by the Department to be individually and cumulatively significant. Please see comment from **Pages 3.22-19 through 21**, above.

Pages 4.21-27 through 4.21-51 provide Mitigation Measures necessary to reduce Project-related impacts to less than significant levels. The Department has the following comments to increase the effectiveness of the proposed Mitigation Measures.

The Draft EIS/PA does not include an impacts analysis section for desert kit fox. Because of its protective status, the Department cannot authorize their take; therefore they must be fully avoided. The Department recommends BLM include an additional Mitigation Measure that requires the Project applicant to conduct pre-activity surveys to determine if desert kit fox are present on or nearby the Project site that could be impacted through Project activities before those activities are conducted. The Department recommends BLM require the pre-activity surveys follow the USFWS's 2011 "Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance" since both species exhibit similar behaviors. The Department recommends BLM require as a new additional Mitigation Measure that if desert kit fox, their burrows or other sign are found on the Project site or within 200 feet of the site during pre-activity surveys or opportunistically, that avoidance measures included in the Standard Recommendations be followed. Additionally, the Department recommends BLM include a Mitigation Measure that requires a qualified biologist monitor all potential desert kit fox dens to determine if they are occupied or not, and require that occupied dens be monitored as work approaches the buffer zones to observe behavior to determine if larger buffers are necessary to prevent adverse impacts to desert kit fox.

The following comments pertain to the Mitigation Measures proposed in the Draft EIS/PA.

WIL-1a: Describes the requirements for a Designated Biologist. The Department recommends BLM add to the list of requirements for a Designated Biologist that the person be familiar with the species likely to be found on the Project site, which means they can identify the species and its sign, they have conducted species-specific surveys following their respective protocols and have seen the species during surveys or during monitoring activities, and they are familiar with the species life history and ecological needs.

This Mitigation Measure also includes a list of activities required to be performed by the Designated Biologist. Please include the Department as an agency to be notified as well as BLM.

WIL-1b: Describes qualifications for Biological Monitors and their Project-related duties. If the Biological Monitors are required to move species out of the way of construction or rescue them from pits, trenches, or other excavations, they would need a Scientific Collecting Permit pursuant to Fish and Game Code section 2080.1. Additionally, if any of these species to be moved or otherwise captured are State-listed under CESA, an ITP would be warranted prior to conducting these activities.

WIL-1b 1: Requires the Biological Monitor to be present on the Project site during construction activities that occur in suitable habitat for DT, BUOW, and American badger. All the different habitat types found within the Project site have been described as suitable for one or more of these species. The Department recommends BLM remove the qualifier language, "in suitable habitat" from this Mitigation Measure and include all species that could occur on the Project site, including desert kit fox, coast horned lizard, San Joaquin pocket mouse, etc.

WIL-1b 6: Requires that all potential wildlife pitfalls be inspected and either covered or outfitted with escape ramps at the end of each work day. There have been issues with species become entrapped in trenches and excavated holes even when covered as some dig under the covers. The Department recommends that BLM reword this Mitigation Measure to require that all potential wildlife pitfalls, even if covered, be inspected at the beginning, middle, and end of each day, including non-work days. The increased inspection schedule is to discover species before they become affected by stress, weather, or predators.

WIL-1e: Requires pre-construction surveys for SWHA within 2,640 feet of the Project site during its nesting season and implementation of a 2,640-foot no-disturbance buffer around active nests. The Department concurs with a portion of the Mitigation Measure. However, this Mitigation Measure allows for the buffer zones to be adjusted through consultation with the qualified biologist and BLM. If the buffer is to be reduced from 2,640 feet, then consultation with the Department would be required to determine if alternative avoidance is appropriate or if issuance of an ITP is warranted. The Department recommends BLM modify the language in this Mitigation Measure requiring consultation with and written concurrence from the Department prior to reducing the buffer distance.

WIL-1g 2: Allows for the passive relocation of BUOW and the destruction of their burrows during the BUOW breeding season. In accordance with our "Staff Report on Burrowing Owl Mitigation", the Department recommends against this provision and recommends BLM remove it as a possibility from the Final EIS/PA. It has been found that even with qualified biologists monitoring and/or scoping burrows prior to initiating the relocation effort, take of BUOW eggs and chicks was occurring.
WIL-1g 3: Allows for the reduction of no-disturbance buffers around occupied burrows during the BUOW breeding season or at the discretion of BLM. The Department recommends the Mitigation Measure require consultation with the Department prior to approving buffer reductions.

WIL-1g 4: States that if accidental take of BUOW occurs, the Designated Biologist will be notified immediately. The Department recommends that BLM add additional language requiring the Designated Biologist to contact the Department immediately upon discovery of take of the species and to submit a written report within 3 days of the incident describing what was discovered, how it was discovered, what they think may have caused the take, and what will be done to prevent future take.

WIL-1g 5: Requires habitat compensation for impacts to BUOW territories. The Department recommends that BLM include additional language in this Mitigation Measure requiring a qualified biologist to determine territory sizes prior to starting Project-related activities to inform appropriate compensation. The Department also recommends establishment of a non-wasting endowment for the continued management of compensatory lands. Additionally, the Department recommends BLM require this Mitigation Measure be completed prior to starting Project-related activities.

WIL-1i 1: Requires submittal and approval of a Condor Monitoring and Avoidance Plan that will detect California condor within 5 miles of the Project site followed by visual monitoring by a biological monitor within 2 miles of the Project site that will allow curtailment of WTGs when a California condor is detected within 2 miles of the Project site. The Department is concerned

that the system will work only on VHF tagged condors. While the USFWS strives for 100 percent of condors to be outfitted with VHF transmitters, the transmitters are affixed to tail feathers that molt periodically, which reduces the number to approximately 76 percent of birds outfitted with VHF tags as time passes. Additionally, as the population expands, the feasibility of outfitting 100 percent of the population with VHF tags diminishes. The Department recommends BLM change the language in the last sentence to require the Condor Monitoring and Avoidance Plan address a procedure for detecting condors that are not currently outfitted with VHF transmitters and throughout the life of the Project. We also recommend that the Condor Monitoring and Avoidance Plan be submitted and approved prior to starting operations of the WTGs, and identify who shall approve the Condor Monitoring and Avoidance Plan in the final EIS/PA.

WIL-1j 6: Requires re-initiation of formal consultation with USFWS and operation of WTGs only during night hours when condors are generally roosting if a condor is struck by a turbine blade. The Department concurs with the requirement to operate the WTGs only during night hours after a condor strike occurs. However, as mentioned previously, the Department cannot authorize the take of California condor. The Department recommends BLM include additional language to this Mitigation Measure to require the Project applicant to immediately contact the Department upon discovery of an injured or dead California condor and, if dead, prohibit removal or other physical disturbance of the carcass by the Project applicant, their consultants, or other representatives. We recommend that Department or USFWS enforcement personnel collect the carcass from the field and send it to a laboratory to determine cause of death, if possible. If injured, require the on-site biologist immediately bring the injured animal to a veterinarian. We recommend the Project applicant identify the veterinarian including contact name, number, and address prior to operation of the WTGs.

WIL-1k 2 and 3: Require curtailment or other modification of WTGs if a golden eagle is injured or killed. The golden eagle is a State fully protected species, and the Department cannot authorize the take of this species. The Department recommends BLM modify the language in these two Mitigation Measures to require the Project applicant immediately report the injury or death of a golden eagle to the Department upon its discovery. If the golden eagle is found to be dead, prohibit removal or other physical disturbance of the carcass by the Project applicant, their consultants, or other representatives. We recommend that Department or USFWS enforcement personnel collect the carcass from the field and send it to a laboratory to determine cause of death, if possible. If injured, require the on-site biologist immediately bring the injured animal to a veterinarian. Require the veterinarian be pre-identified with contact name, phone number, and address prior to operation of the WTGs.

WIL-2a: Requires measures to protect nesting birds during vegetation clearing activities. The Department does not concur that vegetation removal is the only activity that may cause disturbance to nesting birds and recommends BLM require Project-related activities occur outside the nesting bird season unless a qualified biologist conducts intensive visual nesting bird surveys. Staking, geotechnical work, trenching, solar panel installation, operations and maintenance activities, and decommissioning activities have the potential to disrupt nesting birds by increasing noise levels, increasing human activity, increasing ground vibration, and increasing dust, which can negatively impact nesting birds and their ability to successfully reproduce. The Department recommends BLM change the language in this Mitigation Measure to replace "vegetation clearing" or "clearing" with a more general "Project-related activities".

If you have any questions regarding these comments, please contact Lisa Gymer, Senior Environmental Scientist (Specialist), at the address provided on this letterhead, by telephone at (559) 243-4014, extension 238, or by electronic mail at lisa.gymer@wildlife.ca.gov.

Sincerely,

Jeffrey R. Single, Ph.D.
Regional Manager

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California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. Natural Resources Agency; March 7, 2012.

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United States Fish and Wildlife Service. 2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office; January 2011.

---------- Forwarded message ----------
From: **Jessica Rempel** <jessica_rempel@fws.gov>
Date: Mon, Jun 23, 2014 at 12:30 PM
Subject: Service's informal comments on Tylerhorse DEIS - BBCS and Eagles
To: Kim Marsden <kmarsden@blm.gov>
Cc: Amy Fesnock <afesnock@blm.gov>, Cedric Perry <cperry@blm.gov>, Thomas Dietsch <thomas_dietsch@fws.gov>

Hello Kim,

Attached are the Service's informal comments on eagle and migratory bird information as presented in the BLM's draft environmental impact statement (DEIS) for the Tylerhose wind project. We focused our review on Appendix C-4 to the BLM's DEIS (Tylerhorse Wind Energy Project Draft Bird and Bat Conservation Strategy, prepared by Sapphos Environmental, Inc., for Heartland Wind, LLC, dated September 19, 2013). We also reviewed and provide comments on the BLM's impact analyses in relation to golden eagles and on proposed conservation measures for eagles and migratory birds.

We recommend the draft BBCS be revised to address our comments. We have not shared our comments with the applicant as we wanted to coordinate our review with the BLM in the context of our review of the DEIS. Please combine our comments on the draft BBCS with yours, if any, and share with the applicant (please Cc: me). We also recommend the BLM revise relevant sections of the DEIS based on any revisions to the draft BBCS, if needed.

Of particular note, we continue to recommend, as we did in a letter to the applicant and copied to the BLM dated July 31, 2013, that the applicant apply for a programmatic eagle take permit as their proposed project has the potential to result in injury and/or mortality of golden eagles. In addition, and in keeping with your proposed measure WIL-1k1: Golden Eagle Conservation Plan, we recommend the applicant prepare a separate eagle conservation plan that can serve as the basis for a programmatic eagle take permit application.

Finally, for your and the applicant's reference, attached please find the following documents we refer to in our comments: Special Purpose Utility permit (SPUT) mortality reporting spreadsheet, USFWS tower standards, and USFWS lighting standards.

Please feel free to contact me to discuss any of the above or attached.

Thanks,

Jessica

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Jessica Rempel

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c. In the event that no USFWS-approved alternative detection system is available, the Project owner shall implement the failsafe approach of nighttime-only operations to avoid injury and mortality until additional protection measures to reduce the risk of mortality can be implemented.

5. *Change in Percentage of Population Wearing VHF Units (long-term):* In the long term, the potential exists that the USFWS may not be able or wish to maintain VHF transmitters on at least 70 percent of the southern California flock. The USFWS intends to transition to equipping a smaller percentage of the population with VHF transmitters over the long term. The USFWS would provide the Project owner with a 60-day written notice of the anticipated reduction in the percentage of the population equipped with VHF transmitters so the Project owner can implement one of the following alternative detection measures at the time such notice is provided:

   a. The Project owner shall deploy a USFWS-approved alternative detection system that does not rely on any California condors being equipped with VHF transmitters. This system shall be incorporated into the Project owner's "detect and curtail" strategy at the time such notice is provided; or

   b. If the Project owner has not successfully identified another means to detect and curtail, the BLM will require the Project owner to implement nighttime-only operations to reduce the potential for mortality until the Project owner has identified and implemented an alternative system to detect California condors that is approved by the BLM and USFWS.

6. *Procedure to Follow if a California Condor is Struck by a Turbine Blade:* If a California condor were struck by a turbine blade, reinitiation of formal consultation will occur according to the procedures and standards set out in 50 C.F.R. § 402.14 and the Project shall immediately be confined to nighttime-only operations until the agencies determine daytime operations may resume in whole or in part, or until formal consultation is complete.

WIL-1k1: Golden Eagle Conservation Plan. The Project Proponent shall develop and implement a Golden Eagle Conservation Plan (GECP) to address Project impacts to golden eagles. The Project Proponent shall submit the GECP to the BLM and USFWS for review and approval prior to initiation of Project construction. The GECP shall be prepared in accordance with the *Eagle Conservation Plan Guidance* (USFWS, 2013 [Module 1– Land-based Wind Energy, Appendix C]). The GECP shall include a description of the golden eagle studies completed for the Project; a risk analysis; advanced conservation practices to be implemented during operation, including a description of the adaptive management strategy for the Project and compensatory mitigation; and post-construction monitoring and reporting procedures for golden eagles.

Comment [JAR1]: So, this tells me the GECP will be a separate document than the BBCS. We agree.

Comment [JAR2]: When prior to initiation? We have run into problems with these sorts of conditions and the applicant submitting plans for us to review at the last minute and asking for expedited review. We need to set realistic timeframes for us to provide adequate technical assistance on these plans. Specific to this project, I thought there was agreement that the eagle plan would be developed and reviewed between the draft and final EIS so that it might be incorporated into the final, correct?

Golden Eagle

Comment [JAR1]: Note – *Construction* Section

Golden eagles are a resident species in the Tehachapi Mountains, where numerous nesting opportunities are available on ledges and rock outcrops. Resident golden eagles forage in and near the Project area throughout the year, and during the spring and fall migration. Migrants in fall were generally observed flying above 1,000 feet, whereas the more numerous resident birds frequently foraged at heights below 100 feet above ground level (Sapphos, 2011a).

Surveys to identify active and historic golden eagle nests were performed in 2010 and 2011, covering all suitable nesting habitat within 10 miles of the TWP site (see Section 3.22). In 2004, an active eagle nest was detected by Bloom Biological, Inc., approximately 4.3 miles west of the northwestern corner of the Project area (Sapphos, 2011a). This nest represents the nearest historic golden eagle nest in the near-Project vicinity. No additional nests were identified within 10 miles of the Project Area during aerial surveys performed in 2010 and 2011 (described in Section 3.22 and Appendix C-1). The nearest documented golden eagle territory was approximately 15 miles west of the Project area (Sapphos, 2011a; see Appendix C-2, pg. 5-22) . Recent surveys for other projects in eastern Kern have identified nesting and foraging golden eagles as well, and together these data suggest a moderate to high population density in the region, with all potentially suitable nesting habitat associated with rugged terrain to the north of the Project area.

Comment [JAR2]: There is suitable nesting habitat to the south as well

Direct impacts to golden eagles during construction include the loss of or disruption of foraging habitat due to noise from construction activities and human disturbance. Construction of the TWP would permanently impact 23.6 acres of various habitat types that could be used by golden eagles as foraging habitat. Temporary impacts associated with the Project would occur in association with 167.3 acres of habitat that would be revegetated following construction (VEG-3, Habitat Restoration and Revegetation Plan).

Comment [JAR3]: This just accounts for permanent disturbance on the ground. We suggest there is a volume of airspace habitat that will be lost due to the placement of the turbines in that space.

Golden eagles commence nest building prior to most other birds, and disruption of nest building or the abandonment of existing nest sites could occur should eagles nest within one mile of construction activities in the Project area. This species is sensitive to human encroachment and if nests are disturbed by humans, nest abandonment will typically occur. However, construction of the TWP is not likely to result in direct impacts to known golden eagle nests because of the distance between nest sites and the TWP.

Indirect impacts to golden eagles could include the loss of foraging habitat due to the establishment of invasive weeds potentially resulting in a decline in prey density.

Direct and indirect construction-related impacts to golden eagles would be reduced through the implementation of VEG-1c (Weed Management Plan), VEG-3 (Habitat Restoration and Revegetation Plan), WIL-1a (Designated Biologist), WIL-1b (Biological Monitoring), WIL-1c (Worker Environmental Awareness Program), WIL-1e (Preconstruction Surveys for Special-Status Wildlife), and WIL-1o (Avian Power Line Interaction Committee Standards). Measure WIL-2a requires preconstruction surveys for nesting birds, including golden eagles and a one mile no-activity buffer around any active nests with a direct line of sight to the work area, subject to adjustments in consultation with CDFW and USFWS. WIL-1k1 requires preparation of a

Comment [JAR4]: We suggest that these may increase risk for eagles because, if prey habitat is maintained and/or enhanced and eagles are attracted to forage there it puts them at increased risk of collision.

Comment [JAR5]: We recommend the ECP be separate from the BBCS and be prepared prior to the FEIS.

Golden Eagle Conservation Plan in accordance with the USFWS *Draft Eagle* Conservation *Plan* Guidance (USFWS, 2013), while WIL-1k2 (Night Operations) and WIL-1k3 (Minimize Eagle Mortality) provide contingency measures to minimize impacts to golden eagles if injury or mortality occurs. The Golden Eagle Conservation Plan shall outline conservation measures to avoid and minimize impacts on golden eagles and to meet BLM and USFWS requirements regarding the Bald and Golden Eagle Protection Act.

Comment [JAR6]: We note that take in the absence of a permit is a violation of the BGEPA.

Burrowing Owl

Several burrowing owls were observed over-wintering within grassland and open shrub habitats in the Project vicinity during surveys, and several burrows in the Project area showed evidence of owl habitation (Sapphos, 2011a).

Direct effects to burrowing owls from construction can include destruction of burrows/burrow entrances, mortality, and habitat loss surrounding occupied burrows, night lighting, and noise. Burrows that exhibit any owl sign (e.g., owl presence, molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance) within the last three years may be considered active (CDFG, 2012). Construction activities such as grading, the movement of construction vehicles or heavy equipment, and the installation of TWP facility components may result in direct mortality through crushing of adults, young, or eggs within burrows or entrapment of/injury to owls within burrows if burrow entrances become blocked.

Construction would be conducted primarily during daylight hours; however, if it becomes necessary to conduct work at night, lighting would be needed for worker safety. Night lighting has the potential to disrupt burrowing owl breeding/nesting behavior if it would be placed in close proximity to occupied burrows. Any night lighting to be used during construction would be directed toward the interior of the disturbance area or at the specific location being constructed in order to minimize adverse effects to owls and other wildlife species, as required by Measure WIL-1f (Lighting Specifications to Minimize Bird And Bat Collisions). Construction noise could also impact breeding behavior or reproductive success.

WIL-1g (Burrowing Owl Protection Measures) requires pre-construction surveys for burrowing owls and the establishment of a 250-foot disturbance-free (or otherwise appropriate) buffer around occupied burrows during the nesting season (160-foot buffer during the non-breeding season) to minimize or avoid impacts associated with construction disturbance.

In accordance with CDFW guidance (CDFG, 2012), avoidance is the preferred method for dealing with potential Project impacts to burrowing owls. As described in the *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012), the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow. To offset the loss of foraging and burrow habitat on the TWP site, WIL-1g (Burrowing Owl Protection Measures) requires compensation through off-site habitat compensation, while VEG-3 (Habitat Restoration and Revegetation Plan) requires on-site restoration of disturbed habitat capable of supporting the species. The acquisition of occupied

collection line, or perimeter security fencing, and potential effects of red strobe warning lights on the movement of aerial species.

Desert Tortoise

Protocol-level survey findings described in Section 3-22 indicate that desert tortoise is likely absent from Project area. Suitable habitat is present on the Project site; however, the nearest described CNDDB occurrence of the desert tortoise approximately 7 miles to the east (CDFW, 2013). No desert tortoise or tortoise sign indicative of desert tortoise presence (e.g., track, scat, active or inactive burrows, scutes, courtship rings, pallets, drinking depressions, live tortoises, and tortoise carcasses or parts thereof) were observed during protocol-level surveys in October 2011 (Sapphos, 2011a). Based on survey findings and the known distribution of the desert tortoise in the region, operational impacts are not anticipated to this species.

Coast Horned Lizard

As discussed above, the coast horned lizard is presumed present in small numbers within the Project area. Potential operational impacts to coast horned lizard include direct impacts such as risk of mortality by vehicles and disturbance on access roads due to use by maintenance personnel, and increased predation due to the attraction of corvids such as ravens to the site. Direct and indirect impacts to coast horned lizard resulting from operation and maintenance of the TWP would be reduced through the implementation of WIL-1m (Wildlife Mortality Reporting Program), WIL-3a (Minimize Vehicle and Equipment Impacts during Operation and Maintenance), WIL-3b (Operation and Maintenance Education Program), and WIL-3c (Raven Management Plan). These measures would require vehicle speed limits of 15 miles per hour, worker environmental awareness training, predator control measures, and a Wildlife Mortality Reporting Program.

Golden Eagle

Comment [JAR7]: Note – *Operations* Section

Golden eagles use the general Project area on a year-round basis. In addition to the resident eagles, there is an increase in eagle use during spring and fall migratory periods and with eagles moving into the area for over-wintering (Sapphos, 2013). In fall 2005, out of 74 individual golden eagle observations during the migration period, it was estimated that 10 to 15 of the individual eagles were migrants passing through the site, and 4 to 5 were wintering in the area (Sapphos, 2011c). Sapphos (2011a) indicated that migrants generally stayed above 1,000 feet; whereas the resident eagles frequently foraged at heights within 100 feet to 800 feet above ground level (Sapphos, 2011a; 2011c). Golden eagles are susceptible to direct impacts from WTG collisions.

The USFWS Bayesian Model (USFWS 2013, Appendix D) was used to predict annual golden eagle fatalities for the project. Using an input of zero eagle minutes based on the results of the 2011-2012 Bird Use Counts in which no eagles were observed (Sapphos, 2013), and assuming a rotor swept area based on 50 meter radius (exact turbines have not been selected, thus the need to make an assumption), 0.16 eagles are expected to be taken annually, at the 80 percent upper confidence limit (Rempel, personal communication, Aug

27, 2013). The results suggest that from 0 to 7 golden eagles could be killed during the life of this project.

As required by WIL-1k1, implementation of a USFWS-approved Golden Eagle Conservation Plan (GECP) is required to address the potential for take of golden eagles. The GECP would reduce Project-related impacts and help ensure that the Project would be in compliance with the Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA), as amended. The GECP for the Proposed Action may be used to support authorization by the USFWS of a programmatic permit for non-purposeful take of golden eagles under the BGEPA. As required by the GECP, post-construction monitoring for golden eagle (and California condor) in particular will commence in the first year of Project operation and continue for the life of the Project. To meet the requirements of USFWS *Eagle Conservation Plan Guidance* (USFWS, 2013), the GECP (WIL-1k1) will additionally identify eagle risk and an adaptive management strategy for the Project and compensatory mitigation; and post-construction monitoring and reporting procedures for golden eagles. The eagle risk assessment predicts the taking of 0.16 eagles annually, which means that during the30-year life of this project, more than one eagle is expected to be taken. Should an eagle be killed without the Project having a BGEPA permit, Project operations will be modified to ensure that additional eagles are not taken (WIL-1k31p: Minimize Eagle Mortality).

Comment [JAR8]: Not sure how the results suggest 0-7 could be killed. Please expand.

Also, it should be noted that the risk analysis the Service did was based on data that were not collected in accordance with current ECP guidance and should be considered a preliminary quantitative assessment based on limited information. In addition, this risk analysis should be considered in conjunction with a qualitative assessment of the eagle data collected on the project and surrounding sites over the years. Taken together, these assessments suggest that there is a risk to eagles, the risk is likely higher than what the model predicts based on the limited information, and the Service continues to recommend that the applicant prepare an ECP and apply for a programmatic eagle take permit.

Comment [JAR9]: The BLM and the Service should approve this prior to any FEIS.

Burrowing Owl

While burrowing owls in the Project area have some exposure to turbine mortality, there have been no documented burrowing owl fatalities at wind energy facilities in the region. Studies in the Altamont Pass Wind Resource Area (e.g., Smallwood and Thelander, 2005) indicate that can be susceptible to collisions with WTGs. It is anticipated that any burrowing owl mortality that might occur over the Project life would be at a very low level and would have minor effects on burrowing owl populations. As required by WIL-1l, Implementation of the Bat and Bird Conservation Strategy (BBCS) would reduce Project-related impacts to burrowing owl.

California Condor

Based on the locations of known California condor sightings in close proximity to the project area, the level of risk associated with the Proposed Action to the California condor is considered to be moderate. It is conceivable for a California condor to soar into the Project area. While the ability of condors to avoid wind turbines is unknown, the hazards of wind turbines to other vulture species are well documented and these surrogate species demonstrate there is a mortality risk for California condors. However, to date, there are no known California condor deaths that have been attributed to wind turbines in the TWRA or elsewhere. As California condor numbers continue to increase in Southern California, including the Tehachapi Mountains, and their range expands, the risk of condor mortality from collisions with wind turbines increases.

If condors were to occur onsite, direct impacts from operation and maintenance could include disturbance from human activity, collision with WTGs, and collision with or electrocution from transmission lines. Other potential direct impacts would be similar to those discussed above for construction and include the loss or disruption of foraging habitat from vegetation removal or

WIL-1k2: Night Operations. If a golden eagle is injured or killed due to the construction, operation, or maintenance of this Project and the Applicant/grant holder does not possess a current eagle take permit, the Project shall move to the failsafe of night operations only to ensure that no further eagle mortalities or injuries occur. If the Applicant/grant holder applies for and receives an eagle take permit, the conditions of that permit override this measure.

WIL-1k3: Minimize Eagle Mortality. If a golden eagle is taken by the Project, and the Project proponent has not obtained an eagle take permit from USFWS prior to the taking, the BLM will require the ROW holder to implement limitations or restrictions of operations on the entire Project or specific facilities, by season or time of day as appropriate, or other adaptive management measures deemed necessary, in coordination with the USFWS, to avoid further unauthorized take of eagles.

WIL-1l: Bird and Bat Conservation Strategy. The Project Proponent shall develop a BBCS to address Project impacts to special-status avian and bat species. The Project Proponent shall submit the BBCS to the BLM and USFWS for review and approval prior to initiation of Project construction. The BBCS shall be prepared in accordance with the guidance provided by the USFWS (2013). The BBCS shall describe Project design features and ~~advanced conservation practices~~avoidance and minimization measures to be used to minimize the risk of collision pre-construction, during construction, and during operation and maintenance. The plan shall include monitoring, adaptive management, and reporting procedures. The post- construction monitoring methods shall be based on the *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (CEC and CDFG, 2007). The draft BBCS prepared by the Project Proponent is provided in Appendix C-2, and subject to agency approval. The BBCS shall include, but not be limited to, the following minimization measures:

1. Wherever feasible, turbines will not be sited on or immediately adjacent to the upwind sides of ridge crests.
2. Turbine construction will minimize cutting into hill slopes in an attempt to achieve smooth-rounded terrain, rather than sudden berms or cuts, to reduce prey abundance.
3. Rocks unearthed during the excavation process will be used during construction of foundations or hauled offsite and disposed of properly, and not be left in piles near turbines.
4. Discourage small mammals and reptiles from burrowing under or near turbine bases by placing gravel at least five (5) feet around each tower foundation.
5. Site management shall not include rodent control programs on leased lands.

Comment [JAR3]: Please see Service's comments on the draft BBCS.

Comment [JAR4]: As above regarding timelines for review and approval.

Comment [JAR5]: I'd avoid the use of "advanced conservation practices" as these have a defined meaning per the ECPG.

6. Only un-guyed meteorological towers will be constructed for the Project, if feasible. If guy wires are necessary, bird deterrents will be used.

WIL-1m: Wildlife Mortality Reporting Program. The Project Proponent shall submit a Wildlife Mortality Reporting Program to the BLM for review and approval prior to initiation of Project construction. This program shall be implemented during construction and operation and maintenance, and shall require the identification and reporting of any dead or injured animals (both special-status and common species) observed by personnel conducting construction and operation and maintenance activities. Reporting is necessary during construction and operation and maintenance to demonstrate compliance with the avoidance and minimization measures, to assess the effectiveness of the measures, and to make recommendations, if necessary, for future compliance. An appropriate reporting format shall be developed in coordination with the BLM.

WIL-1n: Post-Construction Avian and Bat Mortality Monitoring. Once the Project is operational, the Project proponent shall perform Post-Construction Avian and Bat Mortality Monitoring in the first, second, and third years following the initial operation of the Project to demonstrate the level of incidental injury and mortality to populations of avian or bat species in the vicinity of the Project site. Additional years of monitoring may be required by an appropriate Agency such as the United States Fish & Wildlife Service. Post-Construction Avian and Bat Mortality Monitoring shall include a Mortality Analysis, which shall be conducted as follows:

1. The Project proponent shall provide to the Kern County Planning and Community Development Department, the Bureau of Land Management, the California Department of Fish and Game, and the United States Fish and Wildlife Service the results of the mortality monitoring for avian and bat species on an annual basis. A qualified wildlife biologist shall conduct mortality monitoring using a statistically significant sample size of operational turbines within the wind energy development Project.

2. The Mortality Monitoring Analysis shall note species number, location, and distance from the turbine for each recovered bird or bat, availability of bird and bat prey species, and apparent cause of avian or bat mortality. The Project proponent shall provide all results to the Wildlife Response and Reporting System database within 90 days of completion of the annual study.

3. The Mortality Monitoring shall follow standardized guidelines outlined by the California Energy Commission and California Department of Fish and Game (CEC and CDFG, 2007) and the United States Fish and Wildlife Service (USFWS, 2010) or more current guidance from the United States Fish and Wildlife Service, and shall include carcass scavenging and searcher efficiency trials.

4. At a minimum, the Mortality Monitoring Analysis shall consider four factors:

    a. Number of annual avian and bat mortalities per turbine,

    b. Disproportionate representation of a particular species, and

    c. Comparison to existing data on wind farm mortality.

    d. Comparison to existing data on wind farm mortality from the Tehachapi Wind Resource area and the western United States.

Comment [JAR6]: Please ensure these also consider spatial and temporal distribution of mortalities and a comparison to the project's own anticipated mortalities based on pre-construction studies.

6. In addition to Mortality Monitoring described above, starting in year 1 of Project operation and continuing for the life of the Project, annual Post-Construction Mortality Monitoring for golden eagle shall be conducted by the Project proponent, in conjunction with other monitoring, and submitted to the Kern County Planning and Community Development Department, the Bureau of Land Management, the United States Fish and Wildlife Service, and the California Department of Fish and Game.

WIL-1o: Avian Power Line Interaction Committee Standards. Prior to the issuance of a Notice to Proceed from BLM, the Project proponent shall submit written documentation to the BLM demonstrating that all power lines are engineered and constructed to the most current Avian Power Line Interaction Committee (APLIC) standards for power line design. The Project proponent shall conform to the latest practices to protect birds from electrocution and collision on the transmission line (as outlined in the 2006 and 2012 APLIC standards (APLIC, 2006; 2012).

WIL-1p: Minimize Eagle Mortality. If a golden eagle is taken by the Project, and the Project proponent has not obtained an eagle take permit from FWS prior to the taking, the BLM will require the ROW holder to implement limitations or restrictions of operations on the entire Project or specific facilities, by season or time of day as appropriate, or other adaptive management measures deemed necessary, in coordination with the FWS, to avoid further unauthorized take of eagles. These restrictions would be replaced by the terms and conditions of a BGEPA take permit, should the Applicant obtain one. BLM retains its authority to suspend, terminate, or modify the Project's ROW authorization in accordance with 43 CFR 2807.16 and 2807.17.

Comment [JAR7]: There is another measure called "Minimize Eagle Mortality" (WIL-1k3) above that states mostly the same thing. However, this measure has additional language starting at "These restrictions…" Are both measures needed or can these be combined? We think the final sentence in this one should be retained.

WIL-2a: Avoid Disturbance to Nesting Birds. Vegetation clearing shall take place outside of the general avian breeding season (February 15-September 1), when feasible. If vegetation clearing cannot occur outside the avian breeding season, the Designated Biologist/Biological Monitor shall conduct a preconstruction survey for nesting birds no more than three days prior to vegetation clearing. If no active nests are found, clearing can proceed. If active nests are found, no clearing shall be allowed within 150 feet (passerines) to 250 feet (raptors) of the active nests until the Designated Biologist determines the nest is no longer active or the nest

fails. Note that Swainson's hawk and burrowing owl nests are considered separately. If nesting golden eagles or California condors are identified, a one-mile no-activity buffer will be implemented when nests have a direct line of sight to the work area. If the work area is not within direct view of the nest, the no-disturbance buffer shall be 660 feet. Nest buffers for golden eagles, California condors, and other nesting birds may be adjusted to reflect existing conditions including ambient noise, topography, and species' disturbance tolerance with the approval of the appropriate resource agencies (CDFW and/or USFWS). The Designated Biologist/Biological Monitor shall submit the results of the pre-construction nesting bird surveys to the BLM, USFWS, and CDFW.

Comment [JAR8]: How was 660' determined to be the no-disturbance buffer? This should be dependent on what the disturbing activity is, and the actual configuration of the nest in relation to the activity. We generally recommend the one-mile no-activity buffer without the caveat. We suggest this language be changed to say something along the lines of "If the work area is not within direct view of the nest, the no-disturbance buffer can be reduced in consultation with BLM and the wildlife agencies (USFWS and CDFW)."

WIL-2b Fencing Designs that Facilitate Wildlife Movement. All fences installed on the Project site will be a maximum of four (4) feet in height, wire strand, with a smooth bottom wire at least eighteen (18) inches from the ground to facilitate wildlife movement during operation of the Project.

WIL-3a: Minimize Vehicle and Equipment Impacts during Operation and Maintenance. The Project Proponent shall implement measures to minimize the potential for desert tortoise and other wildlife species mortality along access and maintenance roads. These measures shall include:

1. A speed limit of 15 miles per hour will be maintained on all dirt access/maintenance roads, and all vehicles must remain on designated access/maintenance roads.
2. Pedestrian access outside the limits of the designated access/maintenance roads is permitted year-round as long as no ground-disturbing activities take place.
3. Vehicle traffic and parking shall be confined to designated access roads, and equipment and materials staging areas shall be clearly defined to avoid impacting habitat during the operation phase.

WIL-3b: Operation and Maintenance Education Program. Similar to the requirements for WIL-1c, a Worker Environmental Awareness Program shall be implemented during the construction and operation phase of the Project to alert workers to the hazards posed by ongoing operations to common and special-status wildlife species. The Worker Environmental Awareness Program shall include the same program elements discussed in WIL-1c.

WIL-3c: Implement the Raven Management Plan. Prior to the issuance of a Notice to Proceed by the BLM, a Raven Management Plan shall be developed for the Project site in consultation with the USFWS and CDFW. Implementation of the Raven Management Plan only applies to areas that are desert tortoise habitat. The Raven Management Plan shall require measures such as annual nest removal by a qualified biologist in consultation with the CDFW and the USFWS, removal of carrion at the base of wind turbine generators, storage of garbage in raven-proof containers, and installation of anti-nesting devices on structures where

TYLERHORSE WIND ENERGY PROJECT
DRAFT BIRD AND BAT CONSERVATION STRATEGY

PREPARED FOR:

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September 19, 2013

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SECTION 1.0
INTRODUCTION

Heartland Wind LLC (HW) proposes to construct the Tylerhorse Wind Energy Project (project) in the Tehachapi region of Southern California to provide up to 60 megawatts (MW) of clean, renewable energy. The project would be located on lands administered by the U.S. Bureau of Land Management (BLM), in the unincorporated territory of south-central Kern County.

This Bird and Bat Conservation Strategy (BBCS) documents the efforts undertaken by HW to voluntarily and proactively avoid and minimize impacts to avian and bat species during the siting, design, construction, and operation of the project. This document is intended to support HW's compliance with federal and state statutes and regulations through the implementation of procedures designed to avoid and minimize impacts to birds and bats and their habitats and to compensate or mitigate for unavoidable impacts to these resources.

This BBCS will discuss potential impacts to birds and bats from the construction, operation, and decommissioning of the project, as well as offer protection strategies to minimize these impacts. Many of the general avoidance and conservation measures identified in this BBCS will have the added benefit of minimizing risk and potential impacts for two high-profile species: the California condor (*Gymnogyps californicus*), afforded protection under the Migratory Bird Treaty Act (MBTA) and the California and Federal Endangered Species Acts (ESAs); and the golden eagle (*Aquila chrysaetos*), afforded protection under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA).

California Instruction Memorandum (CA IM) No. 2013-030 (further described in Section 1.3 below) defines how BLM will work with the U.S. Fish and Wildlife Service (USFWS) and renewable energy and transmission right-of-way (ROW) applicants on public land to comply with BGEPA in California. Per this IM, the BLM requires applicants to provide documentation of their decision whether or not to pursue a BGEPA take permit. As such, HW provided documentation to BLM via an August 20, 2013, letter that describes its decision to pursue the "No BGEPA Take Permit Sought" path outlined in CA IM No. 2013-030. The letter confirmed that HW reviewed the "No BGEPA Take Permit Sought" path and understands that the BLM may sign a Record of Decision (ROD) and issue an ROW authorization that requires mitigation to reduce impacts to eagles. Furthermore, HW understands that if it later decides to pursue a BGEPA take permit during the BLM ROW National Environmental Policy Act (NEPA) process, that decision must be documented with the BLM and USFWS, and such a decision may require the BLM-NEPA review process to be extended to incorporate information needed by the USFWS to evaluate issuing a BGEPA take permit. Because this could require additional scoping; delay the release of draft NEPA documents; or require the preparation of supplemental NEPA documents to incorporate new alternatives, additional analysis, or other USFWS-required data or information, HW wants to avoid this situation. If HW later decides to apply for an eagle take permit, it anticipates doing so after completion of the BLM ROW NEPA process and receipt of the BLM ROD; and HW understands that in this case, USFWS would need to do a separate NEPA analysis on the eagle take permit application.

As such, while this document is not an Eagle Conservation Plan (ECP) developed strictly in accordance with each of the recommendations of the USFWS's *Eagle Conservation Plan*

Guidance (*ECP Guidance*),[1] it will address potential risks to golden eagles and present avoidance and conservation measures aimed to reduce golden eagle take to the "no-net-loss" standard required by the Final Take Permit Regulations under 50 CFR 22.26 and 22.27.

This BBCS is organized in five sections, as summarized below, based on recommended tiers and stages of environmental review, risk analysis, and siting decision-making included in both the USFWS's *Final Land-Based Wind Energy Guidelines* (*Final Guidelines*) and *ECP Guidance*.[2,3] The contents of these advisory documents are discussed in Section 1.3.

- Section 1 discusses HW's commitment to avoid and minimize the potential for conflict between wind energy development and conservation of native avian and bat species. It also gives an overview of the project and summarizes key laws and regulations that currently protect birds and bats.

- Section 2 describes the site assessment process undertaken by HW to site the project in a manner that minimizes the potential for impacts to avian and bat species. This section corresponds to Tiers 1 and 2 of the *Final Guidelines* and Stage 1 of the *ECP Guidance*.

- Section 3 presents the methods and results of site-specific surveys and assessments conducted on the project and in the project vicinity, corresponding to Tier 3 of the *Final Guidelines* and Stage 2 of the *ECP Guidance*.

- Section 4 analyzes the fatality risks for avian and bat species at the project, corresponding to the impact prediction segment of Tier 3 of the *Final Guidelines* and Stage 3 of the *ECP Guidance*.

- Section 5 presents the avoidance and minimization measures, including postconstruction mortality monitoring, to be implemented based on the risk analysis, as well as adaptive management practices that will be put into place if avian and bat mortality exceeds expected thresholds. It will also include protective measures committed to by HW in other environmental documents for the project, including the BLM's Environmental Impact Statement (EIS) and the USFWS's Biological Opinion. This section corresponds to Tiers 4 and 5 of the *Final Guidelines* and Stage 4 and 5 of the *ECP Guidance*.

1.1 POLICY AND COMMITMENT TO ENVIRONMENTAL PROTECTION

HW, a wholly owned subsidiary of Iberdrola Renewables, LLC (Iberdrola), proposes to develop the project. Iberdrola develops, builds, and operates renewable energy projects throughout North America and in 23 countries worldwide. Iberdrola is the second largest wind operator in the U.S. since entering the market in 2006, with over 5,700 MW in operation or under contract. Iberdrola is

[1] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

[2] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[3] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

supported by the resources of its international corporate parent, Iberdrola, S.A, a private, Spain-based multinational electric utility company that is the fourth largest utility company in the world by market cap.

The focus on the development of clean energy and respect for the environment are some of the pillars of Iberdrola's company model and the factors that distinguish it as one of the world's leading energy companies in the 21st century. As such, HW, as a subsidiary of Iberdrola, is committed to siting, designing, constructing, and operating wind energy projects in an environmentally sustainable manner in an effort to avoid and minimize potential impacts to birds, bats, and other wildlife and their habitats. HW has voluntarily developed this BBCS to document the specific methods and approaches used to achieve impact avoidance minimization, including compliance with all applicable laws and regulations. These actions have included, and will continue to include:

1. Adoption of approved avian-adapted construction design standards.

2. Careful selection of turbine locations within the project that avoid and minimize the potential for impacts to avian and bat species.

3. Regular coordination with regulatory agencies, such as BLM, the California Department of Fish and Wildlife (CDFW), and USFWS, on potential impacts to avian and bat species within the project. Continued coordination will allow for discussion of new research results, new technologies, and evolving regulations and how they may apply to the project.

4. Development of specific avoidance and minimization measures to reduce impacts to avian and bat species.

5. Provision of ongoing training to all personnel involved in the construction, operation, maintenance, and decommission of the project of conservation measures presented in this BBCS so that personnel understand and comply with all BBCS requirements.

6. Initiation of avian and bat fatality monitoring during the initial phases of operation to document avian and bat mortalities and injuries at wind turbines and associated project elements.

1.2 DESCRIPTION AND BACKGROUND OF PROJECT

The purpose of the project is to construct and operate a wind energy generation facility located in the southern foothills and lower bajada slopes of the Tehachapi Mountains to provide up to 60 MW of renewable wind energy. The project is located in the south-central unincorporated area of Kern County, California, approximately 11 miles south of the City of Tehachapi, and approximately 8 miles northwest of the unincorporated community of Rosamond, California (Figure 1.2-1, *Regional Vicinity Map*). The project property consists of three separate parcels that total approximately 1,207 acres (slightly less than 2 square miles) of BLM-administered land. Two adjacent operating wind projects, the 6,970-acre Manzana (formerly PdV) Wind Energy Project (Manzana Project) and the 9,576-acre Pacific Wind Energy Project (Pacific Wind Project), are in close proximity to the project (Figure 1.2-2, *Project Vicinity Map*). The Manzana Project surrounds

the western and central Tylerhorse parcels on three sides, and borders the easternmost Tylerhorse parcel on its western boundary. The Pacific Wind Project is located approximately 0.5 mile southeast of the central Tylerhorse parcel and less than 1 mile south of the eastern Tylerhorse parcel. The project is bordered by the Tehachapi Mountains to the northwest.

The project would consist of up to 40 wind turbine generators (WTGs) with an anticipated total generating capacity of up to 60 MW. Related and supporting components would include an underground, 34.5-kilovolt (kV) electrical collection system to collect energy from turbines, an interconnecting road network, supervisory control and data acquisition (SCADA) system and fiber optic communications, and fencing of each wind turbine cluster or exterior boundary of the project. The project would use three-bladed WTGs, each ranging from 1.5 MW to 3.0 MW (generator nameplate capacity). Vestas and GE turbines are two of the wind turbine models being considered (Table 1.2-1, *Examples of Wind Turbine Specifications*). The specifications provided in the table are representative of all wind turbine models being considered in terms of impact assessment. Depending on equipment availability, different combinations of turbine types being considered could be installed at the project. Each combination would result in a total project energy capacity of up to 60 MW. The WTGs would be arranged in parallel arrays (turbine strings) generally running northeast to southwest, though spacing of the wind turbines along the arrays would be based on the final turbine selection. The wind turbine rotors would be up to approximately 370 feet in diameter. The maximum total height from tower base to blade tip would be 500 feet. In general, the turbines are spaced 2.5 to 3 rotor diameters apart side-to-side and 6 to 8 rotor diameters between downwind turbine strings (Figure 1.2-3, *Conceptual Site Plan*).

TABLE 1.2-1
EXAMPLES OF WIND TURBINE SPECIFICATIONS

Manufacturer	Model	Capacity (MW)	Rotor Diameter (feet)	Hub Height (feet)	Maximum Height from Tower Base to Blade Tip (feet)
Vestas	112–3.0 MW	3.0	367	275	460
GE	SLE	1.5	253	262	389

To exploit economies of scale and reduce environmental impacts, the project would use the ancillary facilities of the adjacent Manzana Project, a separate wind farm project approved by the Kern County Board of Supervisors on July 29, 2008, which is controlled by Iberdrola on approximately 6,970 acres of private lands. Such facilities include the Manzana Project's previously approved operations and maintenance (O&M) facility, staging and refueling areas, and concrete batch plant. Construction was completed in 2012, and the Manzana Project is currently operating.

If approved, power generated at the project would connect via underground collector lines to a substation located off-site on the Manzana Project. The power generated would in turn be transferred to the Southern California Edison's (SCE's) Whirlwind Substation (Tehachapi Renewable Transmission Project [TRTP] Substation 5) by means of a 220-kV overhead transmission line that has been constructed as part of the Manzana Project (Figure 1.2-2). The impacts of this interconnection were analyzed in the Pacific Wind Project's Environmental Impact Report (EIR). The power would then be sold to a power purchaser (via a power purchase agreement), who in turn would sell energy output to California investor-owned utilities,

municipalities, or other purchasers, in furtherance of the goals of the California Renewables Portfolio Standard (RPS) and other similar renewable programs in the state.

The project property is located within an area identified as the Tehachapi Wind Resource Area (WRA), which contains some of the best wind resources in California. Several wind energy projects are currently operating in the region, and several others are currently seeking project approval under the regulatory review process (Figure 1.2.4, *Operating Wind Energy Projects within the Tehachapi Wind Resource Area in Relation to the Project*).

1.3 KEY LAWS, REGULATIONS, GUIDELINES, AND INSTRUCTION MEMORANDUMS

1.3.1 Laws and Regulations

Federal

Federal Endangered Species Act

The 1973 ESA (16 USC 1531–1544) provides a framework for the protection of endangered and threatened plant and animal species. Federal agencies may not jeopardize the existence of listed species, which includes ensuring that actions they authorize, fund, or carry out do not adversely affect the species or adversely modify designated critical habitats. Under the federal ESA, all federal departments and agencies must utilize their authorities, as appropriate, to promote the recovery of listed species. The federal ESA prohibits all persons, including federal agencies, from harming or killing ("taking") individuals of a listed species without authorization. Although federal agencies must consult with the USFWS or National Marine Fisheries Service when their activities may affect listed species, projects cannot be stopped unilaterally by the services. However, for any anticipated take to be authorized, applicable measures to minimize the take that are developed in the consultation must be followed.

The California condor is designated as endangered pursuant to the federal ESA. Condors have not been recorded within the project, neither historically nor as a result of on-the-ground surveys; however, due to the species' continued population growth, there is some risk that condors will begin to expand outside of their historic range, particularly into the foothills of the Tehachapis where the project is located. Thus, BLM is engaged in a Section 7 consultation with the USFWS to ensure that the BLM's action in approving the ROW for HW to construct, operate and decommission a wind energy facility does not jeopardize the existence of the California condor.

Migratory Bird Treaty Act

The MBTA of 1918 (16 USC 703–712), as amended, provides for federal protection of all migratory bird species, including California condor and golden eagle, and does not include provisions for authorized take. Under the Act, it is unlawful to pursue, hunt, take, capture, kill, or sell birds, their active nests, eggs, parts, and so forth. The U.S. government is exempt from the MBTA permit requirements based on the court decision in *Newton County Wildlife Assn. v. U.S. Forest Service*, 113 F. 3d 110 (8th Cir. 1997), but its agencies must minimize take caused by their activities. Nesting birds and the contents of the nest within the project are afforded protection during the nesting season pursuant to the MBTA. Nonfederal contractors are required to obtain a depredation permit from the USFWS prior to removal or disturbance of nesting birds.

Comment [JAR1]: Another federal order that should be mentioned in relation to migratory birds is Executive Order 13186 (see: http://ceq.hss.doe.gov/nepa/regs/eos/eo13186.html)

Comment [JAR2]: This is awkward here. There have been court decisions in various districts regarding the interpretation of the MBTA, but it is incorrect to say the US government is "exempt" from the MBTA permit requirements. In fact, all agencies are responsible for meeting the intent of the MBTA and Executive Order 13186 to protect and conserve migratory birds. Keep it to MBTA and EO 13186.

Comment [FWS MB-TD3]: I agree this should be removed.

In addition, a Federal Migratory Bird Special Purpose Salvage permit would be needed to collect dead migratory birds, nests, eggs, or parts from the wild.

Bald and Golden Eagle Protection Act

The BGEPA (16 USC 668–668d, 54 Stat. 250) is administered by the USFWS to protect bald eagles (*Haliaeetus leucocephalus*) and golden eagles, their nests, eggs, and parts.[4] The BGEPA states that no person shall take, possess, sell, purchase, barter, offer for sale, purchase or barter, transport, export, or import any bald or golden eagle alive or dead, or any part, nest, or egg without a valid permit to do so. The BGEPA also prohibits the take of bald and golden eagles unless pursuant to regulations. *Take* is defined by the BGEPA as an action "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." *Disturb* is defined in the BGEPA as follows:

> to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available; (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

In addition to immediate impacts, this definition covers impacts from human-caused alterations initiated near a previously used nest site during a time when eagles were not present.

Although the bald eagle was removed from the Endangered Species List in June 2007, it is still federally protected under the MBTA and BGEPA. The *National Bald Eagle Management Guidelines* were published in conjunction with delisting by the USFWS in May 2007 to provide provisions to continue to protect bald eagles from harmful actions and impacts.[5] Unlike the bald eagle, the golden eagle has never been federally listed and is protected solely under BGEPA and MBTA.

Final Eagle Programmatic Take Permits under 50 CFR 22.26 and 22.27

On September 11, 2009, the USFWS implemented new rules governing the take of bald and golden eagles.[6,7] The new rules address authorization of (1) disturbance-type take of bald and golden eagles due to otherwise lawful activities (50 CFR 22.26) and (2) removal or relocation of eagle nests in rare cases where their location poses a risk to human safety or the eagles themselves (50 CFR 22.27).[8]

Permits are distinguished as either individual take or programmatic take permits. Permit issuance is conditioned on various criteria, the most important of which is that the permitted take is consistent with the goal of stable or increasing breeding populations for bald and golden eagles. A programmatic permit is available to industries or agencies undertaking activities that

[4] U.S. Fish and Wildlife Service. n.d. *Bald Eagle Management Guidelines and Conservation Measures: Bald and Golden Eagle Protection Act.* Available at: http://www.fws.gov/midwest/Eagle/guidelines/bgepa.html

[5] U.S. Fish and Wildlife Service. May 2007. *National Bald Eagle Management Guidelines*. Available at: http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf

[6] U.S. Fish and Wildlife Service. 11 September 2009. "Eagle Permits; Take Necessary to Protect Interests in Particular Localities; Final Rules." *Federal Register*, *74*(175): 46836–46879.

[7] U.S. Fish and Wildlife Service. 20 May 2008. "Authorizations under the Bald and Golden Eagle Protection Act for Take of Eagles. Final Rule." *Federal Register*, *73* (98): 29075–29084.

[8] U.S. Fish and Wildlife Service. 11 September 2009. "Eagle Permits; Take Necessary to Protect Interests in Particular Localities; Final Rules." *Federal Register*, *74* (175): 46836–46879.

may disturb or otherwise take eagles on an ongoing operational basis. The USFWS has defined *programmatic take* as "take that is recurring, is not caused solely by indirect effects, and that occurs over the long term or in a location or locations that cannot be specifically identified."[9] Projects seeking programmatic permits are required to propose avoidance and minimization measures sufficient "to reduce the take to the maximum degree practicable" and apply advanced conservation practices (ACPs) developed in concert with the USFWS, such that any additional take after ACP application is unavoidable.[10]

Bureau of Land Management California Desert Conservation Area Plan

Administered by the BLM, the California Desert Conservation Area (CDCA) Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources. The project is located on lands administered by the BLM that are designated in the CDCA Plan as Unclassified. According to the CDCA "Energy Production and Utility Corridors" section, "Sites associated with power generation or transmission not identified in the Plan will be considered through the Plan Amendment Process."[11] Therefore, a Plan Amendment will be required for this project in accordance with the CDCA.

West Mojave Plan

BLM produced the West Mojave Plan as an amendment to the CDCA Plan. The West Mojave Plan is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise (*Gopherus agassizii*), the Mohave ground squirrel (*Xerospermophilus mohavensis*), and nearly 100 other plants and animals and the natural communities of which they are a part and (2) provides a streamlined program for complying with the requirements of the California and federal ESAs.[12,13]

The impacts to avian and bat species listed under the West Mojave Plan were considered within this BBCS.

State

California Endangered Species Act

[9] U.S. Fish and Wildlife Service. 11 September 2009. "Eagle Permits; Take Necessary to Protect Interests in Particular Localities; Final Rules." *Federal Register*, *74* (175): 46836–46879.

[10] U.S. Fish and Wildlife Service. 11 September 2009. "Eagle Permits; Take Necessary to Protect Interests in Particular Localities; Final Rules." *Federal Register*, *74* (175): 46836–46879.

[11] U.S. Department of the Interior, Bureau of Land Management. 1980. *California Desert Conservation Area Plan*. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/cdd/cdcaplan.Par.15259.File.dat/CA_Desert_.pdf

[12] U.S. Department of the Interior, Bureau of Land Management. 1980. *Final Environmental Impact Report and Statement for the West Mojave Plan*. Moreno Valley, CA: California Desert District. Available at: http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/Vol-1-Chapter1_Bookmarks.pdf

[13] U.S. Department of the Interior, Bureau of Land Management. January 2005. *West Mojave Plan—A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment Final Environmental Impact Report and Statement*. Moreno Valley, CA. Available at: http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/Vol-1-Chapter1_Bookmarks.pdf

The California ESA (California Fish and Game Code §§ 2050 et seq.) prohibits the take of listed species, except as otherwise provided in state law. The *take* for the California ESA is defined as it is in the federal ESA; however, unlike the federal ESA, the California ESA also applies the take prohibitions to species petitioned for listing as state candidates rather than only those listed species. State lead agencies are required to consult with the CDFW to ensure that any actions undertaken by the lead agency are not likely to jeopardize the continued existence of any state-listed species or result in destruction or degradation of required habitat. CDFW is authorized to enter into Memoranda of Understanding (MOUs) with individuals, public agencies, universities, zoological gardens, and scientific or educational institutions to import, export, take, or possess listed species for scientific, educational, or management purposes.

Section 2080 of the California ESA states:

> no person shall import into this state [California], export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission [State Fish and Game Commission] determines to be an endangered species or threatened species, or attempt any of those acts, except as otherwise provided in this chapter, or the Native Plant Protection Act, or the California Desert Native Plants Act.

Due to the potential presence of state-listed threatened, endangered, or candidate species within the project, compliance with the California ESA was considered in the evaluation of the project.

Title 14, California Code of Regulations, Sections 670.2 and 670.5

These state regulations list plant and animal species designated as threatened and endangered under the California ESA. California Species of Special Concern (CSC) are those species that are indicators of regional habitat changes or are considered potential future protected species. CSCs do not have any special legal status but are intended by CDFW for use as a management tool to take these species into special consideration when decisions are made concerning the future of any land parcel.

Due to the potential presence of CSC within the project, impacts to these species were considered in the evaluation of the project.

California Fish and Game Code Section 3511

The State of California classifies certain animals as “fully protected.” This classification was the State’s initial effort in the 1960’s to identify and provide additional protection to certain species that were rare or faced possible extinction. Lists were made for fish, mammals, amphibians and reptiles, birds, and mammals. Section 3511 of the California Fish and Game Code lists 13 species of fully protected birds. Fully protected species may not be taken or possessed at any time. Additionally, no permits or licenses may be issued for their take, except for scientific research and relocation of bird species for the protection of livestock.

Due to the potential presence of several fully protected bird species within the project, impacts to these species were considered in the evaluation of the project.

1.3.2 Guidelines

Federal

Interim Technical Guidance

In February 2010, the USFWS published the *Interim Technical Guidance*, including a description of survey methods recommended to use in characterizing golden eagle use on and adjacent to projects that may require a programmatic take permit.[14] The recommendations cover both aerial and ground-based survey options for use in determining habitat occupancy, and emphasize recording and observing golden eagle nest sites. Given the large survey areas involved, aerial surveys are generally more effective and appropriate than ground-based surveys in most areas.

This technical guidance was implemented in Sapphos Environmental, Inc.'s design of the aerial golden eagle surveys conducted in 2013 in the 10-mile-radius project survey area.

Draft Eagle Conservation Plan Guidance and Technical Appendices

In January 2011, the USFWS published the *Draft Guidance*,[15] which expanded on the permit issuance criteria described in the final take permit regulations under 50 CFR 22.26. This *Draft Guidance* delineates the conditions for issuance of programmatic permits for incidental take of eagles under BGEPA, with particular focus on the wind energy industry, and is designed to assist developers in complying with two core environmental laws: the MBTA and the BGEPA. As described in the *Draft Guidance*, conservation measures must be implemented that will avoid and minimize take to the maximum extent possible, and advanced conservation practices must be used such that any residual take is unavoidable. Furthermore, when the permitted take would otherwise cause eagle populations to decline, compensatory mitigation must be employed such that no net population decline occurs. The *Draft Guidance* recommend five stages in coordinating with the USFWS in the development of an ECP to support application for programmatic permits for take of eagles, including: (1) an initial site assessment using publicly available data to identify potential eagle use areas, as well as the potential risk involved with development of these areas; (2) completion of rigorous on-site surveys for the selected site to obtain data allowing for eagle mortality; (3) estimate of mortality risk from wind turbines based on the survey data; (4) identification and evaluation of the anticipated effectiveness of ACPs to avoid mortality and, if necessary, identification of compensatory mitigation; and (5) postconstruction monitoring to determine whether actual take exceeds anticipated take such that adaptive management will be required. The *Draft Guidance* was the only document available during development of the 2011–2012 avian field studies on the project, and so bird use count methodology (described in Section 3.0) was based on recommendations within this document.

[14] Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance*. Arlington, VA: U.S. Fish and Wildlife Service, Division of Migratory Bird Management

[15] U.S. Fish and Wildlife Service. January 2011. *Draft Eagle Conservation Plan Guidance*. Available at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

The Eagle Conservation Plan Guidance Technical Appendices (*Draft ECP Technical Appendices*), written to accompany the Final Eagle Conservation Plan Guidance, became available to project proponents and consultants in a draft form on August 17, 2012.[16] These appendices recommend current methods approved by USFWS for assessing and documenting risks to eagles associated with wind project development; however these technical appendices became available after project-specific surveys on the project commenced.

Eagle Conservation Plan Guidance

In April 2013, the USFWS published the most recent version of the *ECP Guidance*, which clarified the permit issuance criteria described in the final take permit regulations under 50 CFR 22.26.[17] The document reiterates that the approaches within the appendices are recommendations only, but that following the guidance will assist project proponents in complying with regulatory requirements and avoiding unintentional take of eagles at wind energy projects, and will also provide a framework for the biological data needed to support permit applications for project proponents that wish to pursue a permit.

Project siting and design, as well as pre-permitting biological resource studies, were completed prior to the release of the *ECP Guidance*; however, this BBCS has, when possible, integrated recommendations from this guidance, particularly in regard to document structure.

Land-Based Wind Energy Guidelines

As wind energy proliferates across the U.S., growing concern has been placed on the impact of these developments on environmental resources during both short-term construction and long-term operation. As a response, the USFWS issued their voluntary Interim Guidelines in 2003 to advise developers on recommended methods to assess, develop, and site their project in order to reduce adverse effects to environmental resources, particularly fish and wildlife. The Wind Turbine Guidelines Federal Advisory Committee was established by USFWS in 2007 in order to review and make recommendations going forward on improvements to the Interim Guidelines. The Committee's final recommendations were submitted in 2010. The USFWS subsequently used these to develop a new set of voluntary guidelines, the draft *Land-Based Wind Energy Guidelines*, released after public comment and peer review in July 2011. Following additional rounds of comments and language refinement, the *Final Guidelines* were released on March 23, 2012.[18]

The *Final Guidelines* outline effective measures to avoid or minimize impacts to wildlife and their habitats from wind energy facilities. They also encourage reviewing agencies and other professionals to complete five tiers of analysis to determine impacts and design avoidance and minimization strategies:

[16] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. August 2012. *Eagle Conservation Plan Guidance*, Module 1—"Land-Based Energy Technical Appendices." Washington, DC: U.S. Department of the Interior.

[17] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

[18] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

- **Tier 1:** Preliminary site evaluation, including landscape-level assessment and literature review
- **Tier 2:** Site characterization, including potential presence of species of concern
- **Tier 3:** Field studies and impact prediction
- **Tier 4:** Postconstruction (operational) studies to estimate impacts
- **Tier 5:** Other postconstruction studies and research

The key laws, regulations, and guidelines described above have been closely followed in order to inform both the study designs conducted on the project and the avoidance and minimization measures designed to protect birds and bats during project construction and operation. Furthermore, the guidelines issued by the USFWS, including the *ECP Guidance* and the *Final Guidelines*, have been used to critically evaluate the project for potential impacts to birds and bats at each level of project development. These levels of evaluation are mirrored in the organization of this BBCS.

State

California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development

The California Energy Commission (CEC) together with the CDFW issued voluntary guidelines for reducing impacts to birds and bats from wind energy development in 2007.[19] Similar to the federal *Final Guidelines*, previously described in this section, these guidelines provide information to help reduce impacts to birds and bats from new development or repowering of wind energy projects in California. They include preliminary screening of proposed wind energy project sites; pre-permitting study design and methods; assessing direct, indirect, and cumulative impacts to birds and bats in accordance with state and federal laws; developing avoidance and minimization measures; establishing appropriate compensatory mitigation; and post-construction operations monitoring, analysis, and reporting methods. The subject guidelines have not been approved or disapproved by the CEC or the CDFW; nor has the CEC or the CDFW passed on the accuracy or adequacy of the guidelines. Nevertheless, due to the potential for effects as a result of project implementation to birds and bats, the avian and bat studies conducted in support of baseline characterization of avian and bat resources found at the proposed project property were designed to be consistent with the CEC Guidelines.

1.3.3 Instruction Memorandums

Federal

Bureau of Land Management Instruction Memorandum No. 2010-156

The purpose of IM No. 2010-156 is to provide direction to renewable energy projects for complying with the BGEPA, including its implementing regulations (i.e., September 11, 2009, Eagle Rule 50 CFR Parts 13 and 22). This compliance will ensure environmentally responsible authorization and development of renewable energy projects on BLM-administered lands. The

[19] California Energy Commission. 26 September 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development.* Final Committee Report. Prepared for: California Department of Fish and Game. Sacramento, CA.

BLM directs that "consideration of golden eagles and their habitat must be incorporated in the National Environmental Policy Act (NEPA) analysis for all renewable energy projects." This should include a direct and indirect effects analysis, cumulative effects analysis, and best management practices to avoid or minimize the unintentional take of eagles. Further, as a condition of the right-of-way grant, BLM will require an Avian Protection Plan (APP, now referred to as a BBCS), or a plan considering both birds and bats at the discretion of the applicant, which should evaluate options to avoid and minimize project impacts to birds and/or bats in the siting, operations, and monitoring phases of the project. Coordination on potential impacts to golden eagles and their habitat should be started early with USFWS, and the project must document in their administrative record any and all correspondence from USFWS on whether or not the project will likely take golden eagles. The USFWS must also address whether USFWS considers the development of an APP as a feasible option for the project. This coordination should be incorporated into the project's NEPA document. If USFWS considers an APP as a feasible option, a letter of concurrence must be sought and received from the USFWS that addresses the adequacy of the document. This letter of concurrence should be included in the administrative record. The BLM will not issue an ROD approving the project if the USFWS indicates that an APP is not sufficient to avoid or minimize take resulting from the proposed project. If an APP is deemed appropriate by the USFWS, the BLM may issue an ROD approving the project, but BLM will not issue a Notice to Proceed until the USFWS letter of concurrence for the project APP is received.

State

Bureau of Land Management Instruction Memorandum No. 2013-030

The purpose of IM No. CA-2013-013 is to provide supplemental guidance on implementation of the BLM Washington Office IM 2010-156, described above, in California. Specifically, it defines how BLM will work with the USFWS and renewable energy and transmission right-of-way applicants on public land to comply with BGEPA in California. This IM, however, does not replace the IM 2010-156 policies.

The IM notes that BGEPA protects eagles and their nests from take, and that take of such birds without a permit is punishable by criminal and civil penalties. Renewable energy projects on BLM-administered land have the potential to affect, and even take, eagles. USFWS has an established protocol for authorizing take of eagles for activities that are otherwise lawful under the BGEPA and its implementing regulations, as long as take is unavoidable even though advanced conservation practices are implemented. Renewable energy applicants are not legally required to seek or obtain an eagle take permit under BGEPA, but any take of an eagle without a permit would be a violation of BGEPA and may result in law enforcement actions against the owner and/or operator. Additionally, BLM requires ROW grant holders to comply with all applicable federal and state laws and regulations; therefore, although pursuing an eagle take permit on BLM-managed public land is voluntary, take without a permit is a violation of federal law and a violation of the BLM ROW authorization.

The BLM recommends that coordination between the applicant, BLM, and the USFWS begin as soon as possible in the permitting process. If applicable, BLM will recommend that the ROW applicant begin collecting eagle data following the *ECP Guidance* and the BLM will concurrently review available information about golden eagle use of the proposed project area to determine if the project will have the potential for take under BGEPA. BLM will discuss the findings of this review with the USFWS. If BLM and USFWS determine the project has a potential for take, the

BLM will recommend the applicant collect at least 2 years of eagle use data as described in Appendix C of the *ECP Guidance*, and will also invite USFWS to be a cooperating agency during the NEPA process. Furthermore, the USFWS will recommend that the applicant prepare an ECP and, if appropriate, submit a BGEPA take permit applicant. USFWS will document this recommendation to BLM in written form. Once USFWS has recommended that an applicant apply for a take permit, it is the applicant's decision whether to pursue a permit or not, but this decision by the applicant should be provided in writing to the BLM. The process at this point will then diverge based on the applicant's decision whether or not to pursue a BGEPA permit.

If a permit is sought, an acceptable take permit application package must be sent to the USFWS in advance of release of the project's Draft EIS so that relevant eagle risk assessment can be incorporated in the environmental analysis. BLM will not issue a Draft EIS until these steps are completed. The BLM and the USFWS will then coordinate the ROW and BGEPA permitting process, which will result in the preparation of a joint NEPA document, in most cases.

If no permit is sought by the applicant, the BLM will continue to process the ROW application. In the Draft EIS, the BLM will analyze any conservation measures proposed by the applicant to avoid and minimize impacts on eagles. The NEPA analysis will also include an eagle risk assessment. The BLM may sign an ROD and issue an ROW authorization that requires mitigation to reduce impacts to eagles. The ROW authorization will include terms and conditions that identify any actions that the applicant must perform if an eagle is taken without a take permit from USFWS. These terms and conditions will also make clear that these restrictions would be replaced by the terms and conditions of a BGEPA permit, should the applicant decide to pursue one later. If the project subsequently takes an eagle without a take permit, the project will be considered in violation of the BGEPA, and the USFWS will retain sole authority to seek law enforcement action against the project proponent under BGEPA. The BLM, regardless of the USFWS's decision on enforcement, will retain its authority to suspend, terminate, or modify the project's ROW authorization.

Renewable energy applicants that have initiated the NEPA process at the issuance of this IM, as is the case for the project, will follow the process detailed within this IM as closely as is feasible.

HW has decided to pursue at this time the "No BGEPA Take Permit Sought" path outlined in the above IM. HW has reviewed the "No BGEPA Take Permit Sought" path and understands that the BLM may sign a ROD and issue an ROW authorization that requires mitigation to reduce impacts to eagles.

SECTION 2.0
TIER 1 AND TIER 2 – PRELIMINARY SITE SELECTION AND SITE CHARACTERIZATION

This section of the BBCS describes the initial site selection process for the project, and also details the steps taken by the former applicant, enXco Development Corporation (enXco, now EDF Renewable Energy) to conduct a preliminary site evaluation and characterization of the project vicinity, corresponding to Tiers 1 and 2 of the *Final Guidelines*[20] and Stage 1 of the *ECP Guidance*.[21] As part of the transfer of the ROW application for the project to HW from the former applicant in 2012, all investigations related to biological resources transferred to HW and became the property of HW; therefore, all work undertaken by enXco on the project between 2004 and 2011 is ascribed to HW within this document.

The preliminary site selection and site characterization for the project was undertaken in concert with the preliminary site selection and site characterization for two wind energy projects that are now in operation on adjacent privately held properties, the Manzana Project, permitted for up to 300 MW; and the Pacific Wind Project, permitted for up to 151 MW. The preliminary site selection and characterization process involved a review of published and unpublished literature and databases; coordination with agencies and stakeholders, including the USFWS and the BLM; as well as reconnaissance-level site visits to evaluate baseline site characteristics. More detailed, directed studies on the project were subsequently conducted beginning in 2011 and continuing through 2013, to further quantify bird and bat use on the project property. This section of the BBCS focuses on the early stages of site assessment and characterization done in the general project vicinity.

2.1 PRELIMINARY SITE SELECTION

Preliminary site selection for the project was initiated in 2004, based on a number of factors, including a preliminary wind resource assessment, environmental and cultural considerations, review of terrain and topography, and access to interconnection and transmission. The determination of a strong, recoverable wind resource on the site, and the proximity to the approved Whirlwind VI facility led to entitlement applications being initiated for the adjacent Manzana and Pacific Wind Projects. The anticipated development of the Pacific Wind and Manzana Projects was expected to create an infrastructure of roads and transmission lines that provide an opportunity for infill development that would allow the applicant to exploit economies of scale and minimize environmental impacts. Development of the project would also be consistent with the management objectives outlined the Energy Policy Act of 2005, which established a goal for the Secretary of the Interior to approve 10,000 MW of non-hydropower renewable energy projects located on public lands.

Concurrent with the initial consideration of siting the project on these specific parcels of BLM-administered land, the use of private lands within Kern County, as well as other BLM-administered land within the Tehachapi WRA, was also considered. In general, the project, as

[20] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[21] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

now sited, proved more favorable than all considered alternatives due to the site's superior wind resource, location in less environmentally sensitive habitats than other available lands, proximity to existing interconnection points, economic infeasibility of aggregating sufficient parcels under private ownership, and impact reductions and economies associated with strategic "infill" development.

2.2 SITE CHARACTERIZATION METHODS

To determine potential impacts to environmental resources, particularly avian and bat species, resulting from the development of the Project, the site characterization was initiated in 2004 with a constraints analysis. The constraints analysis was based on information gathered during a desktop analysis, coordination with regulatory oversight agencies and wildlife advocacy organizations, and field assessments. More detailed studies conducted on the site between 2011 and 2013 to update and quantify bird and bat use of the project are discussed in Section 3.

2.2.1 Desktop Analysis

The desktop analysis included a review of existing and potential Habitat Conservation Plans[22] and Natural Community Conservation Plans;[23] as well as the West Mojave Plan,[24] an element of the CDCA Plan; and the Kern County General Plan.[25] A query of the California Natural Diversity Database (CNDDB)[26,27,28] was undertaken to identify special-status species, including listed, sensitive, and locally important species with the potential to occur within, and adjacent to, the project property. The query was conducted for the U.S. Geological Survey (USGS) 7.5-minute series, Tylerhorse Canyon, topographic quadrangle, in which the project property is located, as well as the eight surrounding 7.5-minute series topographic quadrangles (Cummings Mountain, Tehachapi South, Monolith, Willow Springs, Little Buttes, Fairmont Butte, Neenach School, and Liebre Twins). The National Wetlands Inventory (NWI) was reviewed for the same USGS topographic quadrangles.[29] In addition, the USGS quadrangles were reviewed to assess the location of blue-line drainages. Finally, a review of proposed and designated critical habitat for

[22] U.S. Fish and Wildlife Service. May 2009. *Habitat Conservation Plans.* Region 8. Available at: http://ecos.fws.gov/conserv_plans/servlet/gov.doi.hcp.servlets.PlanReport?region=8&type=HCP&rtype=2&hcpUser=&view=report

[23] California Department of Fish and Game. Accessed April 2010. *Natural Community Conservation Planning (NCCP)*. Available at: http://www.dfg.ca.gov/habcon/nccp/status.html

[24] Bureau of Land Management. January 2005. Final Environmental Impact Report and Statement for the West Mojave Plan. California Desert District, Moreno Valley, CA. Available at: http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/Vol-1-Chapter1_Bookmarks.pdf

[25] Kern County. 15 July 2004 (Amended 13 March 2007). Kern County General Plan, Land Use, Conservation and Open Space Element. Bakersfield, CA. Available at: http://www.co.kern.ca.us/planning/pdfs/kcgp/KCGPChp1LandUse.pdf

[26] California Department of Fish and Game. 2004. *Rarefind 2: A Database Application for the Use of the California Department of Fish and Game Natural Diversity Database*. Sacramento, CA.

[27] California Department of Fish and Game. 2005. *Rarefind 3: A Database Application for the Use of the California Department of Fish and Game Natural Diversity Database*. Sacramento, CA.

[28] California Department of Fish and Game. 2012. *Rarefind 4: A Database Application for the Use of the California Department of Fish and Game Natural Diversity Database*. Sacramento, CA.

[29] U.S. Fish and Wildlife Service. [August 1986] 1995. *National Wetlands Inventory Map, Tylerhorse Canyon, California*. Available at: http://www.fws.gov/wetlands/data/index.html

federally listed threatened and endangered species was conducted.[30]

[30] U.S. Fish and Wildlife Service. 2013. Critical Habitat Portal. Available at: http://criticalhabitat.fws.gov/crithab/

2.2.2 Agency Coordination

Informal consultation was undertaken with the USFWS to review the scope of federally listed, candidate, and other sensitive species that have the potential to occur in the project property, as well as to confirm field methods to be used in assessing the presence or absence of these species.

Other agencies contacted included BLM, CDFW, the U.S. Army Corps of Engineers (USACOE), and Kern County. Coordination was initiated in 2004 and 2005. Further coordination with agencies continued between 2011 and the present.

2.2.3 Field Assessment Methods

Sapphos Environmental, Inc. conducted a variety of environmental baseline surveys between 2004 and 2011 to provide a general overview of the habitat and wildlife in the project vicinity. These surveys were conducted to determine the location and extent of plant communities, sensitive habitats, and the potential for occurrences of sensitive plant and animal species.

The majority of the surveys conducted on the project from 2004 to 2011 were reconnaissance-level and were characterized by pedestrian or vehicle-based surveys of the project vicinity. In general, the surveys focused on documenting the following:

- Migratory bird presence and habitat
- Raptor presence and habitat
- General wildlife habitat
- Vegetation community types
- Wetland locations

Habitat Assessments

The preliminary habitat assessment was conducted by Sapphos Environmental, Inc. on June 24, July 1, July 8, July 22, and July 29, 2004. Additional surveys were undertaken on January 28, July 12, and July 13, 2005. Field surveys during this period were undertaken by six to eight Sapphos Environmental, Inc. biologists. The project property was resurveyed on July 6, 7, and 8, 2009 to verify that no substantial changes had occurred that would necessitate major revision of the conclusions of the 2004 and 2005 surveys. The habitat assessment served as the tool for identification of areas within the project property with the potential to support special-status species.

Plant Community Mapping

The purpose of the plant community mapping was to characterize the plant communities within the project property. The plant community map provided the basis for determining the presence or absence of state-designated sensitive plant communities, including wetland, aquatic, and riparian habitats. The plant community mapping also served as one source of information for making a determination regarding the ability of the project to provide suitable habitat for sensitive plant and wildlife species.

Project data and aerial photographs were reviewed, and site visits were conducted on April 14

and 15, 2005, to map and characterize the vegetation communities within the project. The site was revisited on November 23, 2011, to further refine the boundaries of the plant communities present on-site. The description of plant communities followed the classification system provided in *Preliminary Descriptions of the Terrestrial Natural Communities of California*[31] and cross-referenced to vegetation series described in *A Manual of California Vegetation*.[32] Scientific names and common names were determined using *The Jepson Manual*.[33] Common names not available from *The Jepson Manual* were taken from *A Flora of Southern California*.[34]

Riparian and Wetland Mapping

Information gathered from a literature review was analyzed to determine the presence of hydric soils, drainage features, and the potential presence of drainages / isolated dry washes and intermittently flooded features. Geographic information systems (GIS) were used to identify the locations of drainage feature crossings (i.e., road crossings and underground power lines) to determine the potential presence of features subject to CDFW jurisdiction pursuant to Section 1600 of the State Fish and Game Code.

The determination of presence or absence of federally protected wetlands, as defined in Section 404 of the Clean Water Act, conformed to the protocols specified in the *Corps of Engineers Wetlands Delineation Manual*,[35] as modified by the U.S. Supreme Court case, *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, No. 99-1178 (January 9, 2001).[36] The determination regarding the potential presence or absence of federally protected wetlands included review of USGS topographic maps and NWI maps, interpretation of aerial photographs, spatial analysis using GIS, plant community mapping, field analysis, and coordination with the USACOE.

Field surveys were conducted on June 7 and 8, 2006, to determine the presence or absence of potential waters of the United States not evident on the NWI or USGS maps. A team of two certified wetland delineators conducted the field investigations. The results of the determination of presence or absence of federally protected wetlands were documented in a letter and transmitted to the USACOE.[37]

2.3 SITE CHARACTERIZATION RESULTS

Comment [FWS MB-TD4]: Discussion of lost foraging habitat should be included here, rather than using the same sentence under each individual species account.

[31] Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

[32] Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, CA: California Native Plant Society.

[33] Hickman, J.C., ed. 1993. *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.

[34] Munz, P. 1974. *A Flora of Southern California*. Berkeley, CA: University of California Press.

[35] U.S. Army Corps of Engineers. January 1987. *Corp of Engineers Wetlands Delineation Manual*. Final Technical Report Y-87-1. Vicksburg, MS. Prepared by: Environmental Laboratory, U.S. Army Engineer Research and Development Center, Waterways Experiment Station, Vicksburg, MS.

[36] U.S. Supreme Court. 9 January 2001. Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers. No. 99-1178, 531 U.S. 159.

[37] Mendez, Irena, Sapphos Environmental, Inc., Pasadena, CA. 22 June 2006. Letter to Mr. Aaron Allen, U.S. Army Corps of Engineers, Ventura, CA. Subject: Determination of Non-Jurisdiction for Proposed PdV Wind Energy Project in Southern Kern County.

As a result of the desktop analysis, coordination with agencies and stakeholders, and multiple reconnaissance-level field investigations, the general attributes of the project property in terms of their potential for harboring or attracting bird and bat species were characterized in relation to land use designations, topography and plant communities, land use and habitat connectivity, riparian and wetland habitats, presence of migratory corridors and wildlife congregation areas, and potential presence of special status bird and bat species.

2.3.1 Land Designations

The project property consists of ~~four~~ three? noncontiguous parcels comprising a total of 1,207 acres on lands administered by the BLM. The project property is within the West Mojave Plan boundary (Figure 2.3.1-1, *Project in Relation to the West Mojave Plan*). Due to the location of the project study area within the boundaries of the West Mojave Plan, plant and animal species addressed in this Plan were evaluated for their potential to be present within the project vicinity.

The project also lies at the northern edge of the Antelope Valley Important Bird Area (IBA), a 300,000-acre area designated by The Audubon Society for its grassland bird and raptor communities. (Figure 2.3.1-2, *Project in Relation to Audubon Important Bird Areas*).[38] Audubon identifies IBAs based on the presence of healthy bird populations; IBAs do not necessarily include declining or imperiled bird species.[39]

The project is not located within critical habitat for any federally threatened or endangered avian or bat species. The Tejon Ranch Critical Habitat Unit, designated critical habitat for the California condor, is located approximately 2.7 miles west of the project property.

2.3.2 Topography

The project is located within the USGS 7.5-minute series Tylerhorse Canyon topographic quadrangle (Figure 2.3.2-1, *Topographic Map with USGS 7.5-Minute Quadrangle Index*) in the northwestern Antelope Valley portion of the Mojave Desert. The Antelope Valley consists of approximately 1,200 square miles (3,108 square kilometers) of elevated desert terrain. It is primarily an alluvial desert plain containing bedrock hills and low mountains. The geology of the Antelope Valley is characterized by relatively flat-lying topography and valley fill deposits.

The project straddles the desert floor and the adjacent foothills of the Tehachapi Mountains, a short transverse range that connects the southernmost Sierra Nevada Mountains (to the northeast) with the San Emigdio Mountains (to the southwest). Elevation on the project ranges between 3,480 feet to 3,960 feet above mean sea level (MSL).

2.3.3 Plant Communities

The project is located within the western Mojave Desert region of the desert floristic province.[40]

[38] National Audubon Society. Accessed May 2013. "Antelope Valley (Lancaster) Site Profile Report." Available at: http://netapp.audubon.org/iba/Reports/270

[39] National Audubon Society. Updated June 2012. "Important Bird Areas Program." Available at: http://web4.audubon.org/bird/iba/

[40] Hickman, J.C., ed. 1993. *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.

Mojave Desert vegetation is dominated by low, widely spaced shrubs. The species composition of the Mojave Desert has common elements with the Great Basin to the north and many succulent species common to the Sonoran Desert to the south and east. The most widely distributed plant is the creosote bush (*Larrea tridentata*), which covers extensive areas in nearly pure stands, often in close association with bursage (*Ambrosia dumosa*).

Five plant communities were identified within the project property: Mojavean Juniper Woodland and Scrub, Non-native Grassland, Joshua Tree Woodland, Mojave Desert Wash Scrub, and Mojave Mixed Woody Scrub. One plant community present on the project property, Joshua Tree Woodland, is designated as sensitive by the CDFW (Figure 2.3.3-1, *Plant Community Map*; and Table 2.3.3-1, *Plant Communities Present within the Project Property*). A total of 26 acres have been mapped as "Disturbed" to account for areas that have been previously impacted such that native vegetation is no longer present. The plant communities found on the project are widespread through the Antelope Valley region and are not unique to the project property.

TABLE 2.3.3-1
PLANT COMMUNITIES PRESENT WITHIN THE PROJECT PROPERTY

Plant Community	Element Code / Type	Total Project (acres)
Mojavean Juniper Woodland and Scrub	CTT72220CA (CNDDB) / 72220 (Holland)	565
Non-native Grassland	CTT42200CA (CNDDB) / 42200 (Holland)	202
Joshua Tree Woodland	CTT75400CA (CNDDB) / 73000 (Holland)	98
Mojave Desert Wash Scrub	CTT63700CA (CNDDB) / 63700 (Holland)	40
Mojave Mixed Woody Scrub	CTT34210CA (CNDDB) / 34210 (Holland)	276
Disturbed	N/A	26
TOTAL		**1,207**

KEY:
CNDDB = California Natural Diversity Database
SOURCES:
1. California Department of Fish and Game. 2009. *Rarefind3: California Natural Diversity Database*. Sacramento, CA.
2. Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

2.3.4 Land Use and Habitat Connectivity

The project property is currently largely vacant and used for seasonal livestock grazing and off-road vehicle (ORV) use. There is no developed roadway system within the project; however, there is an existing, rather dense network of two-track dirt roads and single ORV tracks that have been used historically to support ORV use and ranch operations. No paved roads exist within the project.

The land surrounding the project property consists of two commercial wind energy projects, several electrical transmission lines, the Los Angeles Aqueduct, a patchwork of undeveloped parcels with a network of two-track dirt roads, and several rural residences (Figure 2.3.4-1, *Existing Land Uses in Relation to the Project*). The Manzana Project, operated by HW's parent company Iberdrola, is a 6,970-acre wind energy facility that began operations in 2012. The facility currently consists of 126, 1.5-MW capacity wind turbine generators (189-MW generation capacity) and associated infrastructure. The Manzana Project almost completely surrounds both the project property's western and central parcels (Figure 2.3.4-1). The Pacific Wind Project, operated by

EDF Renewable Energy, is a 9,576-acre wind energy facility that also began operations in 2012. The facility currently consists of 70, 2-MW WTGs (140 MW generation capacity) and associated infrastructure. The as-built footprint of the Pacific Wind Project is located approximately 1 mile south of the project's eastern parcel and approximately 0.5 mile southeast of the project's central parcel.

Although the project property itself, as well as the land to the north and east of the largest eastern parcel, is largely undeveloped, in general the area is fairly fragmented and provides little in the form of habitat connectivity with the surrounding landscape. Due to the proximity of two large operating wind energy facilities adjacent to the project property, construction of a wind energy facility on the project property itself would cause little habitat fragmentation. Rather, it would provide an opportunity to strategically infill these parcels with compatible development.

2.3.5 Riparian and Wetland Habitats

There were no NWI wetlands identified within the project property, and the nearest wetland is located approximately 1.3 miles northwest of the project property. Multiple intermittent or ephemeral drainages in the project property were identified, which, during extreme rain events, convey surface water runoff to Rosamond Lake located on Edwards Air Force Base northeast of Lancaster. The USGS 7.5 minute series Tylerhorse Canyon quadrangle depicts Tylerhorse Canyon, an ephemeral blue-line drainage crossing through the northeastern portion of the parcel in section 26, Gamble Springs Canyon crossing through the middle of the parcel in Section 24, Burham Canyon crossing through the northeast corner of the parcel in Section 24, and six additional unnamed ephemeral drainage crossing through the proposed project area (Figure 2.3.5-1, *Drainage System*). Cottonwood Creek, a major drainage in the western Antelope Valley, is located approximately 1 mile to the west of the project study area in a northwest-southeast direction. Runoff from the Tehachapi Mountains flows within Cottonwood Creek towards Rosamond Dry Lake.

There is no riparian or wetland habitat within the project property, and very little in the greater project vicinity. Therefore, bird and bat species that depend on such habitat for nesting or stopover activities would not be expected to occur frequently on the project.

2.3.6 Presence of Migratory Corridors and Wildlife Congregation Areas

The topography of the project vicinity is predominately characterized by flat scrubland or grasslands and low hills with little topographical relief. There are no obvious geophysical or hydrological features that would tend to create natural points of wildlife congregation or "funnels," such as prominent ridgelines or mountain gaps that could potentially serve as a large-scale or regional migratory pathway. Data collected during habitat assessments did not indicate that the project is located within a known major migratory pathway for any major species group, including neotropical migrants, waterfowl, raptors, particularly golden eagles, or bats.

For the majority of avian and bat species, the particular habitat types present on the project do not act as an attractant that would tend to concentrate large groupings of wildlife. Habitats on the project, such as desert scrub, juniper and Joshua tree woodland, and non-native grassland, are common and plentiful throughout the greater Mojave Desert. The project area does not appear to provide important stopover habitat for migrating birds or bats, especially those that depend on open water or forested environments for stopover habitat. Nesting or roosting

substrates, such as Joshua trees, scattered residential windbreaks, and transmission towers, provide some habitat for nesting raptors and corvids, such as red-tailed hawk, American kestrel, and common raven; but no suitable nesting locations for larger-bodied raptors of concern, such as golden eagle or California condor, were identified on the project during initial site characterization.

2.3.7 Potential Presence of Special Status Bird and Bat Species

The project is located in an area that provides potentially suitable habitat for 17 special-status avian species and 4 species of bats. Special-status species include those listed as threatened or endangered under the federal and California ESAs, species proposed for listing, species of special concern, and other species identified either by the USFWS, BLM, or CDFW as unique or rare, and that have the potential to occur within the project area. In addition, all species included in the West Mojave Plan and raptor species included on the CDFW Watch List were also considered as potentially occurring sensitive species. Of particular concern among the 17 special status avian species, California condor is federally and state- listed as endangered, as well as "fully protected" under the California Fish and Game Code; Swainson's hawk is state-listed as threatened; and the golden eagle is afforded protection under the BGEPA and is listed as "Fully Protected" under the California Fish and Game Code. A comprehensive list of the special status avian and bat species potentially occurring on the project, their status, habitat requirements, and the likelihood of their occurrence based on habitat and field surveys is provided in Table 2.3.7-1, *Special Status Bird and Bat Species Potentially Present Within the Project Vicinity*.

TABLE 2.3.7-1
SPECIAL STATUS BIRD AND BAT SPECIES POTENTIALLY PRESENT WITHIN THE PROJECT VICINITY

Species	Status (Federal/State/ BLM/WeMo)	Habitat	Potential Occurrence on the Project
Birds			
American white pelican (*Pelecanus erythrorhynchos*)	--/CSC/ --/WeMo	Sandy coastal beaches and lagoons, waterfronts and pilings, and rocky cliffs.	Present. Observed migrating through the project property in large numbers.
California condor (*Gymnogyps californianus*)	FE/SE, CFP/--/--	Lives in rocky scrubland, coniferous forests, and oak savannas. They are often found near cliffs or large trees, which they use as nesting sites. Individual birds have a large home range and have been known to travel up to 150 miles in search of carrion.	No known occurrences of this species within the project property or the immediate surrounding region. Nearest known occurrence of this species, based on USFWS GPS-transmitters, is approximately 3.7 miles to the west.
White-tailed kite (*Elanus leucurus*)	--/CFP/BLM/--	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	Present. One individual was observed flying through the Manzana Project. No nesting available, but may be present during migration.

Comment [JAR5]: More recent GPS data recorded an individual 1.3 miles to the NW of the project (fall 2013).

TABLE 2.3.7-1
SPECIAL STATUS BIRD AND BAT SPECIES POTENTIALLY PRESENT WITHIN THE PROJECT VICINITY, *Continued*

Species	Status (Federal/State/ BLM/WeMo)	Habitat	Potential Occurrence on the Project
Northern harrier (*Circus cyaneus*)	--/CSC/ --/WeMo	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	Present. No known nesting, but common during winter and during migration.
Sharp-shinned hawk (*Accipiter striatus*)	--/WL/-- /WeMo	Nests in riparian growths of deciduous trees and live oaks. Preys mostly on small passerine birds.	Present. Not known to breed in Southern California. Common migrant.
Cooper's hawk (*Accipiter cooperii*)	--/WL/-- /WeMo	Nests in a wide variety of habitat types, from riparian woodlands and digger pine-oak woodlands through mixed conifer forests.	Present. Potential breeding species, but not currently known to nest on-site. Common local resident and migrant in the Antelope Valley.
Northern goshawk (*Accipiter gentilis*)	--/CSC/BLM/--	Found in coniferous and deciduous forests; during the cold winter months migrates to warmer areas, usually at lower elevations.	Present, but extremely rare. A single adult was observed flying north on spring migration at the Manzana Project. Very uncommon species south of the southern Sierra Nevada Mountains.
Swainson's hawk (*Buteo swainsoni*)	--/ST/ BLM/WeMo	Nests in oaks or cottonwoods, often in or near riparian habitats. Forages for small mammals, birds, and reptiles in grasslands, irrigated pastures, and grain fields.	Present. No nesting population, but were observed using the Manzana Project during migration. Individual Swainson's hawks were documented flying at the Pacific Wind Project and foraging over the project.
Ferruginous hawk (*Buteo regalis*)	--/WL/-- /WeMo	Breeds outside of California. Forages in open grasslands.	Present. Not known to nest in project property, but common as a winter resident.
Golden eagle (*Aquila chrysaetos*)	BGEPA/WL, CFP/BLM/--	Nests in canyons and large trees in open habitats. Forages chiefly for mammalian prey in grasslands and over open areas.	Present. No nesting population, but were observed using the project property during migration. Nearest known active nest is approximately 15 miles northwest of the project property in 2013.
Merlin (*Falco columbarius*)	--/WL/--/--	Breeds outside California; inhabits coastlines, open grasslands, savannahs, and woodlands.	Present. Not known to nest, but expected in low numbers during migration.
American peregrine falcon (*Falco peregrinus anatum*)	--/CFP/--/--	An aerial forager that preys almost chiefly on birds; prefers open areas, habitats along rivers, sea cliffs, and islands.	Present. No nesting population, but one individual was observed at adjacent Manzana Project during migration.

TABLE 2.3.7-1
SPECIAL STATUS BIRD AND BAT SPECIES POTENTIALLY PRESENT WITHIN THE PROJECT VICINITY, *Continued*

Species	Status (Federal/State/ BLM/WeMo)	Habitat	Potential Occurrence on the Project
Prairie falcon (*Falco mexicanus*)	--/WL/--/--	Primarily inhabits perennial grasslands, savannahs, and rangeland. Nests on cliffs, canyons, and rock outcrops.	Present. No known nests on-site, but ranges from an infrequent or common year-round resident and migrant.
Burrowing owl (*Athene cunicularia*)	--/CSC/BLM/ WeMo	Level, open, dry, heavily grazed, or low-stature grassland or desert vegetation with burrows excavated by badgers, prairie dogs, or ground squirrels. Preys on small mammals and insects.	Present. Burrowing owls and occupied burrows observed on the project during both breeding and wintering seasons.
Vaux's swift (*Chaetura vauxi*)	--/CSC/ --/WeMo	Feeds aerially on small insects; breeds in forest habitats.	Present. Observed at both the Manzana and Pacific Wind Projects. Project is not within breeding range. Expected to be seen only during migration.
Loggerhead shrike (*Lanius ludovicianus*)	--/CSC/ --/WeMo	Nests in shrublands and forages in open grasslands. Often found associated with agriculture and urbanized areas. All plant community types in the project property provide suitable habitat.	Present as a year-round resident at the project property.
Le Conte's thrasher (*Toxostoma lecontei*)	--/CSC/ BLM/WeMo	Resides in desert scrub habitats, primarily open desert wash, alkali desert scrub, and desert succulent scrub. Occupies deserts with sparse vegetation consisting of cholla and creosote bush. Suitable habitat in the project property includes Mojave Desert Wash Scrub, Mojave Creosote Bush Scrub, Mojavean Juniper Woodland and Scrub, Joshua Tree Woodland, and Mojave Mixed Woody Scrub plant communities.	Present as a year-round resident at the project property.
Bats			

TABLE 2.3.7-1
SPECIAL STATUS BIRD AND BAT SPECIES POTENTIALLY PRESENT WITHIN THE PROJECT VICINITY, *Continued*

Species	Status (Federal/State/ BLM/WeMo)	Habitat	Potential Occurrence on the Project
Western small-footed myotis (*Myotis ciliolabrum*)	--/--/BLM/--	Found in deserts and desert mountains in the western U.S. Occupies daytime roosts in cracks in canyon walls, caves, mines, tree bark, or abandoned houses. It hibernates in caves or mine tunnels within the summer range, and is active during winter. Formerly regarded as a subspecies of *Myotis leibii*. Recent work has shown that *M. ciliolabrum* should be elevated to specific status. Trees and rock crevices in the project property could provide suitable roosting habitat.	No records in the USGS 7.5-minute Tylerhorse Canyon topographic quadrangle or the eight surrounding quadrangles. No roosts found, but may migrate through and forage on habitat in the project property.
Yuma myotis (*Myotis yumanensis*)	--/--/BLM/--	Common in western U.S., generally prefers open forests and woodlands with sources of water. Feeds on small flying insects and forages over water sources. Roosts in buildings, mines, caves, and crevices; and separate night roosts may be used. Roost location and foraging proximity is closely tied to bodies of water.	No records in the USGS 7.5-minute Tylerhorse Canyon topographic quadrangle or the eight surrounding quadrangles. No roosts found, but may migrate through and forage on habitat in the project property.
Pallid bat (*Antrozous pallidus*)	--/CSC/BLM/--	Occurs throughout the American West. Roosts in rock crevices, caves, mineshafts, under bridges, in buildings, and within hollow trees. Consumes crickets, scorpions, beetles, grasshoppers, and other invertebrates. Roosts in small colonies of 10–100 and emerges late at night to forage on the ground. Forms nursery colonies, and gives birth usually in June.	No records in the USGS 7.5-minute Tylerhorse Canyon topographic quadrangle or the eight surrounding quadrangles. No roosts found, but may migrate through and forage on habitat in the project property.

TABLE 2.3.7-1
SPECIAL STATUS BIRD AND BAT SPECIES POTENTIALLY PRESENT WITHIN THE PROJECT VICINITY, *Continued*

Species	Status (Federal/State/ BLM/WeMo)	Habitat	Potential Occurrence on the Project
Western mastiff bat (*Eumops perotis*)	--/CSC/BLM/--	In the Southwest U.S., generally away from human developments. Takes diurnal refuge in vertical rock crevices on cliffs. Roost entrances are large and horizontally oriented, and face downward as they are entered from below, where there is an unobstructed drop of several meters. Colonies from 2 to several dozen bats. Leaves day roosts late in the evening to forage on moths, crickets, and grasshoppers. Not believed to use night roosts. Normally one young, probably in June to early July, within nursery colonies.	No records in the USGS 7.5-minute Tylerhorse Canyon topographic quadrangle or the eight surrounding quadrangles. No roosts found, but may migrate through and forage on habitat in the project property.

KEY:
BGEPA = Bald and Golden Eagle Protection Act
BLM = Bureau of Land Management sensitive species
CSC = California Department of Fish and Wildlife (CDFW) species of special concern
FE = U.S. Fish and Wildlife Service federally endangered species
CFP = CDFW fully protected species
SE = CDFW state-endangered species
ST = CDFW state-threatened species
WeMo = avian species included in the West Mohave Plan
WL = CDFW Watch List
USGS = U.S. Geological Survey

2.4 CONCLUSIONS

Based on the information collected from the desktop analysis, informal consultation with the agencies, and baseline site characterizations, it was determined that the project property was relatively unconstrained for wind development in relation to potential conflicts with birds and bats. Specifically, as a result of site characterizations it was determined that the project would likely have a relatively low potential for population-level impacts to the majority of bird and bat species, including two species of particular conservation interest in the region, the golden eagle and the California condor. However, due to the presence of these and other special-status species in the project vicinity, it was determined that additional site-specific surveys were warranted to further document the wildlife and habitat present on the project. These survey methods and results are summarized in Section 3.0.

SECTION 3.0
TIER 3 – SITE-SPECIFIC SURVEYS AND ASSESSMENT

This section details the exhaustive number of directed avian and bat surveys conducted within and adjacent to the project since 2004, including a description of the survey methods employed and general results. Based on the initial site assessments of the project, and the determination that the project could potentially support species of special concern, including golden eagles and California condors, enXco engaged Sapphos Environmental, Inc. in 2004 to assess the biological resources of the greater project area by way of site-specific surveys on adjacent privately held potential wind energy facilities, including the Manzana Project and the Pacific Wind Project. Overall, Sapphos Environmental, Inc. completed thousands of hours of biological surveys within the renewable energy project properties adjacent to the project. In October 2011, in coordination with the BLM, it was determined that additional updated biological resource surveys should be conducted within the boundaries of the specific project parcels to further assess the biological resources. Sapphos Environmental, Inc. began these surveys in 2011, including a full year of bird use counts (BUCs), burrowing owl habitat assessment and burrow occupancy, and aerial eagle nesting surveys. The methods and results of the project-specific avian surveys conducted between 2011 and 2013; the methods and results for avian migration, avian use, and bat surveys conducted at the Manzana and Pacific Wind Projects between 2004 and 2010; and the desktop analysis of California condor distribution in the Antelope Valley described below correspond to Tier 3 of the *Final Guidelines*[41] and Stage 2 of the *ECP Guidance*.[42]

The combined results of the surveys quantify the distribution, relative abundance, behavior, and use of birds and bats in the project vicinity. A risk assessment for general avian and bat species, as well as individual risk accounts for special-status species, including the golden eagle and California condor, is presented in Section 4.0, *Risk Analysis*.

3.1 SITE-SPECIFIC AVIAN AND BAT SURVEYS

3.1.1 Avian Surveys

Avian surveys conducted within and adjacent to the project between 2004 and 2013 included the following survey types: 2011–2012 Tylerhorse Bird Use Counts; 2013 Aerial Golden Eagle Nest Surveys; Ground-Based Eagle Surveys at Adjacent Projects, including 2004–2005 Manzana Project Raptor Migration Counts, 2008–2009 Pacific Wind Project Bird Use Counts, and Pacific Wind Project Diurnal Raptor Transects; 2005–2012 Tylerhorse California Condor Analysis; and 2011–2012 Tylerhorse Burrowing Owl Surveys. The survey methods and general results of these surveys are described in the following sections.

[41] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[42] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

3.1.1.1 2011–2012 Tylerhorse Bird Use Counts

Methods

Sapphos Environmental, Inc. conducted four seasons of Bird Use Count (BUC) surveys at Tylerhorse for one continuous year between December 2011 and November 2012.[43,44,45,46] BUCs were designed in accordance with the CEC guidelines and the most current ECP guidelines at the time of survey design (*Draft Guidance*).[47,48] The *Draft Guidance* recommended 30-minute point count surveys at 800-meter-radius plots within and adjacent to the project footprint. This recommendation is quite different from the current *ECP Guidance*, which recommends much longer survey periods, between 1 and 4 hours per point count.[49] The CEC recommends approximately 1 to 1.5 BUC points per square mile. The project property encompasses approximately 1,207 acres (1.9 square miles). Based on this recommendation and the noncontiguous nature of the three parcels that constitute the project, three BUC points were selected as part of the survey effort (Figure 3.1.1.1-1, *2004–2012 Avian Survey Locations*). The number and location of these points have been proportionally distributed among the main habitat types onsite: one BUC point in Mojavean Juniper Woodland and Scrub, one BUC point at the intergrade between Mojavean Juniper Woodland and Scrub and Mojave Desert Wash Scrub, and one BUC point at the intergrade between Non-Native Grassland and Joshua Tree Woodland. When possible, points were located at high vantage points where an unobstructed view of the surrounding area was provided. The exact location of each BUC point was marked using a Garmin global positioning system (GPS) unit, and photographs were taken in each of the four cardinal directions.

During each of four seasons, biologists conducted six 30-minute unlimited distance counts at each of three points within the Tylerhorse property. Biologists surveyed each point four times in the morning (between sunrise and 12:00 p.m.) and twice in the afternoon and evening (between 12:00 p.m. and sunset) during the course of each season. Methods follow the BUC section of

[43] Sapphos Environmental, Inc. 30 March 2012. Memorandum for the Record No. 11. Subject: Results of 2011–2012 Winter Bird Use and Burrowing Owl Surveys at the Tylerhorse Wind Energy Project, Kern County, California. Prepared for: enXco Development Corporation, San Ramon, CA. Pasadena, CA.

[44] Sapphos Environmental, Inc. 24 July 2012. Memorandum for the Record No. 1. Subject: Results of 2012 Spring Bird Use Surveys and Special-Status Plant Surveys at the Tylerhorse Wind Energy Project, Kern County, California. Prepared for: Iberdrola Renewables, LLC, Portland, OR. Pasadena, CA.

[45] Sapphos Environmental, Inc. 11 March 2013. Memorandum for the Record No. 2. Subject: Results of 2012 Summer Bird Use Surveys and Summer Burrowing Owl Surveys at the Tylerhorse Wind Energy Project, Kern County, California. Prepared for: Iberdrola Renewables, LLC, Portland, OR. Pasadena, CA.

[46] Sapphos Environmental, Inc. 12 March 2013. Memorandum for the Record No. 3. Subject: Results of 2012 Fall Bird Use Surveys at the Tylerhorse Wind Energy Project, Kern County, California. Prepared for: Iberdrola Renewables, LLC, Portland, OR. Pasadena, CA.

[47] California Energy Commission. 26 September 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development*. Final Committee Report. Prepared for: California Department of Fish and Game, Sacramento.

[48] U.S. Fish and Wildlife Service. January 2011. *Draft Eagle Conservation Plan Guidance*. Available at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

[49] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

the CEC Guidelines and the Point Counts section of the *Draft Guidance*.[50,51] Biologists collected observations of the number and species of birds observed, their activity, and estimated distance from the observer. For flying birds, the observer noted the bird's estimated height above the ground.

Results

During BUC surveys, 1,716 observations of individuals representing 45 species were recorded over 35 days of sampling (24 sampling replicates) within the project between December 15, 2011, and November 28, 2013 (Appendix A, *Bird and Bat Compendium*). In addition to the 45 confirmed species recorded, fifteen individual birds could not be identified to species and were identified to the lowest possible taxonomic level, such as Unknown *Toxostoma* Sp., or Unknown Sparrow. The overall yearly bird detection rate was 23.8 birds per 30-minute survey or 47.7 birds per survey hour.

Five species of passerine land birds accounted for more than three-quarters of all bird observations. House finch, a resident species that gathers in large flocks in fall, was the most commonly observed species with a total of 731 individual observations (42.6 percent of all observed individuals). The white-crowned sparrow, a common overwintering species, was the second most common species, with 298 recorded observations (17.4 percent of all observed individuals), followed by three resident species: the western meadowlark with 129 recorded observations (7.5 percent of all observed individuals); lark sparrow with 110 recorded observations (6.4 percent of all observed individuals); and finally common raven with 85 recorded observations (5.0 percent of all observed individuals).

The species richness, bird detection rate, and most prevalent species were also calculated by season in order to determine any seasonal differences in bird use at the project (Table 3.1.1.1-1, *Bird Use Count Survey Results by Season*). Species richness was similar throughout all four seasons (ranging between 23 and 27 species observed). Detection rates differed depending on the season, with the highest rates experienced in the winter (94.8 birds per survey hour), likely as a result of large flocks of common passerine species wintering on the project, such as house finches and white-crowned sparrows. The lowest detection rate occurred in summer (14.2 birds per survey hour); detectability is likely lower in this season as a result of fewer species actively maintaining territories or feeding nestlings. Spring and fall detection rates were between these two extremes, with 31.8 and 50.3 birds detected per survey hour, respectively. During all four seasons, the house finch was one of the top three species detected. Seasonal differences included high rates of white-crowned sparrows in the winter and flocks of mountain bluebirds in the fall.

[50] California Energy Commission. 26 September 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development*. Final Committee Report. Prepared for: California Department of Fish and Game, Sacramento.

[51] U.S. Fish and Wildlife Service. January 2011. *Draft Eagle Conservation Plan Guidance*. Available at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

TABLE 3.1.1.1-1
BIRD USE COUNT SURVEY RESULTS BY SEASON

Season	Dates Conducted	Number of Species Observed*	Overall BUC Detection Rate per Survey Hour	Raptor BUC Detection Rate per Survey Hour	Top Three Species Detected and Percentage
Winter	12/8/2011 through 2/27/2012	25	94.8	0.33	House finch, 41% White-crowned sparrow, 33% Lark sparrow, 7%
Spring	3/14/2012 through 5/16/2012	23	31.8	0.00	Chipping sparrow (*Spizella passerina*), 19%, Western meadowlark, 19% House finch, 16%
Summer	6/7/2012 through 8/31/2012	24	14.2	0.44	Western meadowlark, 27% California quail (*Callipepla californica*), 10% Common raven, 9 % House finch, 9%
Fall	9/9/2012 through 11/29/2012	27	50.3	0.56	House finch, 72% Lark sparrow, 8% Mountain bluebird (*Sialia currucoides*), 4%

NOTE: This species total only includes those species observed during the course of BUC surveys

A total of 12 observations of five diurnal raptor species were recorded during BUCs: 4 observations of red-tailed hawk, 3 observations of prairie falcon, 2 observations of American kestrel and northern harrier, and 1 observation of merlin. Altogether, raptors accounted for only 0.7 percent of all bird observations. The overall raptor detection rate for BUCs was 0.33 raptor per survey hour, or 0.17 raptor per 30-minute survey (mean raptor use) (Table 3.1.1.1-2, *Characteristics of Raptor Use at the Project*). To allow comparison with data collected at other U.S. wind energy projects raptor use estimates from this study were adjusted from 30-minute to 20-minute, by including only those raptors observed during the first 20 minutes of the survey period. This results in a raptor detection rate of 0.13 raptor per 20-minute survey. Mean raptor use for the project was generally low, with red-tailed hawk and prairie falcon occurring most frequently. No golden eagles were observed over the course of the 72, 30-minute BUC survey replicates, nor were any golden eagles recorded incidentally during other survey types at the project. The golden eagle mean use at the project was, therefore, 0.00 eagle per 30-minute survey.

TABLE 3.1.1.1-2
CHARACTERISTICS OF RAPTOR USE AT THE PROJECT

Species	Number Observed	Percent of all Raptors Observed	Mean Raptor Use (observations/ 30-minute survey)
Red-tailed hawk	4	33.3	0.06
Prairie falcon (WL)	3	25.0	0.04
American kestrel	2	16.7	0.03
Northern harrier (CSC, WEMO)	2	16.7	0.03
Merlin (WL)	1	8.3	0.01
Total	**12**	**100**	**0.17**

Key:
CSC=California Department of Fish and Wildlife (CDFW) species of special concern
WEMO=Avian species included in the West Mohave Plan
WL=CDFW Watch List

The mean (average) flight height for all birds observed in flight was 33.9 feet. The majority of the 1,175 birds detected in flight during bird use counts were at heights lower than the expected rotor-swept zone (115–189 feet above ground level [AGL]) (*n*=1,155 birds, or 98.3 percent of all birds observed in flight) (Table 3.1.1.1-3, *Flight Heights Observed during Bird Use Counts*). Twenty-eight of the 33 species detected in flight were not observed within the rotor-swept zone; the only five species with flights observed in this band were the northern harrier, red-tailed hawk, prairie falcon, white-throated swift, and common raven. A single northern harrier was recorded on December 19, 2011, soaring at approximately 350 feet AGL. Of the 4 red-tailed hawks recorded flying, 2 (50 percent) were observed at a height within the rotor-swept zone. The mean flight height of red-tailed hawks during all BUCs was 417.5 feet, indicating that this species spends considerable time within the rotor-swept zone. Of the two prairie falcons observed in flight, 1 (50 percent) was recorded flying within the rotor-swept zone at 200 feet AGL on January 12, 2012. A single white-throated swift was recorded flying at 150 feet AGL on December 19, 2011. Finally, a total of 59 common ravens were observed in flight during BUCs, with a mean flight height of 159.8 feet AGL, directly within the rotor-swept zone. Of these 59, 15 individuals (25.4 percent of all ravens) were observed within the rotor-swept zone.

TABLE 3.1.1.1-3
FLIGHT HEIGHTS OBSERVED DURING BIRD USE COUNTS

Species	Flight Height (feet)			Number Observed in Flight	Flights in the Rotor-Swept Zone
	Minimum	Maximum	Mean		
Galliformes					
California quail	2	2	2.0	2	0 (0%)
Accipitriformes					
Northern harrier	25	350	187.5	2	1 (50%)
Red-tailed hawk	120	700	417.5	4	2 (50%)
Unknown accipiter species	25	25	25.0	1	0 (0%)
Falconiformes					
American kestrel	25	30	27.5	2	0 (0%)
Prairie falcon	200	1000	600.0	2	1 (50%)

TABLE 3.1.1.1-3
FLIGHT HEIGHTS OBSERVED DURING BIRD USE COUNTS, *Continued*

Species	Flight Height (feet)			Number Observed in Flight	Flights in the Rotor-Swept Zone
	Minimum	Maximum	Mean		
Columbiformes					
Mourning dove	1	30	10.3	6	0 (0%)
Apodiformes					
White-throated swift	150	150	150.0	1	1 (100%)
Anna's hummingbird	5	5	5.0	1	0 (0%)
Unknown hummingbird	3	3	3.0	1	0 (0%)
Piciformes					
Ladder-backed woodpecker	10	10	10.0	1	0 (0%)
Northern flicker	25	25	25.0	2	0 (0%)
Passeriformes					
Unknown *Empidonax* species	5	5	5.0	2	0 (0%)
Ash-throated flycatcher	5	6	5.5	2	0 (0%)
Loggerhead shrike	5	25	10.4	5	0 (0%)
Western Scrub-jay	5	5	5.0	1	0 (0%)
Common raven	5	800	159.8	59	15 (25.4%)
Horned lark	10	100	54.8	24	0 (0%)
Northern Rough-winged swallow	15	15	15.0	6	0 (0%)
Unknown swallow species	80	80	80.0	3	0 (0%)
Western bluebird	3	3	3.0	2	0 (0%)
Mountain bluebird	3	40	9.3	29	0 (0%)
Northern mockingbird	4	20	8.7	9	0 (0%)
Unknown *Toxostoma* species	4	4	4.0	1	0 (0%)
European starling	7	9	8.5	8	0 (0%)
Yellow-rumped warbler	11	55	33.7	3	0 (0%)
Chipping sparrow	10	20	10.2	51	0 (0%)
Lark sparrow	2	40	26.4	45	0 (0%)
Black-throated sparrow	5	15	6.3	8	0 (0%)
Savannah sparrow	10	10	10.0	1	0 (0%)
Lincoln's sparrow	15	15	15.0	1	0 (0%)
White-crowned sparrow	1	40	20.0	200	0 (0%)
Dark-eyed junco	1	10	4.6	14	0 (0%)
Unknown sparrow species	3	45	34.5	4	0 (0%)
Western meadowlark	1	50	13.3	38	0 (0%)
Brewer's blackbird	15	80	23.1	8	0 (0%)
Scott's oriole	14	14	14.0	1	0 (0%)
House finch	5	100	28.6	621	0 (0%)
American goldfinch	35	35	35.0	2	0 (0%)
Unknown passerine species	10	40	25.0	2	0 (0%)

3.1.1.2 2013 Aerial Golden Eagle Nest Surveys

Methods

The primary purpose of the aerial golden eagle nest surveys was to identify eagle nesting sites and current use in the vicinity of the project. Of the two eagle species, only golden eagles are likely to nest in the vicinity of the project; bald eagles in Southern California breed only near large water bodies that do not occur near the project (e.g., Big Bear Lake, Lake Hemet) or the ocean, which is more than 50 miles away. The survey was designed and conducted according to the methods recommended in the *ECP Guidance*,[52] based on the *Interim Golden Eagle Technical Guidance*.[53]

Database and Literature Search

Prior to conducting the surveys, Sapphos Environmental, Inc. conducted a database and literature search to identify golden eagle nests previously recorded in the area. The Sapphos Environmental, Inc. database included golden eagle nest locations in and around the Tehachapi Mountains observed during surveys that Sapphos Environmental, Inc. has conducted, as well as locations obtained from reports made publicly available through Environmental Impact Reports (EIRs) or EISs.

Golden eagle nest location data was obtained from additional EIRs/EISs, either from reported location coordinates or by georeferencing maps contained in the original survey reports published in the technical appendices of the EIRs/EISs for nearby projects in Kern County:

- Alta Infill II Wind Energy Project[54]
- Alta-Oak Creek Mojave Project[55]
- Morgan Hills Wind Energy Project[56]
- Tejon Mountain Village[57]
- Alta East Wind Project[58]

[52] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

[53] Pagel, J.E., D.M. Whittington, and G.T. Allen. February 2010. *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance*. Carlsbad, CA: U.S. Fish and Wildlife Service, Ecological Services Office; and Arlington, VA: U.S. Fish and Wildlife Service, Division of Migratory Bird Management.

[54] Kern County. August 2011. *Alta Infill II Wind Energy Project Supplemental Environmental Impact Report*. Prepared by: Kern County Planning and Community Development Department, Bakersfield, CA, with technical assistance from Aspen Environmental Group, Agoura Hills, CA.

[55] *Kern County. October 2009.* Alta-Oak Creek Mojave Project Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA, with technical assistance by Aspen Environmental Group, Agoura Hills, CA.*

[56] Kern County. October 2011. *Morgan Hills Wind Energy Project Environmental Impact Report*. Prepared by: Kern County Planning and Community Development Department, Bakersfield, CA.

[57] Kern County. June 2009. *Tejon Mountain Village Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA.

[58] Kern County. January 2013. *Plan Amendment and Environmental Impact Statement/Environmental Impact Report for the Alta East Wind Project*. Prepared by: Kern County Planning and Community Development Department, Bakersfield, CA, and U.S. Department of the Interior, Bureau of Land Management, California Desert District Office, Moreno Valley, CA.

- Manzana (formerly PdV) Wind Energy Project[59]

All reported nest locations were included on field maps and loaded onto GPS units carried during the aerial surveys.

Aerial Surveys

Sapphos Environmental, Inc. conducted two aerial surveys for golden eagles in the vicinity of the project property. The surveys were conducted in accordance with methods recommended by the USFWS in the *ECP Guidance* and earlier protocols.[60,61,62] Published USFWS protocols recommend conducting surveys in a 10-mile buffer around the proposed project property, which, for the current project, translates to a focal survey area of 408 square miles (Figure 3.1.1.2-1, *2013 Focal Survey Area and Previously Reported Nest Locations*). The reported locations of golden eagle nests up to 15.3 miles outside the focal survey area were also visited, as the associated territories were considered to have potential to overlap with the focal survey area. Although this is not specifically recommended by the USFWS, it can be useful in interpreting the results of the survey within the focal survey.

Consistent with previous recommendations, the current *ECP Guidance*[63] recommends conducting two surveys during the golden eagle breeding season, at least 30 days apart. In Southern California, nest-building and courtship can start in the fall and extend through February; eggs are laid in February or March.[64] The first aerial survey was conducted on April 11 and 12, 2013, and the second survey was conducted on May 30 and 31, 2013.

The surveys were conducted by experienced avian biologists, each of whom had hundreds of hours of aerial survey experience, including prior experience conducting aerial surveys for eagles in the Tehachapi area. The first survey was conducted by Dr. Joseph Platt and Dr. Pauline Roberts, and the second survey was conducted by Dr. Pauline Roberts and Mr. John Ivanov. The biologists were knowledgeable of the nesting behavior, nest types, and nesting habitat requirements for golden eagles and other raptors found in and around the study area, as well as the locations of various habitats within the study area. All previously reported nest sites obtained as a result of the literature and database search were visited during the surveys. All potentially suitable nesting habitat, including areas with cliffs, rocky outcrops, large trees, or utility towers, and all previously reported nest sites were visited and searched during the surveys. All areas of the focal survey area were visited to determine whether potential nesting habitat was present. At each occupied or unoccupied nest structure, observers recorded the

Comment [FWS MB-TD6]: Please add citation if the qualifications are stipulated in the report. If not, this should be removed. Providing the names of the avian biologists is sufficient.

Comment [FWS MB-TD7]: Please add citation if the qualifications are stipulated in the report. If not, this should be removed.

[59] Kern County. September 2007. *PdV Wind Energy Project Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA.

[60] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

[61] U.S. Fish and Wildlife Service. January 2011. *Draft Eagle Conservation Plan Guidance*. Available at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

[62] Pagel, J.E., D.M. Whittington, and G.T. Allen. February 2010. *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance*. Carlsbad, CA: U.S. Fish and Wildlife Service, Ecological Services Office; and Arlington, VA: U.S. Fish and Wildlife Service, Division of Migratory Bird Management.

[63] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA.

[64] Dixon, James B. 1937. "The Golden Eagle in San Diego County, California." *The Condor* 39(2): 49–56.

time; date; location; nest condition; aspect; site description; bird species; and any observations of chicks, eggs, or adults nearby. Individual golden eagles were classified by age as adult or subadult according to plumage characteristics.[65,66] The survey was conducted in a Hughes 500 helicopter, a light utility helicopter with the power and maneuverability demanded by the survey conditions, such as the need to hover near cliffs in windy conditions. The pilots were experienced at conducting surveys for golden eagles and other wildlife.

Comment [FWS MB-TD8]: Please add citation if the qualifications are stipulated in the report. If not, this should be removed.

Results

Database and Literature Search

As a result of the database and literature, two reported golden eagle nest sites within the 10-mile-radius focal survey area were identified. One, Nest 48, was observed during surveys conducted for the Morgan Hills and Alta East Wind Energy Projects in 2011 and included in reports appended to their EIRs/EISs (Figure 2). The other, Nest 70, was observed in 2004. Bloom Biological, Inc. conducted ground-based and aerial surveys for eagle and raptor nests within 2 miles of the adjacent Manzana Project, and reported a golden eagle nest west of the Manzana Project, approximately 4.2 miles west of the current project. The exact nest site was apparently not discovered, as the observation was described as follows: "one adult pair was observed with a nest in either a cliff, digger pine, or valley oak." Bloom Biological also reported the presence of a cliff within the Tylerhorse Canyon that was considered suitable for nesting by golden eagles, although no location was provided. The Bloom Biological report was included in the technical appendices of the Manzana Project EIR.

Additional nest locations were identified as reported in EIRs/EISs for nearby projects, all outside the focal survey area. A total of 11 nest sites up to 15.3 miles from the proposed project (including the 2 within the focal survey area) were identified as having the potential to represent territories that might overlap with the focal survey area (Figure 2). Additional nest locations on Tejon Ranch and to the northeast of the project property, all more than 16 miles from the project, were identified but were not considered to have the potential to represent golden eagle territories that could overlap with the focal survey area.

Aerial Surveys

The first aerial survey was conducted on April 11 and 12, 2013, and the second replicate survey was conducted on May 30 and 31, 2013. The weather was clear and sunny on all survey days, as is typical of the western Mojave Desert. Wind conditions ranged from calm to speeds of up to approximately 30 knots (35 miles per hour). During both surveys, all areas of potentially suitable habitat were covered and a search for nests conducted. All of the previously reported nests in the vicinity of the project, up to 15.3 miles away, were visited to determine their current status (Table 3.1.1.2-1, *2013 Status of Golden Eagle Nests and Reported Nest Sites*). No potential nest trees or cliffs were observed on the floor of the Antelope Valley or in the northern foothills of the San Gabriel Mountains, to the south of the project. Extra search effort was made when suitable sites were observed, such as where cliffs or rock outcrops were present; where

[65] Clark, W.S. 2001. "Ageing Eagles at Hawk Watches: What Is Possible and What Is Not." In *Hawkwatching in the Americas*, ed. K.L. Bildstein and D. Klem Jr. North Wales, PA: Hawk Migration Association of America, pp. 143–148.

[66] Clark, W.S., and B. Wheeler. 2001. *Peterson Field Guides: Hawks of North America*. 2nd ed. New York, NY: Houghton Mifflin.

forested areas with emergent trees were present, especially those that were distant from human residences, on windward or north-facing slopes; and where tall utility towers were present. Areas near previously recorded nests and where eagles were observed were also carefully searched.

TABLE 3.1.1.2-1
2013 STATUS OF GOLDEN EAGLE NESTS AND REPORTED NEST SITES

Nest ID	Distance from Project (miles)	2013 Occupancy by Golden Eagle	Comments on 2013 Status	Reported Status in Previous Year(s)
3	14.9	Occupied (decorated)	Decorated but not actively used. No golden eagles or alternate nests observed.	2011: Active[1] 2012: Unknown
4	15.3	Occupied (active)	2 adults observed in April, 1 chick observed in May.	2011: Active[1] 2012: Unknown
35	13.7	Unoccupied	No signs of use. Immature golden eagle perched in nest tree in May 2013; no adults or alternate nests observed.	2010: Active[2] 2011: Unoccupied[3,4] 2012: Active[1]
42	12.0	Unoccupied	Appearance more like red-tailed hawk nest; would be unusually small for golden eagle.	2011: Unoccupied[3,4] 2012: Unoccupied[1]
43	12.6	Unknown	No nest found at reported location, no eagles observed.	2011: Unoccupied[3,4] 2012: Unknown[1]
44	12.6	Unoccupied	No eagles observed in the area.	2011: Unoccupied[3,4] 2012: Unoccupied[1]
45	13.5	Unoccupied	No eagles observed in the area. Nest is in poor condition.	2011: Unoccupied[4] 2012: Unoccupied[1]
46	13.9	Unoccupied	Nest is very old and in very poor condition. No eagles observed in the area.	2011: Unoccupied[4] 2012: Unoccupied[1]
48	4.2	Unoccupied	In active use by common ravens. Nest is 30 feet up on rocky outcrop/headwall of a draw. Nest is smaller than typical for golden eagle, and nest cup is small, consistent with recent maintenance by common raven.	2011: Unoccupied golden eagle nest[3] 2012: Occupied by common ravens. Juvenile golden eagle observed flying 0.2 mile away.[1]
49	10.2	Unoccupied	In active use by red-tailed hawks. Nest located in a snag; small size and appearance consistent with nest built by red-tailed hawk.	2011: Unoccupied golden eagle nest[3] 2012: Occupied by red-tailed hawks[1]
70	4.2	Unknown	No nest observed in the area; no eagles observed.	2004: "one adult pair was observed with a nest in either a cliff, digger pine, or valley oak."[5] No other observations reported.

SOURCE:
[1] Observed status during survey conducted by Sapphos Environmental, Inc.
[2] Kern County. October 2009. *Alta-Oak Creek Mojave Project Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA, with technical assistance by Aspen Environmental Group, Agoura Hills, CA.
[3] Kern County. October 2011. *Morgan Hills Wind Energy Project Environmental Impact Report*. Prepared by: Kern County Planning and Community Development Department, Bakersfield, CA.
[4] Kern County. January 2013. *Plan Amendment and Environmental Impact Statement/Environmental Impact Report for the Alta East Wind Project*. Prepared by: Kern County Planning and Community Development Department, Bakersfield, CA, and U.S. Department of the Interior, Bureau of Land Management, California Desert District Office, Moreno Valley, CA.

[5] Kern County. September 2007. *PdV Wind Energy Project Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA.

Overall, most of the habitat containing potential nest sites consisted of areas with large trees. Such areas occurred in the Tehachapi Mountains running east-west to the north of the project, including the oak woodlands and oak savannah at the western edge of the survey area and coniferous forest in the northern and northeastern edges of the focal survey area. Few cliffs within the focal survey area were potentially suitable for use by nesting golden eagles. Most of the hilly and mountainous area lacked exposed rock, and what little was present was mostly composed of steep slopes of crumbly rock that lacked the inaccessible ledges of hard rock that golden eagles prefer. No cliffs were observed that were considered suitable for nesting by golden eagles within the project property. Both large trees and tall utility towers occurred within the focal survey area that could provide nesting sites for golden eagles, although no golden eagle nests were observed within the focal survey area. Large trees occurred in the Tehachapi Mountains to the north. Several occupied red-tailed hawk nests were observed on utility towers in the northwest of the focal survey area, along with unoccupied nests that could have been suitable for use by either red-tailed hawks or common ravens. However, none of the nests were large enough for use by golden eagles. Utility towers on the floor of the Antelope Valley were observed to be generally too small and/or too close to roads and human activity to be suitable nest sites.

No occupied ~~or unoccupied~~ golden eagle nests were observed within 10 miles of the project, inside the focal survey area. No nests were observed during the survey other than those that had been previously reported. No eagles were observed behaving in a manner suggesting a breeding pair, other than the two adults observed at the sole actively occupied nest. Two occupied golden eagle nests (one active and one decorated) and one unoccupied golden eagle nest were observed outside the focal survey area (Figure 3.1.1.2-2, *Golden Eagle Nests and Individuals Observed during 2013 Aerial Surveys*; Table 3.1.1.2-1).

Comment [FWS MB-TD9]: Nest 48 was identified as an unoccupied GOEA nest in 2011. Though this was used by a Raven in 2012 and possibly in 2013, the current status is listed as unoccupied. GOEA could potentially reoccupy this site in the future.

Nest 3, located 14.9 miles to the northwest of the project, was in an oak tree on a north-facing slope. The nest was decorated with fresh green plant material in April, but no adults were observed nearby, and the nest had not been noticeably altered when it was revisited in late May. During both the April and May surveys, the area between Nest 3 and the focal survey area was carefully searched for additional nests, but no golden eagles or nests were observed.

Nest 4, located 15.3 miles to the northwest of the project, was active, and one chick was observed during the May survey. The nest was in a tall isolated oak tree on a northwest-facing hillside.

Nest 35, located 13.7 miles north of the project, immediately north of the town of Tehachapi, was not occupied in 2013. The nest was not decorated, there was no whitewash on or around the nest, and no adults were observed in the vicinity. When the nest was revisited on May 30, an immature golden eagle was perched at the top of the pine tree containing the nest. The bird had dark body plumage, its nape was not discernibly golden colored, and its tail was hidden by branches. The plumage was consistent with a bird in its second year, which would have hatched in 2012 and not yet completed molt into Basic I plumage.[67] Due to its age, the bird was presumed to be a nonbreeding individual. A search for alternate nests within approximately 1

[67] Bloom, Peter H., and William S. Clark. 2001. "Molt and Sequence of Plumages of Golden Eagles and a Technique for In-Hand Ageing." *North American Bird Bander* 26(3): 97–116.

mile did not result the observation of any golden eagle nests, but there is ample potential habitat to the north that was not searched due to the distance from the focal survey area.

Nests 44, 45, and 46, all located east of the project on Soledad Mountain (12.6, 13.5, and 13.9 miles from the project, respectively) were not occupied, and no eagles were observed in the area. The nests were consistent in appearance with golden eagle nests, but did not have signs of recent use.

Observations made at the locations of other previously reported nests were less confirmatory of use by golden eagles (Figure 3.1.1.2-3, *2013 Results of Visits to Additional Previously Reported Golden Eagle Nest Sites*).

Nest 42, located 12.0 miles east of the project on Soledad Mountain, was smaller than a typical golden eagle nest, and lacked the broad top that is commonly seen in golden eagle nests. The nest was in poor condition and has not been reported as occupied by any observers for 3 years in a row. No eagles were seen in the area of this nest, or others in the cluster (43, 44, 45, and 46). There is a lack of evidence confirming this as being a golden eagle nest.

Nest 43, located 12.6 miles east of the project on Soledad Mountain, was not found by biologists during the 2013 surveys, despite a focused search, and no eagles were observed in the area.

Nest 48, located 4.2 miles west of the project, was not occupied by golden eagles. Instead, the nest was in active use by common ravens. The nest was smaller than is typical of golden eagles, and the nest cup was too small for use by golden eagles, although the cup would be maintained and rebuilt each year by whichever species of bird was actively using the nest. The nest was roughly 30 feet up on a rocky outcrop that cut across a shallow draw or drainage (no running water was present), on a flat ledge set into the rock face. This nest has not been observed as occupied by golden eagles, though it was reported as an unoccupied golden eagle nest in 2011. ~~and thus the lack of evidence of recent use by golden eagles suggests that it might not be appropriate to classify it as a golden eagle nest, although additional surveys would be warranted to support the classification.~~ This nest was only 0.6 mile from Nest 70, reported as a golden eagle nest in 2004, although the description suggests a nest was not directly observed.

Comment [FWS MB-TD10]: There is no need to explain away the potential for nesting at this nest site.

Nest 49, located 10.2 miles north of the project, was in active use by a pair of red-tailed hawks, and was observed with two large chicks and one attending adult on May 30. The nest was located in a snag, and its size was typical for red-tailed hawks, but it was substantially smaller than a typical golden eagle nest. The nest also actively used by red-tailed hawks in 2012, and was reported as an unoccupied golden eagle nest in 2011. ~~The lack of evidence of recent use by golden eagles and the nest's physical appearance suggest that it should not be classified as a golden eagle nest, but additional surveys would be warranted to support the classification.~~

Comment [FWS MB-TD11]: No need to provide this conjecture. It is sufficient to note that the nest is currently occupied by RTHA and was previously reported as an unoccupied GOEA nest.

Nest 70, located 4.2 miles west of the project, was not found during the surveys. The biologists searched trees in the area, but were unable to identify any golden eagle nests. Nest 70 was originally reported in 2004, and the report suggests that the biologists at the time did not find the specific nest location, but rather inferred its location and existence based on behavior of two adult golden eagles. ~~Nest 70 is only 0.6 mile from the site of Nest 48, which is on a short cliff and was reported as unoccupied in 2011, and occupied by common ravens in 2012 and 2013. It is possible that the eagles observed in 2004 may have been nesting at Nest 48, although its current appearance is not consistent with use by golden eagles and it was occupied by common ravens in 2012 and 2013.~~

Comment [FWS MB-TD12]: More unnecessary conjecture. It is also possible that the observers missed the nest or that the nest came off the cliff due to age or a weather event.

Golden eagles were observed at a total of four locations during the aerial surveys, only two away from nests (Figure 3.1.1.2-2). One adult was observed in flight over the Antelope Valley on April 12, 2013, flying at 200 feet AGL; this eagle was presumably hunting. A second observation was made of an adult flying in the Tehachapi Mountains on April 12; this individual was traveling westward, flying approximately 100 feet over closed canopy coniferous forest. Its flight was direct and was more consistent with travel than with hunting. An attempt was made to follow this individual at a distance, but visual contact was lost as it passed over ridges. At nests, two adults were observed at the active nest (Nest 4) during the April survey, and a single immature individual, as mentioned above, was observed at Nest 35 in May.

3.1.1.3 Ground-Based Eagle Surveys at Adjacent Projects

No golden eagles were observed within the project as a result of the year of BUCs conducted on the project between December 2011 and November 2012, nor were they observed as a result of reconnaissance surveys conducted on the project during survey efforts for other special status species; however, this species is known to occur in the area, albeit infrequently, as a result of surveys conducted on approved wind energy projects located adjacent to the project, the Manzana Project and the Pacific Wind Project. For that reason, survey methods and results designed to detect golden eagles at these two projects are described below to provide a fuller picture of golden eagle use in the general study area. Pacific Wind BUCs were conducted prior to the release of the *Draft Guidance*, but survey methods comply with the methodology for eagle surveys recommended in that document.[68] Pre-permitting studies for the Manzana Project, including the 2004–2005 raptor migration counts described below, were conducted prior to the release of the CEC Guidelines or the multiple iterations of the USFWS's *ECP Guidance*. Therefore, the surveys conducted at the Manzana Project were not conducted in accordance with these recommended methodologies for assessing golden eagle use, in the form of eagle exposure minutes, at wind energy projects. Despite this, the results of the Manzana Project surveys are valuable with respect to characterizing regional use of the area by golden eagles.

2004-2005 Manzana Project Raptor Migration Counts

Methods

Standardized avian use surveys at the Manzana Project consisted of both fall and spring raptor migration counts in fall 2004, spring 2005, and fall 2005.[69,70,71,72] Bloom Biological, working as a subconsultant to Sapphos Environmental, Inc., conducted four seasons of raptor migration surveys at the Manzana Project. Fall and spring surveys were designed to detect migrating

[68] U.S. Fish and Wildlife Service. January 2011. *Draft Eagle Conservation Plan Guidance*. Available at: http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

[69] Sapphos Environmental, Inc. 25 August 2006. *PdV Wind Energy Project Biological Resources Technical Report.* Prepared for: enXco Development Corporation. Prepared by: Sapphos Environmental, Inc., Pasadena, CA.

[70] Sapphos Environmental, Inc. 11 August 2006. *PdV Wind Energy Project Biological Resources Technical Report Technical Appendices.* Prepared for: enXco Development Corporation. Prepared by: Sapphos Environmental, Inc., Pasadena, CA.

[71] Bloom, P.H. 15 October 2005. *Fall-Spring Raptor Migration and Winter Raptor Survey of the Proposed PdV Wind Energy Project, Kern County, California, 2004-2005*. Santa Ana, CA.

[72] Bloom, P.H. 30 March 2006. *Fall 2005 Raptor Migration Study of the Proposed PdV Wind Energy Project, Kern County, California.* Santa Ana, CA.

raptors. Consistent with studies conducted at many raptor migration monitoring stations across the United States, measurements for raptors per hour or raptors per day were gathered. This study design is in sharp contrast to point count survey designs, which often gather data for less than 1 hour per day. Hawk migration survey methods were adapted after procedures established by Hawk Watch International (HWI). The Manzana Project's study area originally consisted of approximately 6,440 acres. A total of three observation points were established within the study area for use as raptor migration survey locations (Figure 3.1.1.1-1). Two observation points (Points 1 and 2 in Figure 3.1.1.1-1) were used in fall 2004, one observation point (Point 2 in Figure 3.1.1.1-1) was used in spring 2005, and three observation points (Points 1, 2, and 3 in Figure 3.1.1.1-1) were used in fall 2005. Each count station was staffed by one biologist per survey day. Observers surveyed the skyline using the naked eye, high-powered spotting scopes, and binoculars. Observers recorded all raptor observations within their field of view and were in radio contact to minimize double counting. In the final data compilation, every effort was made to eliminate duplicate daily observations from the final species totals. Resident raptors were observed daily and identified by behavioral and plumage characteristics. Suspected residents, as inferred by their predictable locations, defensive behavior toward other raptors, and in some cases distinct plumages, were counted only once per day. When evaluating raptor totals, it is important to note that observations likely included both migrating and resident birds. Therefore, totals may suggest a higher number of individuals than were actually present, as multiple observations for each individual on the same day were likely recorded on occasion. The effort to avoid repeatedly recording known or presumed residents more than once each day illustrates the focus on counting individuals present, as opposed to raptor usage rates. Due to the methodology of these surveys, in which every passage of a migratory eagle was recorded, but not passage of every resident eagle, extracting data, such as eagle exposure minutes, would be prohibitively difficult given the complexity and age of the data.

Winter raptor presence-absence surveys were also conducted by Bloom Biological in winter 2004–2005.[73] Methods for winter surveys consisted of one person driving accessible locations of the Manzana Project over a 6 to 8 hour period each day to record wintering raptors; thus, observations are considered to be opportunistic rather than recorded with standardized methodology.

Results

Raptor migration surveys in fall 2004 were conducted over 26 days from October 3 to November 16. Two count stations (Figure 3.1.1.1-1) were each staffed by one biologist each daily, and observations were conducted for a at least 8 hours per person per day, yielding approximately 16 count hours per survey day and 474 total survey hours. Over the total 474 survey hours, a total of 1,143 raptors were detected passing directly over the count stations. Of these 1,143 raptor observations, 45 golden eagle observations were recorded (comprising approximately 4 percent of all raptors observed). Biologists estimated that these 45 observations were likely made up of 8 migrating golden eagles, as evidenced by their tendency to soar over 1,000 feet and fly direct routes over the site, and 4 year-round or overwintering resident local birds, based on their pattern of traveling back and forth between the Manzana Project and the Tehachapi Mountains.

[73] Bloom, P.H. 15 October 2005. *Fall-Spring Raptor Migration and Winter Raptor Survey of the Proposed PdV Wind Energy Project, Kern County, California, 2004-2005*. Santa Ana, CA.

Spring raptor migration surveys were conducted over 30 days from February 16 to April 20, 2005. A single count station (Figure 3.1.1.1-1) was staffed by one biologist daily, and 6 to 7 hours of observations were conducted each day, yielding 198 total survey hours. Over the total 198 survey hours, a total of 1,249 raptors were detected passing over the single count station. Of these 1,249 raptors, 11 golden eagle observations were recorded (comprising approximately 1 percent of all raptors observed). Biologists estimated that these 11 observations likely consisted of 5 individual golden eagles, only one of which was considered a potential spring migrant. No more than 3 golden eagles were seen on any one day.

Raptor migration surveys in fall 2005 were conducted during 52 days from August 15 to November 12. Three count stations (Figure 3.1.1.1-1) were occupied by one biologist daily, and observations were conducted between 7 to 10 hours per day, yielding 1,257 total survey hours. Over the total 1,257 survey hours, a total of 1,932 raptors were recorded passing over the three count stations. Of these, 74 golden eagle observations were recorded (comprising approximately 4 percent of all raptors observed). Biologists estimated that the majority of the 74 golden eagle observations were duplicate observations of the 4 to 5 resident or floater eagles seen during previous surveys on-site, as no more than 3 observations were made in any single survey day. Beyond the 4 to 5 estimated resident or floater birds, it was estimated that the observations represented 10 to 15 migrant eagles passing over the site and 4 to 5 eagles wintering in the area.

Winter presence-absence surveys in winter 2004–2005 were conducted between November 30, 2004, and February 15, 2005. Surveys were conducted for 30 days, approximately 6 to 8 hours each day, for a total of 187 survey hours. A total of 220 raptors were recorded during the surveys, of which 11 golden eagle observations were recorded (comprising approximately 5 percent of all raptors observed). Biologists estimated that the 11 observations consisted of 4 resident eagles, 3 migrants, and 2 to 3 wintering birds.

2008–2009 Pacific Wind Project Bird Use Counts

Methods

Sapphos Environmental, Inc. conducted four seasons of BUC surveys at the Pacific Wind Project between March 2008 and March 2009.[74,75,76,77] BUCs were performed in accordance with the CEC Guidelines, as described for the Tylerhorse BUCs, which recommend approximately 1 to 1.5 BUC points per square mile. The Pacific Wind Project originally

[74] Sapphos Environmental, Inc. 17 October 2008. Memorandum for the Record No. 6. Subject: Results of 2008 Avian Spring Migration Surveys at the Proposed Pacific Wind Energy Project, Kern County, California. Prepared for: enXco Development Corporation, San Ramon, CA.

[75] Sapphos Environmental, Inc. 22 October 2008. Memorandum for the Record No. 8. Subject: Results of 2008 Avian Summer Season Surveys at the Proposed Pacific Wind Energy Project, Kern County, California. Prepared for: enXco Development Corporation, San Ramon, CA.

[76] Sapphos Environmental, Inc. 14 January 2009. Memorandum for the Record No. 13. Subject: Results of 2008 Avian Autumn Surveys at the Proposed Pacific Wind Energy Project, Kern County, California. Prepared for: enXco Development Corporation, San Ramon, CA.

[77] Sapphos Environmental, Inc. 7 December 2009. *Pacific Wind Energy Project Biological Resources Technical Report. Volume 1.* Prepared for: enXco Development Corporation. Prepared by: Sapphos Environmental, Inc., Pasadena, CA.

encompassed approximately 8,300 acres (approximately 13 square miles), and based on the recommended number of points, 18 points were selected as part of the survey effort (Figure 3.1.1.1-1). When possible, points were located at high vantage areas where an unobstructed view of the surrounding area was provided. In each season, biologists conducted three 30-minute unlimited distance counts at each of the 18 points to count birds in each of the six habitats. The observers surveyed each point twice in the morning and once in the evening. Observers collected observations of the number and species of birds observed, their activity, and estimated distance from the observer. For flying birds, the observer noted the bird's estimated height above the ground.

Results

A total of 108 hours of BUCs were conducted at the Pacific Wind Project between March 25, 2008, and March 3, 2009. A single immature golden eagle was recorded flying approximately 300 feet above the ground on March 1, 2009. This was the sole golden eagle detected during the year of BUC surveys at the Pacific Wind Project. A total of 216, 30-minute BUC survey replicates were completed, resulting in a golden eagle mean use of 0.005 eagle per 30-minute survey.

2008–2009 Pacific Wind Project Diurnal Raptor Transects

Methods

Diurnal raptor survey transects, conducted on the Pacific Wind Project between April 14, 2008, and February 19, 2009, collected information on the occurrences and activities of diurnal raptors. A single observer during spring 2008 conducted three raptor diurnal counts standardized for distance (birds/kilometer), to count raptors and common ravens, from April 14 to May 27; a single observer during summer 2008 conducted one raptor diurnal count, standardized for distance (birds/kilometer), from July 30 to August 1; two observers during autumn 2008 conducted 11 weekly raptor diurnal counts from August 20 to November 13; and three observers during winter 2008–2009 conducted six weekly raptor diurnal counts, standardized for distance (birds/kilometer), from December 23 to February 19. The spring surveys were conducted along two preestablished unlimited distance survey transects (Figure 3.1.1.1-1; Transects A and B), and the summer, autumn, and winter surveys along five preestablished unlimited distance survey transects (Figure 3.1.1.1-1; Transects A, B, C, D, E) within and just beyond the Pacific Wind Project. Sapphos Environmental, Inc. used line transects of unequal distances and times for the raptor transects. Raptor transects A and B totaled a length of 12.9 miles (20.8 kilometers) during spring, whereas raptor transects A through E totaled a length of 22 miles (35.4 kilometers) during summer, autumn, and winter. Observation times were standardized for each transect, when possible. All transects within each sampling period were usually conducted on the same day to reduce concerns associated with repeat counts of birds. All line transects were driven at 5 miles per hour with frequent stops. Line transects were sampled at all times of day depending on seasons but mainly during midday (10:30 a.m.–3:00 p.m.) during the cold season when raptors are expected to be most abundant and active.

Results

Two golden eagles were recorded as a result of fall diurnal raptor transects on the Pacific Wind Project: 1 adult was recorded hunting over the Pacific Wind Project on August 21, 2008, and 1 subadult was observed hunting over the Pacific Wind Project on September 5, 2008. In addition, six golden eagles were observed on five occasions within and outside of the project during the course of other surveys: 1 immature was recorded hunting over the Pacific Wind Project on March 25, 2008; 1 immature was recorded hunting over the Pacific Wind Project on July 2, 2008; 1 eagle of unknown age was recorded 1 mile west of the Pacific Wind Project on February 23, 2009; 1 immature eagle was recorded incidentally at the Pacific Wind Project on March 1, 2009; and 2 immature eagles were recorded soaring over the Pacific Wind Project on March 3, 2009. The Pacific Wind Project is located due south, though it is not contiguous, with

all of the project's parcels, thus all of the golden eagle sightings within or adjacent (1 mile west) of the Pacific Wind Project were greater than 0.5 mile away from the project boundary.

3.1.1.4 2005-2012 California Condor Use Analysis

Methods

Surveys on the project and the surrounding adjacent renewable energy projects, including the BUCs, migration counts, diurnal raptor surveys, and raptor nest searches described above, were suitable for documenting California condor presence. California condors are extremely large, striking birds that are easily identifiable. Directed surveys for this species were not necessary to ascertain their presence or absence.

Rather, Sapphos Environmental, Inc. has done extensive research into the historical locations of condors within Southern California to determine the species' historical presence in the project area. Extensive condor telemetry data, provided by the USFWS and inclusive of dates between June 2005 and December 2012, has also informed Sapphos Environmental, Inc.'s assessment on the current movements of condors, and the likelihood of the species to frequent the project area.

Results

Despite a 100,000-year-old fossil record that shows occurrences in northeast Mexico, across the southwestern states from California to Texas, and even in Florida and New York,[78] by the mid-20th century, California condors were largely confined to Southern California (Figure 3.1.1.4-1, *Maps of Historical Condor Sightings between 1890 and 1984*).[79,80,81] Despite protection offered under the federal and state ESAs in the 1960s and 1970s when the wild population began to dramatically decline, condor numbers continued to plummet during the early 1980s; and by 1987, the last wild condors were captured and placed in a breeding program at both the San Diego and Los Angeles zoos.[82] By the late 1980s, the range of California condors in Southern California occupied an area of approximately 2 million hectares (7,720 square miles).[83] California condors primarily occupied a wishbone-shaped area comprising six counties in Southern California; this range, designated by the 1984 California Condor Recovery Plan, is the primary range of concern according to the USFWS[84] (Figure 3.1.1.4-2, *Historical Range of California Condor*).

The Mojave Desert geographic region, where the project is located, lies largely outside the historical range of the California condor. The nearest recorded observation of a California condor to the project boundary, based on a total of 428,041 occurrences from the USFWS Southern Flock GPS data from June 2005 to December 2012, was 3.7 miles to the west and

Comment [JAR13]: As above, more recent data has closer recordings

[78] Snyder, N.F., and J. Schmitt. 2002. "California Condor (*Gymnogyps californianus*)." In *The Birds of North America*. Philadelphia, PA.

[79] Stoms, D.M., F.W. Davis, C.B. Cogan, M.O. Painho, B.W. Duncan, J. Scepan, and J.M. Scott. 1993. "Geographic Analysis of California Condor Sighting Data." *Conservation Biology*, *7*: 148–159.

[80] Koford, C.B. 1953. *The California Condor*. National Audubon Society Research Report Number 4. Washington, DC: National Audubon Society.

[81] Wilbur, S.R. 1978. *The California Condor, 1966–76: A Look at Its Past and Future*. U.S. Fish and Wildlife Service North American Fauna 72. Washington, DC: U.S. Department of the Interior.

[82] U.S. Fish and Wildlife Service. 1996. *California Condor Recovery Plan.* 3rd Revision. Portland, OR.

[83] Meretsky, V.J., and N.F.R. Snyder. 1992. "Range Use and Movement of California Condors." *Condor*, *94*: 313–335.

[84] U.S. Fish and Wildlife Service. 1984. *California Condor Recovery Plan.* 2nd Revision. Portland, OR.

was recorded in June of 2009, in the vicinity of the Tejon Ranch CHU (Figure 3.1.1.4-3, *USFWS California Condor Southern Flock Data [Years 2005–2012] in Relation to Project Boundary*). The Tejon Ranch CHU is located approximately 2.7 miles west of the project boundary. Although there is no nesting habitat within this CHU, it remains an important foraging ground for condors, particular because of its close proximity to the Sespe-Piru Condor nesting area.[85] Despite the proximity of this CHU to the project, historically California condors appear to have rarely descended below the upper slopes of the Tehachapi Uplands and down into the Antelope Valley. Based on historical data collected in the Tejon Ranch and adjacent areas between 1910 and 2005, only a handful of sightings occurred on the floor of the Antelope Valley, with the vast majority occurring in upland habitat on the Tejon Ranch and within the Angeles National Forest (Figure 3.1.1.4-4, *Historical California Condor Sightings: 1910–2005*).

Comment [JAR14]: Tejon CHU was established as foraging habitat but is not inclusive of all the foraging habitat on Tejon or in the Tehachapis. Also, in 2013, a successful condor nest was documented in the immediate vicinity of Bitter Creek National Wildlife Refuge. The nest was not on a large cliff or in a tree. There are areas on Tejon and in the Tehachapis that are very similar to where condors nested near Bitter Creek. We anticipate nesting can and will likely occur in the Tehachapis at some point in the future.

California condors generally inhabit rugged canyons, gorges, and forested mountains mainly between 985 and 8,860 feet in elevation and nest primarily between 2,000 and 4,500 feet. Typically, condors lay eggs on shelves in holes on cliff faces or caves. Roost sites are nearly always on the upper limbs of tall conifers and cliff edges. Wind conditions are an important component to suitable habitat. Condors require areas where the wind blows consistently and strongly enough to provide lift for soaring. The delineation of the California condor historic range, therefore, is largely a result of the availability of appropriate topography, wind resources, nesting habitat, and food resources in this horseshoe-shaped region that are required by condors. Therefore, it is not surprising that only 305 out of 428,041 total condor GPS observations (0.071 percent) over the past 8 years have occurred outside of the historic range, where resources required by condors are not readily available. As well as historically, within the last decade condors infrequently use the floor of the Antelope Valley and the foothills rising out of it: only 5 out of 428,041 total condor GPS observations (0.0012 percent) were located outside of the historic range and on the floor of the Antelope Valley.

There are no known occurrences of California condor within the project, either historically or within the past decade, when a significant proportion of the wild-flying condor population has been tracked via telemetry as well as with GPS transmitters. No condors were detected during a full year of BUC surveys on the project property (December 2011 through November 2012); nor have they been detected during avian surveys conducted over several thousand hours on more than 30,000 acres in the immediately surrounding area over an 8-year time period.

The species' potential for expansion into areas of the Antelope Valley, specifically in the vicinity of the project, is low for three reasons: (1) lack of complex terrain and predominant meteorological conditions required to create the thermal air lift California condors use to soar, (2) marginal foraging habitat, and (3) lack of available overnight and diurnal nesting and roosting locations. Although there is a recoverable wind resource within the project area, the topography, wind, and associated thermal weather patterns do not have the same characteristics as those in the adjacent Tehachapi Mountains, which condors consistently use as a foraging zone and a traveling route between foraging areas in Ventura County and the southern Sierra Nevada Mountains. There are no known nesting sites within the project area. All recently documented California condor nest sites in Southern California are located on public lands within the Los

Comment [JAR15]: However, see Rivers et al. 2014, Resource Selection by the California Condor (Gymnogyps californianus) Relative to Terrestrial-Based Habitats and Meteorological Conditions, Plos One 9(2). The authors of that paper note that we know little about variation in condor use of terrestrial habitats and the extent to which meteorological conditions influence their use of space and discuss how individual condors use of space relative to meteorological and landscape variables is complex. They highlight how meteorological variables are dynamic throughout the annual cycle and suggest research that considers decisions made by an individual on small spatial and temporal scales may be useful for furthering our understanding of California condor resource selection. On a coarse-scale, a take home message is that condors are not restricted in their use of any single habitat. The authors also highlight the need for research into finer scale movements of condors in areas being evaluated for wind development to inform siting considerations and other measures to reduce the risk of collision. We agree with the authors' assessments and suggest that, although this study is informative, work still needs to be done on this topic.

[85] Dudek. 2009. *Tehachapi Upland Multiple Species Habitat Conservation Plan*. Prepared for: Tejon Ranchcorp. Prepared by: Dudek, Encinitas, CA. Available at: http://www.fws.gov/ventura/endangered/habitat_conservation_planning/hcp/docs/draft/TehachapiUpland/04_Section4_CaliforniaCondor.pdf

Padres, Angeles, and Sequoia National Forests.[86] Finally, no cliffs or large trees of the size required by California condors for nesting exist in the project property or within the Tejon Ranch CHU, and similarly there are no suitable substrates for roosting within the project area or the general vicinity.

Despite the unlikely probability of a condor utilizing the floor of the Antelope Valley in the vicinity of the project, it cannot be conclusively stated that condors will never fly within the project boundary during the life of the project (estimated to be 30 years), and risks to this species from the construction and operation of the project should be assessed.

3.1.1.5 2011–2012 Tylerhorse Burrowing Owl Surveys

Methods

Phase I, II, and III burrowing owls surveys, pursuant to the 1993 *California Burrowing Owl Survey Protocol and Mitigation Guidelines,*[87] were conducted by Sapphos Environmental, Inc. on the project property to assess the site for burrowing owl use. This survey methodology was updated in March 2012 by CDFG's *Staff Report on Burrowing Owl Mitigation*;[88] however, as surveys on the project were under way at the time of this report's release, the original 1993 methods were followed.

Phase 1 (of three) of the *Guidelines* recommends a habitat assessment to determine the potential presence of burrowing owl habitat on the project site. A site visit was conducted in 2010 by Sapphos Environmental, Inc. to identify and map the extent of various plant communities at the project property and, concurrently, to assess the compatibility of the project property for burrowing owl occupancy. Based on the plant communities determined to be present, one-hundred percent of the 1,207-acre proposed project property was considered potential burrowing owl habitat.

Due to suitable habitat for burrowing owls within the project property, Sapphos Environmental, Inc. conducted Phase II burrow surveys over the entire 1,207 project property, and not just within the project impact areas and associated 150-meter buffer as stipulated within the 1993 protocol. Surveys for burrowing owl were completed in conjunction with desert tortoise protocol-level surveys on October 28 and 31, 2011. Surveys were in accordance with the USFWS 100 percent coverage recommendations for desert tortoise, using 10-meter belt transects in habitats determined suitable for desert tortoise. In burrowing owl habitat that was not suitable for desert tortoise, parallel transects were spaced 30 meters apart, in accordance with Phase II of the *California Burrowing Owl Survey Protocol and Mitigation Guidelines*. A handheld GPS unit was used to record the location of any burrowing owls, burrows, and sign encountered.

[86] Dudek. 2009. *Tehachapi Upland Multiple Species Habitat Conservation Plan*. Prepared for: Tejon Ranchcorp. Prepared by: Dudek, Encinitas, CA. Available at: http://www.fws.gov/ventura/endangered/habitat_conservation_planning/hcp/docs/draft/TehachapiUpland/04_Section4_CaliforniaCondor.pdf

[87] The California Burrowing Owl Consortium. April 1993. *California Burrowing Owl Survey Protocol and Mitigation Guidelines*. Available at: http://www.dfg.ca.gov/wildlife/nongame/docs/boconsortium.pdf

[88] California Department of Fish and Game. 7 March 2012. Staff Report on Burrowing Owl Mitigation. Available at: http://www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf

Due to the confirmed presence of burrowing owls, burrows, and sign on the project as a result of Phase II surveys, both winter and breeding season burrowing owl burrow checks, consistent with *California Burrowing Owl Survey Protocol and Mitigation Guidelines*, were completed to ascertain burrowing owl occupancy.[89] Winter surveys were conducted between December 8, 2011, and January 12, 2012; and breeding season surveys were conducted between June 7 and August 31, 2012. A complete seasonal burrowing owl survey consisted of four site visits to each burrow. Burrows were visited from 2 hours before sunset to 1 hour after or from 1 hour before sunrise to 2 hours after. Biologists observed each burrow for approximately one-half hour during each visit, taking care to avoid disturbance of owls at the potential burrows. All observed burrowing owl activity and burrowing owl sign such as excrement, pellets, or burrow decorations (or absence thereof) were recorded during each visit. Burrow occupancy status was determined based on the presence or absence of burrowing owls and/or sign. To determine burrow occupancy, a comparison was made over the course of the four burrow visits. If no change was observed between the initial visit and the final visit, the burrow was considered unoccupied. If burrowing owls were observed or new burrowing owl sign was observed at the burrow during at least one of the four visits, the burrow was considered occupied.

Results

As a result of the Phase I surveys in 2010, it was determined that habitat within the project property was suitable burrowing owl habitat, based on the presence of plant communities that burrowing owls are known to occupy, the presence of suitable burrow sites, and a observed prey base consisting of small mammals and reptiles.

As a result of the Phase II burrowing owl burrow surveys in fall of 2011, four burrowing owls and three of their burrows were recorded (Figure 3.1.1.5-1, *2011–2012 Burrowing Owl Burrow Locations*). All three of the burrows were actively used by burrowing owls and contained either owls or their sign (pellets, whitewash, feathers, or burrow decoration). The three burrows observed during the Phase II burrow survey were monitored during the winter as part of the Phase III occupancy surveys. Of these three burrowing owl burrows, two were occupied and one was unoccupied (Table 3.1.1.5-1, *2011–2012 Burrowing Owl Winter and Summer Burrow Occupancy*).

TABLE 3.1.1.5-1
2011–2012 BURROWING OWL WINTER AND SUMMER BURROW OCCUPANCY

Name	Winter 2011–2012 Occupancy	Number of Winter Visits Where Burrowing Owls or Sign Observed	Summer 2012 Occupancy	Number of Summer Visits Where Burrowing Owls or Sign Observed	Location (UTM Easting, Northing)
1	Occupied	1	Unoccupied	0	370723 E, 3867136 N
2	Unoccupied	0	Unoccupied	0	370203 E, 3866977 N
3	Occupied	3	Unoccupied	0	368852 E, 3866748 N
4	N/A*	N/A*	Occupied	1	370119 E, 3867268 N

NOTE: *Burrow discovered after winter 2011–2012 burrow site visits.

[89] The California Burrowing Owl Consortium. April 1993. *California Burrowing Owl Survey Protocol and Mitigation Guidelines*. Available at: http://www.dfg.ca.gov/wildlife/nongame/docs/boconsortium.pdf

The three original burrowing owl burrows found through Phase II surveys were also monitored during the breeding season for occupancy. An additional burrow discovered during 2012 special-status plant surveys was also monitored during the breeding season, bringing the total number of burrows to four (Table 3.1.1.5-1; Figure 3.1.1.5-1). Of the four total burrows visited during the summer breeding season to determine occupancy, burrowing owls or active sign were observed only at burrow 4, the most recently discovered burrow, during the final of four visits. No owls or recent sign were documented at this burrow during the three preceding visits to the burrow; nor was any activity recorded on a camera placed in view of the burrow entrance. Based on the timing of the final burrow check, the individual was likely a post-breeding adult or dispersing juvenile that was temporarily occupying the burrow.

3.1.2 Bat Surveys

Bat surveys conducted within and adjacent to the project between 2005 and 2010 included the following survey types: 2005 Manzana Project Bat Site Assessment and 2009–2010 Tylerhorse Project Active and Passive Bat Monitoring. The survey methods and general results of these surveys are described in the following sections.

3.1.2.1 2005 Manzana Project Bat Site Assessment

Methods

A general bat site assessment was conducted in fall of 2005 as part of the pre-permitting surveys for the Manzana Project, which is located just west of the largest project parcel, and surrounds the central and eastern parcels on three sides. In order to identify bat species that may occur at the Manzana Project, several different methods were employed. Sites with the potential to support bat roosts were inspected visually. Potential bat roosting sites were assessed by surveying a cliff face adjacent to the Manzana Project and abandoned buildings on-site. Thermal imaging cameras were used to assess general bat activity level at two sites with high-quality foraging habitat (Sites 3 and 5; Figure 3.1.2.1-1, *2005 Bat Survey Location Map*). Anabat acoustic bat detectors were deployed to identify low-flying bat species at four locations that had both roosting and high-quality foraging habitat (Sites 1, 2, 3, and 4). One site utilized both Anabat acoustic bat detectors and thermal imaging (Site 3). All sites were located between 0.5 and 2.5 miles of the Tylerhorse Project boundary. All sites with the potential to support bat roosts were inspected during the daytime on October 7, 2005. Thermal imaging and acoustic work was conducted on the evening of October 7, 2005.

Results

No bat roosts were detected on or adjacent to the Manzana Project as a result of visual surveys. A search of deserted buildings at the edge of Cottonwood Canyon did not yield evidence of bats, though a cliff face just outside of the Manzana Project in Tylerhorse Canyon, approximately 2 miles north-northwest of the Tylerhorse project boundary, in the vicinity of Site 1 (Figure 3.1.2.1-1) was identified as providing appropriate shelter for use by cliff-roosting species such as *Tadarida*, *Eumops*, and *Antrozous*. Other potential roosting sites on the Manzana Project include trees and rock crevices, which proved too extensive to survey accurately during this site assessment.

Bat activity in the area was confirmed with the thermal imager. Video recordings made in the area of the anemometer tower (Figure 3.1.2.1-1; site 5) and over Cottonwood Creek (Figure 3.1.2.1-1; site 3) showed bat passes at the rate of one per minute. Due to the similar size and shape of many North American bat species, thermal images do not allow for the elucidation of bat species. The majority of the bats were flying downstream (SE) during the period of the recordings.

The use of four Anabat detectors revealed the confirmed presence of one bat species, the pallid bat (*Antrozous pallidus*), that was recorded near the anemometer tower in the southern part of the project, near the Cottonwood Creek drainage.

3.1.2.2 2009–2010 Tylerhorse Project Active and Passive Bat Monitoring

Methods

Sapphos Environmental, Inc. conducted active monitoring in June 2010 to determine the suitability of roosting habitat within and adjacent to the project property. Visual surveys for potential roosts during daytime and active acoustic surveys for bats during nighttime occurred on June 8, 9, 21, and 22, 2010. Surveys consisted of driving and walking areas within and adjacent to the project property to identify suitable crevice-, cave-, and tree-roosting habitats. No activity was detected within the proposed project; therefore, Anabat recordings were made at more active sites at nearby creeks, canyons, quarries, and mines in order to build a library of calls from local bat species (Figure 3.1.2.2-1, *2010 Bat Survey Location Map*). Potential sites were identified visually during the day and subsequently surveyed acoustically from dusk to evening. Surveyors visually identified potential roost sites by positive presence of individual bats or colonies, and by the presence and identification of guano. The presence of bats was determined through visual identification and through acoustic monitoring via the Anabat SD2 bat detector. Captured bat call files were then analyzed using AnalookW, Version 3.8n.[190]

In July 2010, Sapphos Environmental, Inc. analyzed bat survey data provided by the U.S. Forest Service (USFS) from October 11, 2009, to October 21, 2010. The USFS previously installed two Anabat detectors on a single meteorological tower (Meteorological Tower No. 30) adjacent to the project site to continuously record passive data (Figure 3.1.2.2-1). Anabat detectors were placed at 2 meters AGL and 45 meters AGL on the single meteorological tower. Bat call files downloaded from the two Anabat units were analyzed using AnalookW bat detection software.

Results

As a result of 2010 visual surveys for roosting locations on and adjacent to the project, it was observed that some cave and rock crevice roosting habitat is present in portions of the project; however, suitable arboreal roosting habitat is lacking. Foraging habitat is present at the site, with foraging activities dependent on insect abundance for insectivorous bats. A variety of foraging bats were observed visually and recorded acoustically near the project; most sightings were of individual or pairs. A total of 15 bat call sequences were recorded during 2010 active acoustic field surveys. No listed or sensitive bats species were detected. Of the 15 bat call sequences, 14 were identified as the western pipistrelle and 1 was identified as the Mexican free-tailed bat; both are common species.

Passive survey data from the USFWS between October 11, 2009, and October 21, 2010 were analyzed by Sapphos Environmental, Inc. The 376 nights of data collection (376 nights × 2 detectors = 752 detector-nights) resulted in 536 recordings, all of which were reviewed in detail for species identification. Of the 536 recordings, 497 were identified as containing bat call sequences, resulting in (497 sequences ÷ 752 detector-nights) 0.66 bat call sequences per detector-night.

As a result of both 2010 active field surveys and year-round passive monitoring analysis, six bat species were identified as being present and six additional bat species were identified as being

[90] Corben, Chris. 16 January 2011. AnalookW. Version 3.8n. Brisbane, Australia: Titley Scientific.

potentially present in the vicinity of the proposed project study area (Table 3.1.2.2-1, *Present and Potentially Present Bat Species in the Project Vicinity*). It should be noted that positive species identification can be uncertain with acoustic detectors because some species have similar acoustic signatures. Therefore, these species are typically grouped by their characteristic frequency range (i.e., 40k Myotis and Q25) and designated as potentially present because specific species identification is difficult without a complete sequence of calls or visual confirmation. For example, the 40k Myotis group had the greatest number of recorded bat call sequences (202 of 497 bat calls, or 41 percent). This group consists of three possible species: western small-footed myotis, long-legged myotis, and little brown bat; thus all three are listed as potentially present.

TABLE 3.1.2.2-1
PRESENT AND POTENTIALLY PRESENT BAT SPECIES IN THE PROJECT VICINITY

Common Name	Genus and Species Name	Presence	Status	Population Status	Frequency Category*
Western mastiff (+)	*Eumops perotis*	Present	BLM, CSC	Resident	n/a
Hoary bat (+)	*Lasiurus cinereus*	Present	None	Migratory	Q25
Mexican free-tailed bat (++)	*Tadarida brasiliensis*	Present	None	Migratory	Q25
Big brown bat (++)	*Eptesicus fuscus*	Present	None	Migratory	Q25
Silver-haired bat	*Lasionycteris noctivagans*	Potentially present	None	Migratory	Q25
Pallid bat (+)	*Antrozous pallidus*	Present	BLM, CSC	Resident	Q25
Western small-footed myotis	*Myotis ciliolabrum*	Potentially present	BLM	Resident	40k myotis
Long-legged myotis	*Myotis volans*	Potentially present	None	Resident	40k myotis
Little brown bat	*Myotis lucifugus*	Potentially present	None	Migratory	40k myotis
Western pipistrelle (++)	*Parastrellus hesperus*	Present	None	Resident	n/a
California myotis	*Myotis californicus*	Potentially present	None	Resident	50k myotis
Yuma myotis	*Myotis yumanensis*	Potentially present	BLM	Resident	50k myotis

KEY:
n/a = Not applicable: the western mastiff has a very low and distinctive characteristic frequency; while the western pipistrelle has a distinctive call, marked by a characteristic frequency of 45 kHz, a low-frequency sweep (bandwidth), and a consistent call shape
BLM = Bureau of Land Management Sensitive Species
CSC = California Species of Special Concern
NOTES: * A single species of bat may belong to multiple frequency categories since this table makes a distinction between Q25 and Q30.
+ Diagnostic calls were acoustically recorded for these species during surveys.
++ These species were acoustically recorded and visually observed during surveys.

Of the bat calls derived from passive monitoring, approximately 80 percent of bat calls were recorded at temperatures greater than the mean of 41° F and 97 percent during periods with wind speed ≤ 8 MPH. The combination of these two conditions occurred in 149 out of 376 nights (40 percent), and 78 percent of all bat calls were recorded on these nights. Thus, the majority of

the activity was limited to comparatively few nights. Furthermore, during each night, 91 percent of bat calls were recorded between the hours of 7:00 p.m. to 2:00 a.m.

3.1.3 Reconnaissance Surveys

Methods

Reconnaissance surveys, or incidental observations, of species of potential interest were recorded by biologists on an opportunistic basis. These observations were recorded while conducting BUC surveys, during aerial raptor flights, during burrowing owl burrow checks, while traveling between surveys, and during the course of non-avian-focused surveys, such as special status plant surveys.

Results

In addition to the 45 avian species identified during the 30-minute BUCs, 16 additional avian species were observed incidentally within the project vicinity during the course of all biological surveys conducted between 2011 and 2013. As a result of all surveys completed in the project vicinity between 2011 and 2013, a total of 61 avian species were recorded. (Appendix A). No additional bat species were recorded incidentally during surveys on the project between 2011 and 2013.

HW has been committed throughout the development of the project to design, site, construct, and operate the project in an environmentally sustainable way that avoids and minimizes impacts to birds and bats. In particular, to reduce environmental impacts, the project would use the ancillary facilities of the adjacent Manzana Project, such as the O&M facility, access roads, and transmission lines providing a connection to the Whirlwind substation, thus minimizing ground disturbance. The project has also been designed to avoid any streambed crossings, thus eliminating disturbance to these sensitive areas. As will be further detailed in Section 5.0, additional conservation measures have been developed to lessen the project's impacts to birds and bats.

Nevertheless, it is understood that even with many proactive preventative measures in place on the project, bird and bat species that migrate, breed, winter, or forage in the vicinity of the project have the potential to be adversely affected by wind energy projects as a result of habitat loss, nest disturbance, reduced quality of and accessibility to foraging habitat, and potential for collision with wind turbines resulting in injury or mortality. Furthermore, bird species, particularly raptors, are at risk of collision, bodily injury, or electrocution as a result of contact with overhead transmission lines.

The potential for project impacts to bird and bat species due to disturbance and displacement, habitat fragmentation, collision, electrocution (for birds), and barotrauma (for bats) are first discussed generally, and then in detail for each potential special status species with the potential to occur on the project, in an analysis that approximates the impact prediction segment of Tier 3 of the *Final Guidelines*.[91] This analysis, specifically for golden eagles, also approximates Stage 3 of the *ECP Guidance*,[92] although certain Stage 3 assessment methodologies have been modified or omitted as a result of project specific characteristics, or compatibility of some analyses with data gathered in the field. In all analyses herein, the project is compared to data obtained from similar wind energy projects already in operation. As much as possible, comparative data are drawn from projects that are in close proximity to the project, and/or have similar bird and bat communities and similar habitat types; however, the use of data from projects in the same geographic region are often limited by report availability.

Comment [FWS MB-TD16]: We continue to recommend that the ECP be done in a separate document.

4.1 IMPACTS TO THREATENED AND ENDANGERED WILDLIFE

4.1.1 Threatened and Endangered Bird Species

No bird species listed as threatened or endangered by the USFWS have been detected within the project property.

The California condor, listed as endangered in both the California and federal ESAs, is known to frequent more mountainous habitat to the northwest of the project in the Tehachapi mountains, but condors have not been documented entering the project, either historically or as a result of

[91] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[92] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA

hundreds of hours of field surveys on the project. The closest documented observation of this species near the project is of a condor equipped with a global positioning system (GPS) tag, which was documented approximately 3.7 miles west of the project in 2009. A further description of potential risks to this species is presented in Section 4.3.2, *California Condor*.

Comment [JAR17]: As above, more recent data has closer recordings

A single Swainson's hawk, listed as threatened under the California ESA, was observed incidentally foraging over the project in April of 2012. A further description of potential risks to this species is presented in Section 4.3.8, *Swainson's Hawk*.

4.1.2 Threatened and Endangered Bat Species

No bat species listed as threatened or endangered by the USFWS or CDFW have been detected on the project, nor are any known records for these species within the project area. Therefore, the project is not anticipated to have any impacts on federally or state-listed bat species.

4.2 IMPACTS TO GENERAL AVIAN SPECIES

4.2.1 Disturbance and Displacement

Avian displacement due to disturbance during the construction or operational phases of wind energy projects can be impacted by several factors, including avoidance of turbine noise and vibration impacts, human maintenance activities surrounding turbines, or the lack of available habitat due to gravelling of turbine pads or presence of maintenance roads.[93] Compared to analyses of collision mortality and direct habitat loss, the risks of avian disturbance and displacement due to wind energy development have only recently been studied. Few studies, many of them focused on grassland passerine species, have been conducted, and those that have reveal mixed results on the degree of impact the construction and operation of wind energy projects have on avian disturbance and displacement.

A study conducted at the Buffalo Ridge Wind Resource Area (WRA) in Minnesota included a monitoring study using a before/after and control/impact (BACI) design. The analysis showed that 7 of 22 species of grassland breeding species had reduced use of the areas near turbines, and that this reduced use was primarily within 100 m of the turbine structure.[94] Preliminary results comparing preconstruction and postconstruction grassland bird transects at the Stateline Wind Project in Washington and Oregon suggested a relatively small-scale displacement impact on grassland breeding passerines.[95] Conversely, a postconstruction displacement study conducted at the Judith Gap Wind Energy Project (Judith Gap) in Wheatland County, Montana,

[93] Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. *Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-year Study*. Prepared for: Northern States Power Company, Minneapolis, MN. Prepared by: WEST, Inc., Cheyenne, WY.

[94] Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. *Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-year Study*. Prepared for: Northern States Power Company, Minneapolis, MN. Prepared by: WEST, Inc., Cheyenne, WY.

[95] Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. *Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003*. Prepared for: FPL Energy, the Oregon Energy Facility Siting Council, and the State Technical Advisory Committee. Prepared by: WEST Inc., Cheyenne, WY.

in 2007 found that construction did not negatively impact numbers of breeding grassland birds but, rather, that there was an overall increase in grassland birds on all transects.[96]

Studies of raptor disturbance and displacement at wind energy projects are similarly scarce, and most evidence is anecdotal and related to nesting impacts. A raptor nest occupancy survey for five nests located within 3 miles of the Klondike Wind Project in Sherman County, Oregon, was conducted in 2001 and replicated in 2002, a year after operation began. One red-tailed hawk nest within 2.5 miles of the turbines remained active after operation; one red-tailed hawk, one great horned owl, and one Swainson's hawk nest within 1.75 miles, 1.6 miles, and 3 miles of turbine strings, respectively, did not appear active after operation began. Additionally, one Swainson's hawk nest within 0.25 mile of a turbine string, as well as within 0.25 miles of an access road and O&M facility did remain active.[97] At the Foote Creek Rim Wind Energy Project (Foote Creek Rim) in southern Wyoming, one red-tailed hawk nest was successful within 0.3 mile of a turbine string; and seven red-tailed hawk nests, one great horned owl nest, and one golden eagle nest within 1 mile of the wind facility were all successful.[98] Construction of Phase I of the Montezuma Hills, California, wind energy project did not appear to permanently disturb nesting raptors, as similar numbers of nests were found before and after construction.[99] Construction of the Stateline I project in Oregon and Washington, similarly, did not result in lowered nesting raptor rates within 2 miles of turbine locations; 11 total raptor nests (composed of red-tailed hawk, ferruginous hawk, and Swainson's hawk) were recorded during preconstruction surveys in 2001 as compared to 12 total nests recorded postconstruction in 2002.[100] The project has few natural substrates for diurnal raptor nesting; substrates are limited to scattered Joshua tree and junipers, whereas there are no cliffs or tall trees present within the project property. Thus, construction and operation of the project is not anticipated to cause significant disturbance or displacement to nesting raptors.

It is likely, and reasonable to assume, that activities associated with the construction and maintenance of the project, as well as the presence of project elements, such as project turbines, will disturb and, in some cases, displace birds from currently occupied habitat within the project footprint; however, it is unlikely that this displacement will have population-level ramifications for any of the common and widespread species found within the project vicinity.[101,102] Construction will disturb only a small amount of habitat (119.4 acres) within the

[96] TRC Environmental Corporation. 2008. *Post-Construction Avian and Bat Facility Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana*. Prepared for: Judith Gap Energy, LLC, Chicago, IL. Laramie, WY.

[97] Johnson, G. D., W. P. Erickson, J. White, and R. McKinney. 2003. *Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, OR.* Prepared for: Northwestern Wind Power, Goldendale, WA. WEST, INC., Cheyenne, WY.

[98] Johnson, G.D., D.P. Young Jr., C.E. Derby, W.P. Erickson, M.D. Strickland, and J.W. Kern. 2000. *Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999*. Prepared for: SeaWest Energy Corporation and Bureau of Land Management. Prepared by: WEST, Inc., Cheyenne, WY.

[99] Howell, J.A., and J. Noone. 1992. *Examination of Avian Use and Monitoring at a US Windpower Wind Energy Development Site, Montezuma Hills, Solano County, California*. Prepared for: Solano County Department of Environmental Management, Fairfield, CA.

[100] Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. *Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003*. Prepared for: FPL Energy, the Oregon Energy Facility Siting Council, and the State Technical Advisory Committee. Prepared by: WEST Inc., Cheyenne, WY.

[101] Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. *Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-year Study*. Prepared for: Northern States Power Company, Minneapolis, MN. Prepared by: WEST, Inc., Cheyenne, WY.

project; moreover, suitable habitat will remain both amongst project elements and in more natural, less fragmented lands, primarily located north of the largest parcel. The general project vicinity is currently characterized by two operating wind energy projects, transmission lines, meteorological towers, and off-highway vehicle (OHV) trails; thus existing disturbance activities are already common in the area.

4.2.2 Habitat Fragmentation

Habitat fragmentation is the process of dividing large, contiguous areas of intact habitat into smaller patches that are isolated from one another.[103] In general, wind energy projects cover relatively large areas, but their construction has a relatively low direct impact on existing habitat. The BLM's Programmatic Environmental Impact Statement, for example, estimated that the permanent footprint of wind energy projects is between 5 to 10 percent of the project site, including all project infrastructure.[104] Although direct habitat loss is low, the construction of access roads, which link dispersed turbines, and transmission lines, can lead to habitat fragmentation, which can decrease habitable patch size, increase seemingly less productive edge habitat, and increase the isolation of habitat patches from one another. Avian species within these smaller patches may experience higher nest predation and parasitism, interspecific competition, and lower pairing success and reduced dispersal opportunities.[105] Studies on the impact of habitat fragmentation have thus far been mostly focused on grassland birds. Thirteen grassland bird species have been found to favor larger patches of grassland, while seven grassland bird species have been shown to be edge-adverse.[106]

Comment [JAR18]: Does this take into account the airspace as habitat? See: Diehl 2013, The airspace is habitat, Trends in Ecol & Evol 28(7), p. 377-379

The construction of the project is not anticipated to significantly increase the degree of habitat fragmentation to the area. The majority of the wind project is sited in previously fragmented habitats that are surrounded by operating wind energy projects, and crisscrossed by existing roads and OHV trails. The project will minimize further habitat disturbance by relying on existing roads to the extent practicable, burying the majority of electrical collector lines, and avoiding important wildlife dispersal corridors, such as desert washes.

Comment [JAR19]: What about the operation of the project and the presence of the turbines (relates to question above about airspace as habitat)?

4.2.3 Collision

Avian species that migrate, breed, or winter within the project have the potential to be impacted by collisions with WTG or other project elements, such as power lines or meteorological towers, during project construction or operation. Collisions may occur with resident birds foraging and flying within the project site or with migrant birds seasonally moving through the area. However, because overall avian use of the project is lower compared to many areas in Southern California, where avian species concentrate at wetlands, oases, or along ridgelines where avian

[102] Powlesland, R.G. 2009. *Impacts of Wind Farms on Birds: A Review*. Science for Conservation: Volume 289. Wellington, New Zealand: Department of Conservation.

[103] Johnson, D.H. 2001. Habitat fragmentation effects on birds in grasslands and wetlands: a critique of our knowledge. Great Plains Research 11: 211-231.

[104] Bureau of Land Management (BLM). 2005. Final Programmatic Environmental Impact Statement on wind energy development on BLM administered land in the western United States. U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. USA.

[105] Johnson, D.H. 2001. Habitat fragmentation effects on birds in grasslands and wetlands: a critique of our knowledge. Great Plains Research 11: 211-231.

[106] Johnson, D.H. 2001. Habitat fragmentation effects on birds in grasslands and wetlands: a critique of our knowledge. Great Plains Research 11: 211-231.

species are known to migrate in moderate to high numbers, risk to migrating, breeding, or

Comment [FWS MB-TD20]: Was a comparison done? This statement is not well-supported. Low for all bird species in all seasons is difficult to show and should be presented in a comparative sense (i.e., low compared to what?). Please remove or provide citations comparing bird communities from other habitat types to the bird community found in habitats similar to that found at the project site.

Fatality rates for WTG collisions among facilities implementing appropriate carcass search methodologies across the United States are fairly consistent, with 42 of 63 studies (66.7 percent) reporting fatality estimates for all birds at or below 3.0 bird fatalities/MW/year.[107] When limiting the review to fatality rates documented for projects in arid environments in the western United States containing similar habitats, the average mortality rate is somewhat lower at 2.02 birds/MW/year (Table 4.2.3-1, *Estimates of Mean Bird Fatalities per Turbine and per Megawatt at Wind Energy Projects in the Arid Western United States*), which averaged 1.99 birds/MW/year.

~~In 2001, based on an estimate of 15,000 operational wind turbines in the U.S. by year's end, it was predicted that wind turbine collisions would result in approximately 10,000 to 40,000 bird fatalities per year. To put this into context, it is estimated that 100 million to well over 1 billion birds are killed each year as a result of collisions with all man-made structures (roads, power lines, communication towers, buildings, windows, and wind turbines). Altogether, it has been estimated that avian fatalities due to collisions with wind turbines amount to only 0.01 to 0.02 percent of anthropogenic avian fatalities in the U.S.~~[108]

Comment [FWS MB-TD21]: This is not relevant to this project. The goal of the BBCS is to describe how impacts to birds (and bats) from wind facility development and operations will be avoided, minimized, and mitigated. On a per hazard/turbine basis, wind projects still pose a significant hazard for birds and bats, so this should be the focus of this document.

Based on the results of fatality monitoring at other wind energy projects throughout the western U.S., the degree of WTG collision risk to birds at wind energy projects appears to be species-specific, except along important migration corridors where impacts are increased overall. For example, fatalities of common ravens, turkey vultures, and ferruginous hawks are generally low at studied wind energy projects; whereas fatalities of American kestrels, red-tailed hawks, and horned larks are more common.[109] Thus, the siting of a wind energy project in a migration corridor, in specific types of habitat, or in areas of high biodiversity, along with the behavior of individual species, plays an important role in the risk of WTG collision.

Avian species are also at risk from collision with power lines and related electrical transmission structures.[110,111,112]

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[107] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

~~[108] Erickson, W., G.D. Johnson, M.D. Strickland, D. P. Young, K. J. Sernka, and R. E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.~~

[109] Erickson, W. P., G. D. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[110] Arnett, E.B., D.B. Inkley, D.H. Johson, R.P. Larkin, S. Manes, A.M. Manville, J.R. Mason, M.L. Morrison, M.D. Strickland, and R. Thresher. 2007. Impacts of wind energy facilities on wildlife and wildlife habitat. Wildlife Society Technical Review 07-2. The Wildlife Society, Bethesda, Maryland.

[111] Drewitt, A.L. and R.H. W. Langston. 2006. Assessing the impacts of wind farms on birds. Ibis 148: 29-42.

[112] Janss, G.F.E. 2000. Avian Mortality from Power Lines: A Morphologic Approach of a Species-Specific Mortality. Biological Conservation. 95: 353-359.

species' flight frequency over power lines;[113] a species' flight performance is a better indicator of collision risk.[114] Species of birds susceptible to collisions with power lines generally have a large body size, long wingspan, heavy body, poor maneuverability, and poor vision.[115,116] For example, larger, heavy-bodied birds with short wingspans and poor vision are more susceptible than smaller, lighter-weight birds with larger wingspans, better agility, and more acute vision.[117] Examples of avian groups particularly susceptible to power line collision include loons, storks, grebes, waterfowl, and some species of hawks and eagles.[118] Environmental and engineering factors also influence risk of power line collision. Environmental factors can include land uses, weather, visibility, and lighting, while engineering factors can include size, placement, orientation, and configuration of lines, as well as structure type.[119] In general, construction of the project will not entail the construction or maintenance of overhead electrical transmission lines, as all power generated on the project will be transferred via underground electrical collectors to a substation via ancillary facilities of the adjacent Manzana Project. In an effort to avoid any streambed alterations on the project itself, small sections of overhead transmission lines may be installed over drainages, ~~but collision impacts from these small stretches of line are not anticipated to be substantial~~.

Comment [FWS MB-TD22]: This is poorly worded and doesn't make logical sense. Collision risk for a given species IS related to the passage rate for that species. Each species has a different baseline risk, based on the factors listed, so different species or avian taxa have different susceptibility.

Comment [FWS MB-TD23]: Again, this statement is not supported. It is enough to say that mortalities from transmission line collisions will be minimized by using underground lines wherever possible and then stating where and why this won't be possible everywhere.

A collision risk assessment for passerines and raptors is presented below, as these would be expected to be the general avian groups most likely to be affected by collision, since they make up the majority of avian use on the project.

Passerines

Of the nonraptor avian groups, MBTA-protected passerines (excluding introduced species such as house sparrows, European starlings, ~~and rock doves~~) constitute the most abundant avian fatalities at newer-generation wind energy projects, often comprising more than 80 percent of the avian fatalities.[120,121] For passerine species, there seem to be few patterns linking specific

Comment [FWS MB-TD24]: Not passerines.

[113] Rusz, P.J., Prince, H.H., Rusz, R.D., Dawson, G.A., 1986. Bird collisions with transmission lines near power plant cooling pond. Wildlife Society Bulletin 14: 441-444.

[114] Janss, G.F.E. 2000. Avian Mortality from Power Lines: A Morphologic Approach of a Species-Specific Mortality. Biological Conservation. 95: 353-359.

[115] Janss, G.F.E. 2000. Avian Mortality from Power Lines: A Morphologic Approach of a Species-Specific Mortality. Biological Conservation. 95: 353-359.

[116] Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

[117] Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

[118] Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

[119] Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

[120] Erickson, W., G.D. Johnson, M.D. Strickland, et al. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[121] Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, K.J. Sernka, and R.E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

species or groups with higher turbine collision risk; a wide variety of species have been observed as fatalities throughout the U.S.[122] Ninety-eight species of birds were recorded in Johnson and Erickson's 2011 synthesis of fatality reports from 23 wind energy projects in the Columbia Plateau Ecoregion (CPE) of Washington and Oregon.[123] Passerine fatalities at wind energy projects typically consist of both resident and migrant birds. In a synthesis of wind energy projects in the West and Midwest, nocturnal migrant fatalities made up between 34.3 and 59.9 percent of total fatalities;[124] however, the level of nocturnal migrant mortality is very low in proportion to the overall passage of nocturnal birds over wind energy projects where both nocturnal radar studies and fatality data have been collected.[125] For example, as many as 3.5 million birds per year migrated over the Buffalo Ridge, Minnesota, wind energy project, but the largest nocturnal migrant fatality event at this facility (and the single largest fatality event reported at any western U.S. wind energy project) was 14 birds at two turbines during data collected during spring migration.[126] Marine radar surveys for proposed wind energy projects have found that the majority of nocturnal migrants fly above the rotor-swept zone, putting them out of risk of turbine collision.[127]

Passerine observations were recorded in structured 30-minute unlimited distance bird use count (BUC) surveys between winter 2011–2012 and fall 2012. The species observed during these surveys includes a range of resident and migratory passerines common in the Mojave desert region of Southern California (Appendix A, *Bird and Bat Compendium*). The five species most often observed during BUCs were all common passerines and included, in order of abundance, house finch, white-crowned sparrow, western meadowlark, lark sparrow, and common raven.

The bird community and habitat composition at the project is similar to that documented at the Tehachapi Pass WRA and the San Gorgonio Pass WRA, both located in Southern California, and thus bird utilization and fatality data from these projects may be useful to indicate patterns of passerine fatalities that are likely to occur at the project. The Tehachapi Pass WRA is a large, diverse wind project, including over 3,000 operating turbines, in a project area that ranges from Mojave desert to high foothills of the Tehachapi Mountains in Kern County, California.

[122] Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[123] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[124] Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, K.J. Sernka, and R.E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[125] Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared for: Bonneville Power Administration, Portland, OR. Prepared by: WEST, Inc., Cheyenne, WY.

[126] Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. *Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-year Study*. Prepared for: Northern States Power Company, Minneapolis, MN. Prepared by: WEST, Inc., Cheyenne, WY.

[127] Young, D.P., Jr., and W.P. Erickson. 4–7 June 2006. "Wildlife Issue Solutions: What Have Marine Radar Surveys Taught Us about Avian Risk Assessment?" Presented at the American Wind Energy Association Windpower 2006 Conference and Exhibition, Pittsburgh, PA.

Preconstruction bird utilization studies and fatality studies were delineated by distinct geographic areas of this WRA. The East Slope area of the Tehachapi WRA, which is characterized by desert shrubland with areas of perennial grasslands, junipers, Joshua trees, and creosote bushes, is similar to the habitats present at the project. Common raven, horned lark, western meadowlark, European starling, and dark-eyed junco were the five most abundant identified passerine species recorded in the East Slope between fall 1996 and summer 1998 during bird utilization counts.[128] Several of these common species also appear to be those most likely to be exposed to potential WTG collisions. Despite relatively high use and exposure, common ravens are rarely reported as fatalities according to monitoring studies at other wind energy facilities.[129,130] At the Tehachapi WRA in California, common ravens were found to be the most common large bird, yet few fatalities for this species were documented during intensive mortality studies.[131] A total of six passerines were recorded as fatalities at the East Slope of the Tehahchapi WRA during regular carcass searches between October 1996 and May 1998, only four of which could be identified to species. This included two fatalities each of horned lark and western meadowlark, each comprising 10.5 of all avian fatality observations at the East Slope. Similarly, bird utilization and fatality surveys were conducted concurrently at the San Gorgonio WRA, a project containing approximately 3,000 wind turbines, located in a narrow, low-elevation pass in the Coachella Valley of Southern California.[132] Vegetation in the WRA is dominated by creosote bush, white bursage, brittlebush, and scalebroom. House finch, common raven, European starling, white-crowned sparrow, and white-throated swift were the five most abundant identified passerine species recorded between March 1997 and May 2008. Four passerine fatalities accounted for 12.5 percent of the 32 total avian fatalities documented at near-turbine carcass search sites. These four fatalities included one each of common raven, European starling, white-throated swift, and western meadowlark. Three of these species were also among the five most frequently detected passerines during bird utilization surveys. It should be noted that for both WRAs, carcass search methods were not specifically designed to provide standardized estimates of avian mortality, and in some cases, the long interval between searches (in some cases 90 days), could lead to a high level of uncertainty in overall fatality estimates when searcher efficiency and carcass removal rates are considered. However, given the few publicly available postconstruction mortality reports for habitats similar to the project in Southern California, these two projects ~~give a sense of the~~provide information on the relationship between passerine use and the composition of~~rates of~~ fatalities that have occurred ~~for~~ on projects operating in similar habitats with similar passerine species assemblages.

Comment [FWS MB-TD25]: As pointed out, these studies are deficient for estimating fatality rates. All that these data can tell you is that certain species have suffered mortality. Proper estimators would need to be used to determine the magnitude of the mortalities or the rates at which they occurred.

[128] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[129] Erickson, W., G.D. Johnson, M.D. Strickland, et al. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology Inc., Cheyenne, WA. Prepared for: National Wind Coordinating Committee, Washington, DC.

[130] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[131] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[132] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

Assuming that the project has similar mortality rates as the two WRAs summarized above, as well as that of the other wind energy projects in the arid western U.S. (Table 4.2.3-1), it is unlikely that populations of passerine bird species would be adversely affected by direct mortality from collisions as a result of project construction or operation; any impacts would be on individuals and not species. Collision risk will be further minimized through measures taken by HW during construction and operation, such as ground disturbance restrictions, collection line burial, lighting minimization, and low-impact turbine and met tower design (summarized in Section 5.0).

Comment [FWS MB-TD26]: See comment above.

Comment [JAR27]: What about the two surrounding projects (Manzana and Pacific Wind)? Their post-construction monitoring results would be most useful to inform this project given their locations adjacent to the proposed project. At a minimum, Iberdrola should be able to summarize what has been documented at its Manzana site.

And if those two project sites could be added to the list below, that would be good too.

TABLE 4.2.3-1
ESTIMATES OF MEAN BIRD FATALITIES PER TURBINE AND PER MEGAWATT AT WIND ENERGY PROJECTS IN THE ARID WESTERN UNITED STATES

Wind Energy Project and Location	Survey Years	Habitat	Estimated Mean Bird Fatality/ Turbine/Year	Estimated Mean Bird Fatality/ MW/Year	Estimated Raptor Fatality/ Turbine/Year	Estimated Raptor Fatality/ MW/Year	Reference
Alite, CA	2008–2009	Shrub/scrub grassland	n.d.	0.55	n.d.	0.12	Chatfield, A., W.P. Erickson, and K. Bay. 2010. Final Report: Avian and Bat Fatality Study at the Alite Wind-Energy Facility, Kern County, California. Final Report: June 15, 2009-June 15, 21010. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. Prepared for CH2M Hill, Oakland, CA.
Biglow Canyon Phase I, OR	2008	Dryland agriculture, Conservation Reserve Program (CRP) grassland, shrub-steppe	2.9	1.76	0.06	0.03	Jeffrey, J.D., K. Bay, W.P. Erickson, M. Sonneberg, J. Baker, M. Kesterke, J.R. Boehrs, and A. Palochak. 29 April 2009. *Portland General Electric Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring First Annual Report, Sherman County, Oregon. January 2008 - December 2008*. Technical report prepared for Portland General Electric Company, Portland, OR. Prepared by Western EcoSystems Technology (WEST) Inc., Cheyenne, WY.
Biglow Canyon Phase II, OR	2010–2011	Dryland agriculture, CRP grassland, shrub-steppe	5.98	2.6	0.06	0.03	Enk, T., K. Bay, M. Sonnenberg, and J.R. Boehrs. 2012. *Year 2 Post-Construction Avian and Bat Monitoring Report, Biglow Canyon Wind Farm Phase II, Sherman County, Oregon. September 13, 2010 – September 15, 2011*. Technical report prepared for Portland General Electric, Portland, OR. Prepared by WEST, Cheyenne, WY.
Biglow Canyon Phase III, OR	2010–2011	Dryland agriculture, CRP grassland, shrub-steppe	5.25	2.28	0.11	0.05	Enk, T., K. Bay, M. Sonnenberg, and J.R. Boehrs. 2012. *Draft Year 1 Avian and Bat Monitoring Report, Biglow Canyon Wind Farm - Phase III, Sherman County, Oregon, September 13, 2010 – September 9, 2011*. Technical report prepared for Portland General Electric Company, Portland, OR. Prepared by WEST, Cheyenne, WY.
Buena Vista, CA	2008–2009	Grassland, grazeland, sagebrush chaparral	1.15	1.15	0.44	0.44	Insignia 2009. *2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project*. Report prepared for Contra Costa County. Insignia 540 Bryant Street Suite 200, Palo Alto, CA 94301.
Dillon, CA	2008–2009	Desert scrub	n.d.	4.71	n.d.	0.00	Chatfield, A., W. Erickson, and K. Bay. 2009. Avian and Bat Fatality Study, Dillon Wind-Energy Facility, Riverside County, California. Final Report: March 26, 2008 – March 26, 2009. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 3, 2009.
Dry Lake, AZ	2009–2010	Desert scrub and grazeland	4.66	2.22	0.00	0.00	Thompson, J., D. Solick, and K.Bay. 2011. Post-construction Fatality Surveys for the Dry Lake Phase I Wind Project, Iberdrola Renewables: September 2009-November 2010. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 10, 2011.
Elkhorn Valley, OR	2008	Dryland agriculture and grazeland	1.06	0.64	0.10	0.06	Jeffrey, J.D., W.P. Erickson, K. Bay, M. Sonneberg, J. Baker, J.R. Boehrs, and A. Palochak. 2009. *Horizon Wind Energy, Elkhorn Valley Wind Project, Post-Construction Avian and Bat Monitoring, First Annual Report, January-December 2008*. Technical report prepared for Telocaset Wind Power Partners, a subsidiary of Horizon Wind Energy, Portland, OR. Prepared by WEST, Cheyenne, WY.
Foote Creek Rim, Phase I	1999–2002	Mixed grass prairie, sagebrush shrubland	1.5	n.d.	0.03	n.d.	Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. *Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002*. Prepared for Pacificorp, Inc. Portland, OR, SeaWest Windpower Inc. San Diego, CA, and Bureau of Land Management, Rawlins District Office, Rawlins, WY.
High Winds, CA	2003–2005	Agriculture, grassland	2.45	1.36	n.d.	n.d.	Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.
Hopkins Ridge, WA	2006	Agriculture, grassland	2.21	1.23	0.25	n.d.	Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. *Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006*. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, WA. WEST, Cheyenne, WY.
Judith Gap, MT	2006–2007	Native Short-grass prairie, dryland agriculture, CRP grassland	4.52	3.01	n.d.	n.d.	TRC Environmental Corporation. January 2008. *Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana*. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416).
Judith Gap, MT	2009	Native Short-grass prairie, dryland agriculture, CRP grassland	3.33	2.22	0	0	Poulton, V., and W. Erickson. 2010. *Post-Construction Bat and Bird Fatality Study, Judith Gap Wind Farm, Wheatland County, Montana*. Prepared for: Judith Gap Energy LLC. Prepared by: Western EcoSystems Technology, Inc. (WEST), Cheyenne, WY.
Klondike I, OR	2001–2002	Dryland agriculture, grazeland, CRP grassland	1.42	0.95	0.00	0.00	Johnson, G.D., W.P. Erickson, and J. White. March 2003. *Avian and Bat Mortality during the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon*. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by WEST, Cheyenne, WY.
Klondike II, OR	2007–2009	Dryland agriculture and grazeland	4.71	3.14	0.17	0.11	Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. 17 July 2007. *Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon*. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, OR. Analysis conducted by WEST, Cheyenne, WY.

Comment [FWS MB-TD28]: Unpublished references need to be provided.

TABLE 4.2.3-1
ESTIMATES OF MEAN BIRD FATALITIES PER TURBINE AND PER MEGAWATT AT WIND ENERGY PROJECTS IN THE ARID WESTERN UNITED STATES, *Continued*

Wind Energy Project and Location	Survey Years	Habitat	Estimated Mean Bird Fatality/ Turbine/Year	Estimated Mean Bird Fatality/ MW/Year	Estimated Raptor Fatality/ Turbine/Year	Estimated Raptor Fatality/ MW/Year	Reference
Klondike III, OR	2007–2009	Agriculture, Columbia Basin shrub-steppe	5.65	3.19	0.27	0.15	Gritski, R., S. Downes, and K. Kronner. [21 April 2010] Updated September 2010. *Klondike III (Phase 1) Wind Power Project Wildlife Monitoring: October 2007-October 2009*. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon, for Klondike Wind Power III LLC. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, OR.
Nine Canyon, WA	2002–2003	Dryland agriculture, CRP grassland, grazed shrub-steppe	3.59	2.76	0.07	n.d.	Erickson, W.P., K. Kronner, and R. Gritski. October 2003. *Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003*. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, OR.
San Gorgonio Phase I and II, CA	1997–1998; 1999–2000	Desert shrub	0.04	n.d.	0.003	n.d.	Anderson, R., J. Tom, N. Neumann, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997-May 29, 1998, Phase II Field Work: August 18, 1999 – August 11, 2000.
Stateline, OR/WA	2001–2003	Dryland agriculture, native grassland, CRP grassland, limited sagebrush	1.93	2.92	0.06	n.d.	Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. December 2004. *Stateline Wind Project Wildlife Monitoring Annual Report. July 2001 - December 2003*. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee. WEST, Cheyenne, WY.
Stateline, OR/WA	2006	Dryland agriculture, native grassland, CRP grassland, limited sagebrush	0.81	1.23	0.07	n.d.	Erickson, W.P., K. Kronner, and K.J. Bay. 2007. *Stateline 2 Wind Project Wildlife Monitoring Report, January - December 2006*. Technical report submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.
Vancycle, OR	1999	Dryland agriculture, grassland	0.63	0.95	0.00	0.00	Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. *Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon*. Technical Report prepared by WEST, Inc., for Umatilla County Department of Resource Services and Development, Pendleton, OR.
Wild Horse, WA	2007	Mixed grass prairie	2.79	1.55	0.17	n.d.	Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. *Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington*. Prepared for Puget Sound Energy, Ellensburg, Washington, by WEST, Cheyenne, WY.
Mean Bird and Raptor Fatalities per Turbine and per Megawatt			**2.83**	**2.02**	**0.10**	**0.08**	

NOTE: Project data listed above as "n.d." did not have publicly available data for that particular fatality parameter, or not enough information was available to facilitate conversion between MW/year and turbine/year. The mean calculated for each of the four parameters was only made with projects for which data was available for that parameter).

Comment [FWS MB-TD28]: Unpublished references need to be provided.

Raptors

Raptors appear to have a higher risk of turbine collision than other bird species in general, when use rates and fatality estimates are compared. For example, raptors typically make up an average of 6 percent of total reported wind energy project avian fatalities, yet often represent far less than 6 percent of recorded observations during preconstruction avian surveys.[133]

Substantial data on raptor mortality due to wind turbine collision at wind energy projects are available from studies throughout the western and midwestern U.S.[134] Relatively high numbers of raptor fatalities have been documented at some wind energy projects like Altamont Pass, with an estimate of 0.10 raptor per turbine per year between 1999 and 2000.[135] However, a review of studies at wind energy projects across the U.S. reported that collision-related raptor fatalities amounted to only 0.033 raptor fatality per turbine per year.[136] At newer-generation wind energy projects in the U.S., raptor mortality has been absent to relatively low when compared to that at Altamont Pass. Newer-generation wind energy projects are generally composed of fewer, larger, and slower-moving turbines, and raptor mortality at these plants has been found to range from 0 to 0.04 raptor fatality per turbine per year.[137] A multitude of factors likely influence the range of fatality rates that are observed between wind energy projects, such as species abundance, local concentrations, species-specific behaviors, weather, and facility characteristics.[138] For raptors in particular, abundance appears to explain a significant portion of the variability in raptor fatality rates between different wind energy projects. A regression analysis of raptor use and mortality for 13 newer-generation wind energy projects, where similar methods were used to estimate raptor use and mortality, found that there was a significant positive correlation between raptor use and mortality at different sites.[139]

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[133] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

[134] Young, D.P., Jr., J.D. Jeffrey, K. Bay, and W.P. Erickson. 2009. *Puget Sound Energy, Hopkins Ridge Wind Project Phase 1, Post-Construction Avian and Bat Monitoring, Second Annual Report, January–December 2008*. Prepared for: Puget Sound Energy, Dayton, WA.

[135] Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, K.J. Sernka, and R.E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[136] Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, K.J. Sernka, and R.E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[137] Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[138] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

[139] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

Average (mean) raptor use noted to date was calculated at the project for comparison with data from similar wind energy projects in the western U.S., particularly those that have completed postconstruction monitoring. This comparison is useful in assessing the potential for raptor collision mortality at the project. Overall, raptor abundance in an area explains much, though not all, of the variability in raptor mortality rates across wind energy projects. As described in Section 3.1.1.1, *Tylerhorse Bird Use Counts 2011–2012*, the overall mean raptor use noted to date at the project has been 0.13 raptor observed per plot per 20-minute survey period based on 12 months of observations. This metric for the project is below the range of mean raptor use values reported by 13 newer-generation wind energy projects throughout the West and Midwest U.S.: 0.29 to 2.34 raptors observed per plot per 20-minute survey period.[140] Additionally, the project's mean raptor use is consistent with, if not much lower than, observed raptor use at 25 wind energy projects in the CPE of Washington and Oregon, which ranged between 0.26 and 1.64 raptors observed per plot per 20-minute survey period, with an overall average of 0.68.[141]

Similarly, raptor migration studies completed on the neighboring Manzana Project in 2004 and 2005 also found raptor use of the site to be low, especially compared with similar data collected at other raptor migration monitoring sites in Kern County and the western United States.[142] For example, fall 2005 raptor migration at the project resulted in an observation rate of 0.5 hawk/hour, whereas similar studies from the Goshute Mountains in Nevada (20.0 hawks/hour), Lipan Point in Arizona (4.8 hawks/hour), and the Marin Headlands in northern California (53.8 hawks/hour) resulted in much higher rates of raptor observation.

A total of five raptor species were detected on the project during the course of BUCs between 2011 and 2012, including (in order of abundance), red-tailed hawk, prairie falcon, American kestrel, northern harrier, and merlin. During the fall 2005 raptor migration study at the adjacent Manzana Project, three raptor species with no special status were the most commonly observed species, including the turkey vulture (42 percent of observations), red-tailed hawk (26 percent of observations), and American kestrel (11 percent of observations).[143] As a result of their use of the project area, these would be expected to be the raptor species with the highest collision risk on the project. The prairie falcon, northern harrier, and merlin are all considered species of special concern, and risk assessments for these species will be provided in Section 4.3, *Impacts to Special-Status Bird Species*. Of the three remaining species, turkey vultures appear less susceptible to turbine collision than most other raptors despite their high use and exposure. This is likely due to their foraging behavior and a propensity to scavenge rather than actively hunt.[144] Despite the fact that large groups of turkey vultures move through the Tehachapi Mountains during fall and spring migration, there was no turkey vulture mortality over a 1-year and 7-month

[140] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

[141] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[142] Bloom, Peter H. March 2006. *Fall 2005 Raptor Migration Study of the Proposed PdV Wind Energy Project Kern County, California*. Prepared for: Sapphos Environmental, Inc., Pasadena, CA.

[143] Bloom, Peter H. March 2006. *Fall 2005 Raptor Migration Study of the Proposed PdV Wind Energy Project Kern County, California*. Prepared for: Sapphos Environmental, Inc., Pasadena, CA.

[144] Orloff, S., and A. Flannery. 1992. *Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas*. Work Performed by: BioSystems Analysis, Inc., Tiburon, CA. Sacramento, CA: California Energy Commission.

study in the 637-turbine Tehachapi WRA.[145] American kestrels and red-tailed hawks, on the other hand, appear particularly susceptible to collision with wind turbines. Unlike turkey vultures, red-tailed hawks forage by stooping on prey, which requires high-speed flights and high concentration.[146] Due to their high abundance in many areas and active hunting behavior, red-tailed hawks seem very susceptible to collision at wind energy projects. In a synthesis of avian fatality data at several well-studied wind energy facilities over several years, the red-tailed hawk was the most abundant fatality, raptor or otherwise, at Altamont Pass (36 percent of total fatalities), Montezuma Hills (31 percent of total fatalities), and Tehachapi Pass (10.2 percent of total fatalities).[147] American kestrels are also not only one of the more commonly observed species at wind energy projects but also typically one of the more commonly recorded raptor fatalities.[148] This species accounted for 20 percent of raptor fatalities during mortality studies at the Tehachapi WRA.[149] Similarly, American kestrels accounted for 1.9 percent of all bird fatalities (19 total fatalities) during mortality studies at 23 wind energy projects in the CPE of Washington and Oregon, and was the most frequently detected raptor fatality.[150] Based on their documented presence within the project and in neighboring project areas, as well as their seemingly high propensity for collision with wind turbines, fatalities of both red-tailed hawks and American kestrels are likely during the life of the project, though population-level impacts are not expected from such a small project.

Average annual fatality estimates for raptors reported by 13 newer-generation wind energy projects throughout the West and Midwest U.S., including California, ranged from 0.00 to 0.87 raptor per MW per year.[151] Of 22 projects in the arid Western United States, for which raptor fatality information is publicly available, the average raptor fatality rate was 0.08 raptors/MW/year (Table 4.2.3-1).

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[145] Anderson, R.N., J.T. Neumann, W.R. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. *Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area*. Golden, CO: National Renewable Energy Laboratory, U.S. Department of Energy.

[146] Orloff, S., and A. Flannery. 1992. *Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991*. Final Report to Alameda, Contra Costa and Solano Counties and the California Energy Commission. Prepared by: Biosystems Analysis, Inc., Tiburon, CA.

[147] Erickson, W., G.D. Johnson, M.D. Strickland, et al. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[148] Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[149] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[150] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[151] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

Based on comparisons with a range of mean raptor use rates and raptor fatality rates from operating wind energy projects around the western U.S., particularly those that are located in similar habitats to that of the project, rates of non-special-status raptor fatalities will likely be in the low range of these other known projects. ~~In general, it has been shown that, besides at Altamont, raptor fatality rates are relatively low at most modern wind energy projects.~~[152] All of the most frequently detected species observed on the project as a result of BUCs and raptor migration surveys, that are not designated as special status, are generally widespread and numerous in appropriate habitat throughout California. ~~As such, it is unlikely that non-special-status raptor mortality rates at the project, which are predicted to be similar to low rates observed at other wind energy projects in the arid West, will result in population-level impacts.~~ Post-construction fatality monitoring, ~~and~~ nest occupancy, and productivity monitoring will provide the objective evidence to ~~support this conclusion~~evaluate raptor mortalities.

Comment [JAR29]: Again, can a comparison be made with results with the neighboring facilities given there should be at least a year or two of data for those?

Comment [FWS MB-TD30]: This is way too general. There has been significant raptor mortality on a range of projects. Older projects have not had adequate monitoring and there are a lot of projects without any monitoring at all. I am not aware of a meta-analysis on this topic in the published literature. Please delete. Table 4.2.3-1 is an adequate summary.

Comment [FWS MB-TD31]: This statement is not supported and is unnecessary. Any level of mortality is of concern under MBTA.

4.2.4 Electrocution

Overhead power lines, which are often an integral component of wind energy projects, can pose an electrocution risk to birds.[153] Avian electrocutions have typically been associated with distribution lines, which transmit electricity at less than 69 kilovolts (kV) to residences, businesses, and other individual users, as opposed to transmission lines, which are typically energized at 115 kV and above.[154] Electrocution occurs when birds come into contact with energized equipment.[155] Typically, this occurs for large birds, particularly raptors, whose outstretched wings (flesh to flesh contact, as feathers are typically nonconductive) easily span the distance between energized conductors, or a conductor and grounded hardware, thus completing a circuit that results in electrocution. Of the 50 species of diurnal raptors and owls that regularly breed in North America, 29 species have been reported as electrocution victims.[156] Raptors possess the requisite large wingspan and also regularly use power poles for hunting, resting, feeding, nesting, and territorial defense in open habitats that lack trees, and are therefore particularly susceptible to electrocution.[157] However, small birds can also be electrocuted on closely spaced equipment such as transformers. An additional 30 non-raptor species have been documented as electrocution victims, including crows, ravens, magpies, jays, storks, herons, pelicans, gulls, woodpeckers, sparrows, kingbirds, thrushes, starlings, and

~~[152] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.~~

[153] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

[154] Lehman, R.N. 2011. Raptor electrocution on power lines: current issues and outlook. Wildlife Society Bulletin: 29(3): 804-813.

[155] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

[156] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

[157] Lehman, R.N. 2011. Raptor electrocution on power lines: current issues and outlook. Wildlife Society Bulletin: 29(3): 804-813.

pigeons.[158]

The majority of electrical transmission components on the project will be in the form of underground electrical connector lines that will connect at collector sites located off-site on the constructed Manzana Project. Depending on final engineering design, some overhead transmission lines may be constructed over drainages at the project in order to avoid streambed alterations; though the possibility also exists that lines may be bored underneath drainages. In the event overhead transmission lines are installed on the project, all will be designed in compliance with APLIC recommendations, including 60 inches of horizontal separation and 40 inches of vertical separation between phase conductors and/or grounded hardware, as well as insulation or covering of phases and grounds.[159] ~~With these modifications in place, avian electrocution on the project will be highly unlikely.~~

Comment [FWS MB-TD32]: This conclusion is qualitative and not supported. Any level of mortality is of concern under MBTA. Please delete.

4.3 IMPACTS TO SPECIAL-STATUS AVIAN SPECIES

~~It has been determined that~~ Implementation of the project has the potential to result in impacts to 17 sensitive avian species that were documented within and adjacent to the project property as a result of field surveys, or have a high likelihood of presence during the approximately 30-year life of the project. Individual assessments of species' collision risk with WTGs as well as indirect impacts from the construction and operation of the project are presented below, in taxonomic order. In general, there is a dearth of recent, publicly available fatality monitoring results for wind energy projects in Southern California desert environments. As such, fatality results for each of the following special-status species are presented for both the San Gorgonio and Tehachapi WRAs, wind energy projects that contain a variety of turbine styles and shapes, for which carcass results were conducted in the late 1990s and early 2000s.[160,161] Fatality results for Johnson and Erickson's 2011 synthesis of fatality reports from 23 wind energy projects in the CPE of Washington and Oregon are also presented, as these provide recent standardized data from modern wind energy projects in habitat that resembles that of Southern California.[162] These 23 wind energy projects contain approximately 4,000 MW of wind energy; therefore, it is important to consider the cumulative nature of results when total fatalities of individual species are reported.

Comment [FWS MB-TD33]: Provide Citation for CEQA or NEPA document, if that is the appropriate source.

Comment [JAR34]: As above, there should be results from Iberdrola's own Manzana project, at a minimum. How do those compare?

4.3.1 American White Pelican

[158] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

[159] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

[160] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[161] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[162] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

The American white pelican is listed as a species of special concern by the CDFW. The species of special concern designation is limited to its nesting colonies. American white pelicans breed in colonies throughout the northern United States and Canada, typically in large freshwater lakes on small islands or remote dikes. This species is migratory within the Antelope Valley, travels in large flocks during migration, and has the potential to migrate over the project in spring or fall. Large migrating flocks of American white pelicans were observed soaring over the adjacent Manzana Project during fall and spring raptor migration counts in both 2004 and 2005. Flocks of 50 to up to 2,270 individuals were observed, with the majority of flocks flying below 500 feet and therefore within the rotor-swept zone [91–460 feet, as determined by the specifications of two potential turbine types that may be used on the project (Table 1.2-1). However, this is subject to change based on turbine availability]. No American white pelicans were observed on the Pacific Wind Project or during BUCs or reconnaissance surveys of the current project.

The project is located outside the known breeding range for American white pelican. There are no aquatic habitats that would provide foraging or nesting opportunities for this species within the project; therefore, there are no anticipated impacts to American white pelicans from disturbance/displacement, habitat fragmentation, or electrocution effects. American white pelicans flying within the project property would only have exposure to turbine mortality during migration. No American white pelican fatalities have been reported at wind energy projects in the arid West. Due to this species' propensity to travel in migratory flights and to fly at lower altitudes, the project may result in impacts to American white pelicans due to direct impacts from wind turbine collision; however, due to the lack of reported instances of fatalities of this species associated with wind energy projects, this species is expected to have a relatively low risk of collision on the project.

4.3.2 California Condor

Comment [JAR35]: General note – California condor sections of the DEIS and the associated BBCS will need to be updated with more recent information.

The California condor is listed as endangered pursuant to both the federal and state ESAs and is also a state fully protected species. The potential for take of this species from the operation, construction, and decommissioning of the project are being considered in a Biological Assessment prepared pursuant to a Section 7 consultation under the ESA between the BLM and USFWS.

There are no historical records for California condors within the project area; nor have there been any observations as a result of more than 9 years of avian surveys between 2004 and 2013 on the project and other renewable energy projects to the north, south, and east. Furthermore, USFWS GPS-based condor location data for the past 8 years reveal that despite relatively high condor use in suitable foraging habitat approximately 6 miles north and northwest of the project, near Table Mountain, there is currently an extremely low probability of condors occurring on the project site due to the significant difference in ecological, meteorological, and topographical characteristics between the Antelope Valley, where the project is located, and the Tehachapi uplands, which provides preferred foraging habitat for condors. However, condors are opportunistic scavengers and can be expected to utilize carcasses wherever they are found.[163] Therefore, ~~despite the unlikely probability of a condor utilizing the floor of the Antelope Valley in the vicinity of the project,~~ it cannot be conclusively stated that condors will never fly within the project boundary during the life of the project (estimated to be 30 years), and risks to

Comment [FWS MB-TD36]: This is a speculative statement. Not well supported by the information presented. Provide citation or additional specifics.

Comment [JAR37R36]: Please re-assess with more recent information and considering the increasing population and range of the condor over the life of the project. Also, condors historically occurred in the Antelope Valley and other areas on the east slope of the Tehachapi and southern Sierra Nevada.

Comment [JAR38]: We have records of condors using the floor of the central valley on the north side of the Tehachapis and there is no reason to expect any different to the south.

[163] U.S. Fish and Wildlife Service. 1996. *California Condor Recovery Plan.* 3rd Revision. Portland, OR.

this species from the construction and operation of the project should be assessed.

Disturbance, Displacement, and Habitat Fragmentation

The project area contains potential, albeit marginal, foraging habitat for condors. Condors have not been documented to use the proposed project and surrounding areas as foraging habitat, even though nonnative grassland and native grassland habitats, which condors use, are available within the project vicinity, though they are generally of low quality. The project does not contain extensive grasslands and oak savannah, habitat preferred by condors for foraging. The sparser vegetation in the project property and surrounding region provides limited grazing for seasonal livestock operations. There are no substantial native populations of ungulates such as deer within the project area; therefore, there is limited recreational hunting activity for ungulates, such as deer and feral pigs, which are more plentiful in the Tehachapi Mountains. Potential for carrion in the proposed project would be limited by periods of seasonal grazing activities by sheep, or by occasional trespass of cattle onto public land. Construction of the project would result in the disturbance of approximately 119.4 acres of vegetation, approximately 9.9 percent of the total project property. In addition, as a means of limiting condor attraction to the site, the project proponent is committed to removing any carcasses found on the project. This would effectively result in the loss of the entire project as potential foraging habitat for condors. However, the loss of 1,207 acres of marginal foraging habitat in a region that still contains plentiful appropriate condor foraging habitat is thought to be negligible. As condors do not currently use this habitat for foraging, nor are they likely to use it for nesting or roosting, disturbance, displacement, and habitat fragmentation impacts to this species from construction and operation of the project are not expected.

Comment [FWS MB-TD39]: Provide citation. How is it "low quality"? This is also qualitative. Rephrase with more substantive information.

Comment [JAR40]: However, see Rivers et al (2014). "Previous authors indicated that grassland and oak (Quercus spp.) savanna comprises historically important foraging areas for condors, so it was somewhat surprising that our analysis revealed that condors did not exhibit strong selection of either grassland or savanna habitats within their home range… Selection for sparse vegetation and coastal habitats likely reflects several important features of condor foraging ecology: habitats where food resources (i.e., animal carcasses) and potential predators can be detected, and habitats that have terrain that is amenable for taking off from the ground in flight…"

Collision

The main direct operational effect of the proposed action on California condors, ~~in the extremely low probability event that a condor were to travel outside the historic range and into the Antelope Valley (0.0012 percent of GPS tagged condor observations between 2005 and 2012),~~ would be the potential for collision with WTGs. The ability of condors to avoid WTGs, or other large, stationary project elements is unknown~~; however, the closely monitored Southern California condor population has coexisted with wind energy projects in the Tehachapis for nearly 30 years without a single reported incident of collision~~.

The turkey vulture, a common species throughout the Antelope Valley, is a large, scavenging species with a slightly lower wing-loading ratio than the condor. As a result of its high use of many wind farms in the region, this would be expected to be a species with a high degree of collision risk. Turkey vultures, however, appear less susceptible to turbine collision ~~than most other raptors~~in this area despite their high use and exposure. There ~~was~~ were no reported turkey vulture mortalities~~y~~ over a 1-year, 7-month study in the 637-turbine Tehachapi Pass WRA between 1996 and 1998, although a total of 404 turkey vultures were observed during concurrent bird use surveys.[164]

Comment [JAR41]: There is no exact historic range accurately mapped to a scale that allows this level of analysis. Condors historically occurred in the Antelope Valley and other areas on the east slope of the Tehachapi and southern Sierra Nevada.

Comment [JAR42]: This statement is misleading as the situation in the Tehachapis regarding turbines and condors is not static. The number and size of turbines have been increasing and at the same time the number and range of condors have been increasing.

Comment [FWS MB-TD43]: This is a limited, short duration study.

[164] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

The California condor is also similar in size and ecological characteristics to the old world griffon vulture (*Gyps fulvus*). Both species are large scavengers that have highly social feeding behavior, congregate in large numbers at feeding and bathing sites, and associate in communal roosts at both nesting and foraging regions.[165] This species has been shown to be susceptible to WTG collision in Spain, where approximately 0.12 griffon vulture/turbine/year were estimated to be killed at two wind farms on the Iberian Peninsula. However, the griffon vulture is relatively common within its range, and its breeding range directly overlaps with numerous wind farm installations.[166,167] Furthermore, the two Iberian Peninsula wind farms at which the study was completed are located on mountaintop ridges—the same types of ridges predominately used by soaring raptors. Data for large birds of prey in Europe indicate that these species are most susceptible to collision with WTGs when turbines are placed within close proximity to primary movement corridors, nesting areas, or within areas of high concentrations.[168] In comparison, the project property is located more than 2 miles from the historic range of the condor, where the vast majority of condor movement is concentrated. All recent California condor nesting sites are located on public lands within the Los Padres, Angeles, and Sequoia National Forests.[169] The closest of these national forests is the Angeles, the border of which is located 15 miles south of the project property. Furthermore, with a population of just 64 individuals and a range that now extends over eight California counties, the free-flying Southern California flock of condors could not be considered highly concentrated.

Condors do not currently use the project~~; therefore in the short term, their risk from collision with~~. However, the Southern California flock of condors is growing; USFWS tracking indicates that they are using more of their historic range than in the recent past, and there is potential for the California condor to occupy its historic range or expand its current range during the life of the project, which is estimated to be 30 years. The system will also have an adaptive management component, in case condor use increases near the project or if improved technology allows for an even more reliable monitoring system to be installed.

Comment [FWS MB-TD44]: If this is not applicable, then remove the reference to griffon vultures.

Comment [JAR45]: As of March 31, 2014, there were 70 southern California birds and 131 total in the wild California population (including Pinnacles and Ventana).

Comment [FWS MB-TD46]: If the risk has been quantified, please provide it here or remove this speculative statement.

Comment [JAR47]: As has been discussed and as noted above, this entire California condor section will need to be revised/updated as Iberdrola develops its avoidance plan and through the BLM and FWS consultation process. The resultant plan should be referenced here.

Electrocution

Rideout's analysis of primary cause of death for the entire wild-flying California condor population between 1992 and 2009 showed that during the initial years of the reintroduction program, power line collisions and electrocution were a frequent problem in California. Seven

[165] Snyder, N.F., and J. Schmitt. 2002. "California Condor (*Gymnogyps californianus*)." In *The Birds of North America*. Philadelphia, PA.

[166] Barrios, L., and A. Rodriguez. 2004. "Behavioural and Environmental Correlates of Soaring-Bird Mortality at On-Shore Wind Turbines." *Journal of Applied Ecology*, *41*: 72–81.

[167] Tellería, J.L. 2009. Overlap between wind power plants and Griffon Vultures Gyps fulvus in Spain. Bird Study 56(2): 268-271.

[168] Barrios, L., and A. Rodriguez. 2004. "Behavioural and Environmental Correlates of Soaring-Bird Mortality at On-Shore Wind Turbines." *Journal of Applied Ecology*, *41*: 72–81.

[169] Dudek. 2009. *Tehachapi Upland Multiple Species Habitat Conservation Plan*. Prepared for: Tejon Ranchcorp. Prepared by: Dudek, Encinitas, CA. Available at: http://www.fws.gov/ventura/endangered/habitat_conservation_planning/hcp/docs/draft/TehachapiUpland/04_Section4_CaliforniaCondor.pdf

confirmed condor deaths from electrocution were documented between 1992 and 2007.[170] USFWS, in response to this issue, began a power pole aversion training for releasable condors in 1994 in an attempt to train the birds to avoid perching on power lines. Since this training began, there has been a significant decline in condor deaths attributable to power line collisions or electrocutions, and there have been no recorded deaths from this source since 2007.[171]

There are no overhead transmission lines proposed for construction within the project property, only limited instances of overhead collector line crossings of streambeds. APLIC standards will be used to construct any overhead collector lines to reduce electrocution risk to California Condors~~; therefore, there is a very low risk of electrocution with transmission lines for California condors on the project site~~.

4.3.3 White-Tailed Kite

The white-tailed kite is a state fully protected species. While this species may have once been predominantly distributed in marshes or grasslands, white-tailed kites are now found in a larger variety of habitats within the coastal plains and low foothills, including riparian woodlands and groves of oak and/or sycamore, bordering open fields or grasslands, cultivated lowlands or orchards, and even some suburban habitats. As such, the species has the potential to occur ~~(although infrequently)~~ within the project. A single white-tailed kite was observed in November 2005 within the adjacent Manzana Project flying over grassland at an elevation of 100 feet. No white-tailed kites were observed as a result of avian surveys on either the current project or the Pacific Wind Project.

This species is not expected to frequently move or forage over the project property, and therefore the risk of disturbance/displacement, habitat fragmentation, collision with project elements, or electrocution on the project is low. ~~The white-tailed kite observed adjacent to the project was flying below the rotor-swept zone (91-460 feet), and white-tailed kites generally forage by hovering between 10 and 100 feet over potential prey~~. No white-tailed kites were recorded as fatalities at either the San Gorgonio or Tehachapi WRA, or the 23 Oregon and Washington wind energy projects.[172,173,174] ~~Individuals of this species would have some exposure to turbine mortality on the project, but with relatively low population numbers on the project, these events are expected to be rare, and population level impacts are not expected~~.

Comment [FWS MB-TD48]: If the previous paragraph was accurate, the bird was flying within the rotor-swept zone.

Comment [FWS MB-TD49]: This statement is speculative. As far as I can tell risks have not been quantified. Any mortality would be of concern for MBTA.

[170] Rideout, B.A., I. Stalis, R. Papendick, A. Pessier, B. Puschner, M. Finkelstein, D.R. Smith, M. Johnson, M. Mace, R. Stroud, C. Stringfield, K. Orr, J. Zuba, M. Wallace, and J. Grantham. 2012. "Patterns of Mortality in Free-ranging California Condors (*Gymnogyps Californianus*)." *Journal of Wildlife Diseases* 48: 95–112.

[171] Rideout, B.A., I. Stalis, R. Papendick, A. Pessier, B. Puschner, M. Finkelstein, D.R. Smith, M. Johnson, M. Mace, R. Stroud, C. Stringfield, K. Orr, J. Zuba, M. Wallace, and J. Grantham. 2012. "Patterns of Mortality in Free-ranging California Condors (*Gymnogyps Californianus*)." *Journal of Wildlife Diseases* 48: 95–112.

[172] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[173] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[174] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

4.3.4 Northern Harrier

The northern harrier is a California species of special concern and is considered in the West Mojave Plan. In eastern Kern County, the northern harrier is a fairly common winter visitor, and a rare breeder~~, but it is not expected to breed within or near the project~~.[175] Northern harriers were observed on the adjacent Manzana Project during fall, spring, and winter surveys in 2004 and 2005, though typically only one to two individuals were observed at a time. Most northern harriers observed were recorded flying below 30 feet, which would be a typical foraging height. At the Pacific Wind Project, northern harriers were observed sporadically throughout spring and fall of 2008 and winter and spring of 2009. Both sexes, as well as immature birds, were observed on-site, with all observed flying below 100 feet above ground level (AGL). A total of two northern harriers were observed during the year-long BUCs conducted on the project itself between 2011 and 2012, resulting in a mean raptor use of the project of 0.03 northern harrier/30-minute survey period. A single male was observed flying at 350 feet on December 19, 2011, and a single female was observed flying at 25 feet on November 20, 2012.

Comment [FWS MB-TD50]: It is adequate to state the harriers are rare breeders. No need to add the additional speculative language.

[175] Heindel, M.T. 2000. *Birds of Eastern Kern County*. Available at: http://fog.ccsf.cc.ca.us/~jmorlan/

Some foraging habitat would potentially be lost due to vegetation removal (119.4 acres) and habitat fragmentation, though ample habitat is available to the east of the project and throughout the Antelope Valley. Northern harriers have not been documented breeding within the project~~, nor would they be expected to breed within the project; therefore, disturbance/displacement impacts to breeding birds would not be anticipated~~. Potential migrating heights can reach the proposed rotor-swept range of wind turbines (91-460 feet) in the project property; although due to foraging habits that keep the birds relatively close to the ground, northern harrier mortality is generally low at studied sites.[176] Three northern harriers fatalities (0.3 percent of all fatalities) were recorded during mortality studies at 23 wind energy projects in the CPE of Washington and Oregon, inclusive of approximately 4,000 MW of wind power.[177] No northern harriers fatalities have been recorded at either the San Gorgonio or Tehachapi WRAs as a result of carcass searches conducted in the late 1990s and early 2000s, though northern harriers were observed utilizing both projects concurrently with fatality studies[178,179] ~~While it is possible that small numbers of fatalities of northern harriers could occur over the life of the project, such events are expected to be rare, and collision risk is expected to be low.~~

Comment [FWS MB-TD51]: See above.

Comment [FWS MB-TD52]: There has been minimal monitoring at these WRAs and monitoring methods and analysis is much more robust using current methods. Please state the amount of time when monitoring occurred and the fraction of turbines monitored.

Comment [FWS MB-TD53]: Any mortality is of concern to MBTA. Risk has not been quantified, so remove this speculative statement.

4.3.5 Sharp-Shinned Hawk

The sharp-shinned hawk is a CDFW Watch List species and is also considered in the West Mojave Plan. The species is not known to breed in Southern California but is present during fall and spring migration, and can also be a winter visitor through the Antelope Valley. Several sharp-shinned hawks were observed during raptor migration counts at the adjacent Manzana Project in 2004 and 2005, with most observed flying or hunting low to the ground. At the Pacific Wind Project, a single immature sharp-shinned hawk was observed hunting at 40 feet or less AGL over 3 days in fall of 2008. In winter 2008, a single sharp-shinned hawk was also observed flying low to the ground. No sharp-shinned hawks were observed during the year-long BUCs conducted on the project itself between 2011 and 2012.

Sharp-shinned hawks are not known to breed within the project~~; therefore, disturbance / displacement impacts to breeding birds would not be anticipated~~. Some foraging habitat would potentially be lost due to vegetation removal (119.4 acres) and habitat fragmentation, though this would only impact migrating or wintering birds. ~~Due to the low numbers of sharp-shinned hawks observed adjacent to the project property and their propensity to fly at low elevations, the mortality risk due to WTG collisions for this species is expected to be low~~. No sharp-shinned hawks were recorded as fatalities at either the San Gorgonio WRA or Tehachapi WRA, though sharp-shinned hawks comprised 1.01 percent of raptor observations on the Tehachapi

Comment [FWS MB-TD54]: Speculative statement without supporting risk assessment. Please remove.

[176] Erickson, W., G.D. Johnson, M.D. Strickland, et al. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: National Wind Coordinating Committee, Washington, DC.

[177] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[178] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[179] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

WRA.[180,181] Two sharp-shinned hawk fatalities (0.2 percent of all fatalities) were recorded during mortality studies at 23 wind energy projects in the CPE of Washington and Oregon, inclusive of approximately 4,000 MW of wind power.[182]

4.3.6 Cooper's Hawk

The Cooper's hawk is a CDFW Watch List species and is also considered in the West Mojave Plan. This species normally nests in forested habitats and may occur as a resident or migrant in the vicinity of the Antelope Valley. During field surveys at the adjacent Manzana Project, this species was observed in surveys for resident raptors during the winter and in migratory spring and fall surveys. Cooper's hawk was observed overwintering within shrub habitats, but no nests were identified.

At the Pacific Wind Project, one Cooper's hawk was observed hunting at approximately 50 feet AGL in upland habitats in spring 2008, and a total of 10 Cooper's hawks (1 to 3 daily) were observed hunting at the site on 7 days from September 25 to October 10, 2008. Several of these individuals were seen flying at up to 300 feet AGL. A single adult was also observed hunting on November 14, 2008.

During the course of burrowing owl burrow checks in winter 2011, a single Cooper's hawk was incidentally observed flying at approximately 20 feet AGL, and subsequently perching, in a Joshua tree approximately 200 feet east of the central parcel of the project.

Although seen consistently during spring, winter, and fall raptor surveys, overall use of the area by Cooper's hawks was ~~low~~. Some foraging habitat would potentially be lost due to vegetation removal (119.4) and habitat fragmentation, though ample habitat is available to the east of the project and throughout the Antelope Valley. Cooper's hawks are not known to breed within the project~~; therefore, disturbance/displacement impacts to breeding birds would not be anticipated~~. Though they were observed flying within the rotor-swept range of the wind turbines (91-460 feet), the majority of observations were below 60 feet AGL. Much like the sharp-shinned hawk, Cooper's hawks tend to fly and forage at low altitudes, and therefore are at low risk from wind turbine collisions. No Cooper's hawks were recorded as fatalities at either the San Gorgonio WRA or Tehachapi WRA.[183,184] A single Cooper's hawk fatality (0.1 percent of all fatalities) was

Comment [FWS MB-TD55]: Again rather than using a qualitative description of abundance, use actual data for each season and cite the survey reports.

Comment [FWS MB-TD56]: Please remove subjective conclusion. If there is a risk assessment, then provide the assessment results.

[180] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[181] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[182] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[183] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[184] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

recorded during mortality studies at 23 wind energy projects in the CPE of Washington and Oregon, inclusive of approximately 4,000 MW of wind power.[185]

4.3.7 Northern Goshawk

The northern goshawk is listed as a California species of special concern and a BLM sensitive species. This species is an inhabitant of coniferous forests on its breeding grounds in northern California and is considered a very uncommon to very rare winter visitor in lowland areas.[186] Northern goshawks are considered very rare in Southern California.[187] A single northern goshawk was observed flying north in the spring of 2005 during a migration count on the adjacent Manzana Project. Northern goshawks were not detected as a result of avian surveys conducted at the Pacific Wind Project and the current project.

~~Due to this species' uncommon nature in the Antelope Valley and the paucity of observation records in Southern California, it is unlikely that displacement/disturbance, habitat fragmentation, mortality due to wind turbine collisions, or electrocution would impact this species as a result of construction and operation of the project.~~

4.3.8 Swainson's Hawk

Swainson's hawk is listed as threatened pursuant to the California ESA and is also considered in the West Mojave Plan. The species was listed as threatened in 1983 due to loss of habitat and a reduction in population numbers in California. In 2007, a state-wide survey determined that there were approximately 2,000 pairs remaining in California, 95 percent of which exist in the Central Valley. The breeding pair density within the Antelope Valley is classified as "sparse", or ≥1 breeding pair per 76+ square miles.[188] The Swainson's hawk is a migratory raptor that travels in flocks with as many as several hundred birds. Scrub and grassland habitats within the project property provide suitable foraging habitat for migratory individuals, or for the approximately 10 pairs of Swainson's hawk which continue to nest in the Antelope Valley, though no nest sites have been recorded in close vicinity to the project. [189,190,191,192]

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[185] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[186] Shuford, W.D., and T. Gardali, eds. 2008. *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*. Studies of Western Birds 1. Camarillo, CA: Western Field Ornithologists; and Sacramento, CA: California Department of Fish and Game.

[187] Small, A. 1994. *California Birds: Their Status and Distribution*. Vista, CA: Ibis, p. 74.

[188] Department of Fish and Game Resource Assessment. 2007. California Swainson's Hawk Inventory: 2005-2006. University of California Davis Wildlife Health Center

[189] Garrett, K., and J. Dunn. 1981. *Birds of Southern California: Status and Distribution*. Los Angeles, CA: Los Angeles Audubon Society, p. 408.

[190] Heindel, M.T. 2000. *Birds of Eastern Kern County*. Available at: http://fog.ccsf.cc.ca.us/~jmorlan/

[191] Sapphos Environmental, Inc. 25 August 2006. *Final Biological Resources Technical Report for the PdV Wind Energy Project, Kern County, California*. Pasadena, CA.

[192] California Energy Commission and California Department of Fish and Game. 2 June 2010. *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, CA*. Sacramento, CA.

The migratory surveys conducted in the adjacent Manzana Project verified that Swainson's hawk migrates through the project property and surrounding area during the fall and spring migration over a short window of time. During the 2005 fall migration surveys, 48 birds were observed, and at least 35 individuals were reported flying below 330 feet. At the Pacific Wind Project, a single Swainson's hawk was observed foraging at 400 feet AGL as a result of 170 hours of directed avian studies during spring migration. A single Swainson's hawk was observed incidentally on the project during special-status plant surveys on April 18, 2012. The individual was observed foraging over the property, flying between 75 and 150 feet. No Swainson's hawks were detected during the 36 hours of BUCs on the project.

~~Approximately 119.4 acres of Swainson's hawk foraging habitat would potentially be lost due to vegetation removal during construction, and subsequent habitat fragmentation, though ample foraging habitat, in the form of alfalfa and fallow fields, remains to the east of the project and throughout the central Antelope Valley.~~ Swainson's hawk is not known to breed within the project; therefore, disturbance/displacement impacts to breeding birds would not be anticipated. In flight, whether foraging or migrating, Swainson's hawks can range from ground level to over 1,000 feet AGL. Swainson's hawk were observed flying within the rotor swept zone (91-460 feet) at the project and adjacent wind energy projects; therefore, Swainson's hawks flying within the project property would have some exposure to turbine mortality. There have been no documented fatalities of this species in available fatality reports for wind energy plants in the Southern California region. Specifically, no Swainson's hawk fatalities were reported during the course of Tehachapi WRA and San Gorgonio WRA studies in the late 1990s and early 2000s.[193,194] Elsewhere in the western U.S., Swainson's hawk have been documented as wind turbine collision fatalities. A total of 15 Swainson's hawks were recorded during mortality studies at 23 wind energy projects in the CPE of Washington and Oregon, representing 9 percent of all raptor fatalities, but only 0.8 percent of all bird fatalities.[195] ~~The project is not a significant migratory pathway for Swainson's hawk in California, and~~ No Swainson's Hawk n~~n~~ests ~~for the breeding pairs that remain in the Antelope Valley~~ have not been documented within 2 miles of the project~~; therefore use of the project by Swainson's hawk appears low. However, it is possible that small numbers of fatalities of Swainson's hawk could occur over the life of the project, though such events are expected to be rare. Because this species is protected under the state ESA, the consideration of measures to avoid and minimize disturbance and/or collision risk are warranted.~~

Comment [FWS MB-TD57]: Redundant

Comment [FWS MB-TD58]: Provide citation for rapter nest surveys that might have documented SWHA nests.

Comment [FWS MB-TD59]: Provide actual use data.

Comment [FWS MB-TD60]: Provide risk assessment or remove this speculative statement. Any take of Mig Birds warrants consideration of measures to avoid and minimize take under MBTA. This is the purpose of the BBCS.

4.3.9 Ferruginous Hawk

The ferruginous hawk is a State Watch List species and is also considered in the West Mojave Plan. Although this species does not breed in Southern California, it is commonly observed wintering in the Antelope Valley. Moderate numbers of ferruginous hawks, a total of 23

[193] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[194] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[195] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. WEST, Inc., Cheyenne, WY.

observations in the fall of 2005 alone, were observed during surveys conducted within the adjacent Manzana Project during winter presence surveys and spring and fall raptor migration surveys. Although use of the project area was moderate for migration in the fall, only approximately five individual hawks hunted over the proposed project vicinity over winter. At the Pacific Wind Project, two individuals were observed flying at approximately 200 feet AGL during spring 2008 avian surveys. One ferruginous hawk was observed foraging at approximately 25 feet AGL, approximately 0.3 mile west of the project property, during reconnaissance on April 12, 2012. This species would normally be expected to be present within the project property from early fall to early spring.

Ferruginous hawks do not breed in Southern California; therefore construction of the project and potential disturbance/displacement impacts would not affect breeding birds of this species. Approximately 119.4 acres of foraging habitat for migrating or wintering birds would potentially be lost due to vegetation removal during construction and subsequent habitat fragmentation, though ample foraging habitat remains to the east of the project and throughout the Antelope Valley. Ferruginous hawks hunt using a variety of different pursuit techniques, including from perches, strikes from the ground, aerial hunting, or hovering during strong winds. Aerial hunting typically occurs below 98.4 feet AGL and seldom occurs above 328 feet AGL, indicating that some foraging flights may occur within the rotor swept zone (91-460 feet).[196] Ferruginous hawk fatalities are ~~generally low~~ at studied wind energy projects.[197] One ferruginous hawk fatality was reported in a postconstruction mortality study at the Tehachapi WRA between 1996 and 1998. This fatality accounted for 2.3 percent of raptor fatalities and 0.8 percent of total fatalities observed during the study.[198] No ferruginous hawks were recorded as fatalities as part of the San Gorgonio WRA fatality monitoring.[199] A total of four ferruginous hawk fatalities have been recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon. These four ferruginous hawk fatalities accounted for 0.3 percent of total fatalities observed at the projects.[200] ~~Individuals of this species would have some exposure to turbine mortality on the project, but with relatively low population numbers on the project, these events are expected to be rare, and population level impacts are not expected.~~

Comment [FWS MB-TD61]: Provide actual figures from citation.

Comment [FWS MB-TD62]: Remove speculative statement, provide actual risk assessment if available.

4.3.10 Golden Eagle

Comment [FWS MB-TD63]: Information on Golden Eagle should be moved to separate ECP document.

The golden eagle is afforded federal protection under the Bald and Golden Eagle Protection Act

[196] Bechard, Marc J. and Josef K. Schmutz. 1995. Ferruginous Hawk (Buteo regalis), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/172 doi: 10.2173/bna.172

[197] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[198] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[199] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[200] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

(BGEPA).[201] Furthermore, it is a fully protected species under the California Fish and Game Code, as well as listed as a CDFW Watch List species within nesting and wintering habitats in California. Golden eagles have the potential to occur throughout the entire State of California. Consequently, there are no sites for wind energy development within California, or in the western United States, where there is zero risk of impacts to golden eagle. However, careful site selection and application of advanced conservation practices can significantly minimize the risk to this species.

Some golden eagle populations may be declining, but other populations are generally stable in western North American,[202] and overall numbers are still substantial (e.g., over 21,000 golden eagles estimated in four conservation regions that cover approximately 80 percent of the species' range in the contiguous United States).[203]

Comment [JAR64]: Also see the following more recent pubs:

Millsap et al 2013, Golden eagle population trends in the western US 1968-2010. Journal of Wildlife Management.

Nielson et al 2014, Monitoring abundance of golden eagles in the western United States. Journal of Wildlife Management. * Note that this publication does not include California.

The golden eagle is an uncommon resident throughout California, with eagles generally absent from the immediate coast, urbanized areas, and heavily forested mountains.[204] During winter there is some migratory movement, especially of immature eagles, into agricultural land, grassy plains, desert edges, and larger valleys, such as the Antelope Valley, where they may not occur during the nesting season.[205] Golden eagles favor open country such as broken woodland, savannahs, grasslands, chaparral, sagebrush flats, desert edge, montane valleys, and even occasionally alpine tundra; however nesting is restricted to rugged, mountainous country, such as the Tehachapi Mountains that border the Antelope Valley, where steep cliffs or medium-to-tall trees border on more open country for hunting or scavenging.[206]

Golden Eagle Use of the Project

To date, four different survey types were used to assess golden eagle use and habitat at various spatial scales. These survey types included: (1) standardized BUCs at the project itself, (2) aerial nesting surveys within a 10-mile radius of the project, (3) ground-based eagle surveys at adjacent wind energy projects, and (4) incidental observations of golden eagles during the course of other surveys at the project, Pacific Wind Project, and Manzana Project. Each of these survey methods convey different information about golden eagles; and yet the data gathered to date, and the confluence of the information provided from these different survey methods, would suggest that the project is adequately designed and sited to minimize displacement, disturbance, habitat fragmentation, collision, and electrocution risk to golden eagles.

Suitable golden eagle foraging habitat exists throughout the Antelope Valley, where the project is located; however, golden eagle use of these projects' area, as measured by standardized

[201] *U.S. Code*. 30 April 2004. Title 16, Sections 668–668d: "Bald and Golden Eagle Protection Act." Available at: http://www.fws.gov/le/pdffiles/bepa.pdf

[202] McCaffery, B.J., and C. McIntyre. 2005. "Disparities between Results and Conclusions: Do Golden Eagles Warrant Special Concern Based on Migration Counts in the Western United States?" *Condor*, *107*: 469–473.

[203] Nielson, R.M., L. McManus, T. Rintz, and L.L. McDonald. 2012. A survey of golden eagles (*Aquila chrysaetos*) in the western U.S.: 2012 Annual Report. A report for the U.S. Fish & Wildlife Service. WEST, Inc., Laramie, Wyoming.

[204] Garrett, K. and J. Dunn. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Society, Los Angeles, CA.

[205] Small, A. 1994. California birds: their status and distribution. Ibis Publishing Company. Vista, CA.

[206] Small, A. 1994. California birds: their status and distribution. Ibis Publishing Company. Vista, CA.

point count methodologies, remains low. Golden eagle mean use, expressed as number of individual eagles observed per standardized 30-minute BUC, during the period sampled was 0.00 golden eagle per 30-minute survey, and no incidental observations of golden eagle were recorded during the course of other biological surveys on the project. The adjacent Pacific Wind Project had 0.005 eagle per 30-minute survey, with two individual eagles (one adult and one subadult on separate occasions) observed during fall raptor transects in 2008, and six total observations recorded incidentally on and in the vicinity of the Pacific Wind Project during the course of other surveys.

The Manzana Project, which is located at higher elevations and closer to golden eagle nesting territories in the adjacent Tehachapi Mountains, did not conduct comparable point count surveys as its pre-permitting surveys took place before standardized wind energy protocols were released. Over 1,900 hours of migration studies conducted at Manzana in 2004 and 2005 showed moderate use of the northwestern section of Manzana by resident, wintering, and migrating eagles (Figure 3.1.1.1-1; Point Counts 1, 2 and 3), but biologists consistently estimated a total of only four to five resident golden eagles in the local area, though no more than three golden eagles were ever seen on any one day. The inherent difficulties in distinguishing numbers of unmarked individuals over such a long survey period should be noted, as should the fact that these survey results are almost a decade old. Many of the golden eagle observations during these surveys were of migrating eagles flying over 1,000 feet in elevation and, therefore, at low risk of wind turbine collision. The local area utilized by the eagles detected during the Manzana migration surveys is at the far western edge of the Antelope Valley at the transition of desert floor to the foothills and mountains of the southern Tehachapi Mountains. Both foraging habitat and breeding habitat for golden eagles are more suitable in these foothills and low mountains, and higher golden eagle use in these areas would be expected. This usage area is also at the far western edge of the assemblage of wind energy projects discussed herein.

Comment [FWS MB-TD65]: However, we recommend that you note that these surveys were not dedicated raptor use surveys, were of short duration, and did not follow current ECP guidelines.

Comment [FWS MB-TD66]: If flight heights are available, provide a histogram of flight heights. Otherwise, quantify the fraction of eagle observations above 1000 ft. More important is the fraction of observations below 460 ft. in the context of the max height of proposed turbines or, as described in the ECPG, below 200 m.

~~As a result of the aerial surveys, N~~no occupied golden eagle nests were observed within 10 miles of the proposed project during aerial surveys, inside the focal survey area. Outside the focal survey area, two occupied golden eagle nests were observed, one decorated (Nest 3) and one active (Nest 4) (Figure 3.1.1.2-2). One unoccupied nest was located north of the focal survey area near the town of Tehachapi, and a cluster of unoccupied nests was located east of the proposed project, on Soledad Mountain. Soledad Mountain was the site of several mines dating from the early 20th century, including open pit gold mines, which significantly disturbed the area and altered the mountain's appearance. Resumption of open pit mining was approved in 2010.[207] Golden eagles are intolerant of human activity and disturbances near nest sites, and it is uncertain whether golden eagles would occupy these nests if mining operations are ongoing.

Overall, the literature and database search and aerial surveys indicate that golden eagles do not currently nest within 10 miles of the proposed project. The only prior report of a nest within 10 miles lacks the detail necessary to confirm the observation, and the observation was made 10 years ago.

[207] Kern County. January 2010. *Soledad Mountain Project Supplemental Environmental Impact Report*. Prepared by: Kern County Planning Department, Bakersfield, CA.

The closest confirmed golden eagle nest that has been reported as occupied during surveys conducted in 2011, 2012, and 2013 was 14.9 miles from the proposed project, a distance that precludes the possibility of territory overlap given golden eagle ecology and behavior.[208,209] Due to the lack of confirmed golden eagle nests within 10 miles of the proposed project, calculation of nesting territory metrics recommended in the *Eagle Conservation Plan Guidance* would not be appropriate. Specifically, calculation of the inter-nest distances to approximate golden eagle territory sizes and their potential to overlap with the project footprint is not warranted.

Disturbance, Displacement, and Habitat Fragmentation

Golden eagles are sensitive to human-related disturbance at their nesting sites during the breeding season (approximately February through July in California); however, no occupied golden eagle nests have been documented within a 10-mile radius of the project site despite repeated aerial surveys of the area, most recently in 2013. Due to the lack of confirmed golden eagle nests within the focal survey area, there is no reason to anticipate that the construction or operations of the proposed project would disturb breeding golden eagles.

The project area contains potential foraging habitat for golden eagles, ~~and golden eagles would be expected to use the project infrequently based on survey results of mean use in the area. Although no eagles were detected during the course of directed and reconnaissance surveys on the project property, golden eagles have periodically been detected, though in low densities,~~ foraging in wind energy projects that are adjacent to the project itself. Construction of the project would result in the disturbance of approximately 119.4 acres of vegetation, approximately 9.9 percent of the total project property. The loss of 119.4 acres of marginal foraging habitat in a region with of the project is likely to be negligible foraging habitat, particularly in the areas to

~~If project construction occurs in preferred foraging areas on the project, which is unlikely given the low use of the area, this may cause eagles to avoid the project, thus displacing them. Project operations may also disturb golden eagles if the presence of operational turbines or human maintenance activities causes golden eagles to avoid using the project. However, the likelihood of project construction or operation causing disturbance and displacement of golden eagles is tempered by the high level of activity that would likely already be disturbing to golden eagles in the project vicinity, including existing operating wind energy projects, OHV trail use, transmission lines, backpacking, and seasonal livestock operations.~~

~~Neither the project, nor the project vicinity, has been determined to be an important migratory corridor or stopover site for migrating golden eagles.~~ Migratory season raptor counts (2004 and 2005) conducted at the Manzana Project revealed some migratory golden eagle use of areas to the west of the project, though passage rates were low in comparison to other western count stations~~, and golden eagle numbers at the Manzana Project are confounded by the fact that recorded birds could have included residents, migrants, and overwintering individuals, thus the numbers reported for migration may be overestimated~~.[210] A total of 11 golden eagles were

Comment [FWS MB-TD67]: This was all summarized previously, and the previous summary should be referenced in a single sentence without repeating all of this detail.

Comment [FWS MB-TD68]: Rather than speculating whether eagles might nest, simply include the measures that will be taken in the event that eagles do nest.

Comment [FWS MB-TD69]: No need to repeat survey results again.

Comment [FWS MB-TD70]: No need to speculate on the quality and value of the lost foraging habitat. There is no basis for this speculation.

Comment [FWS MB-TD71]: No basis for this speculation.

Comment [FWS MB-TD72]: Important migratory corridors and stopover sites for GOEA have not been evaluated for this region.

Comment [FWS MB-TD73]: Provide reference and other values.

Comment [FWS MB-TD74]: Impossible to determine without marked birds. Other migratory count stations have the same problem. There is no evidence that that estimates are high or low.

[208] Kochert, M.N., K. Steenhof, C.L. Mcintyre, and E.H. Craig. 2002. "Golden Eagle (*Aquila chrysaetos*)." In *The Birds of North America Online*, ed. A. Poole. Ithaca, NY: Cornell Lab of Ornithology. Available at: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/684

[209] Dixon, James B. 1937. "The Golden Eagle in San Diego County, California." *The Condor* 39(2): 49–56.

[210] Bloom, P.H. 30 March 2006. *Fall 2005 Raptor Migration Study of the Proposed PdV Wind Energy Project, Kern County, California.* Santa Ana, CA.

detected over 198 hours of surveys at the Manzana Project in 2005, resulting in 0.06 golden eagle/hour, as compared to the Sandia Mountains, NM site, which had 348 golden eagles over 612 hours, resulting in 0.57 golden eagle/hour, approximately a tenfold difference between the two sites. Fall 2005 results were similar, with 0.06 golden eagle/hour at the Manzana Project, and 0.25, 0.27, and 0.16 golden eagle/hour, respectively, at the Goshute Mountains of Nevada, the Wellsville Mountains of Utah, and Manzano Mountains of New Mexico hawk watch migration stations.[211] The majority of migrating golden eagles recorded at the Manzana Project were flying over 1,000 feet, appreciably above the rotor-swept zone; ~~thus the construction or operation of the project is not anticipated to displace migratory eagles from migrating over the project vicinity~~.

Comment [FWS MB-TD75]: Again, provide a quantification or a histogram of flight heights.

Comment [FWS MB-TD76]: This is speculative, as mentioned earlier, GOEA are sensitive to disturbance from human activity.

Collision Probability

The probability of collision fatality of raptors at wind energy projects, including the golden eagle, has often not depended solely on raptor abundance, but also upon species-specific flight behaviors, particularly avoidance behaviors, as well as location, local topographic characteristics of the wind energy project, weather, turbine design, and wind energy project design.[212,213,214] ~~It is generally understood that golden eagles are susceptible to collisions with wind turbines, and not only at the Altamont Pass WRA, which has one of the highest breeding concentrations of golden eagles in the world.[215] It is estimated that Altamont kills between 40 to 60 subadult and adult golden eagles each year.[216] Nonetheless, it is suspected that Altamont is an anomaly in regard to the high numbers of golden eagle fatalities. There are many factors that likely contribute to the higher raptor mortality at Altamont, including high raptor use and prey densities, and unique topography with wind resources that attract raptors. In addition, turbine types and configuration have also played a role, including elements such as smaller turbines, high turbine density, lattice towers, and downwind, fast-spinning blades. Technology has changed dramatically since the first wind energy projects, including Altamont, were developed. Many of these changes were made in response to raptor fatalities, particularly golden eagles, at Altamont and have been subsequently integrated into the design of newer generation wind energy projects, including the current project. The experience at Altamont Pass indicates the importance of developing wind farms at locations that are removed from primary breeding and migratory paths.~~

Comment [FWS MB-TD77]: Mortalities at the Altamont are only relevant for the cumulative impacts analysis. Please remove extraneous information and focus on the actual technologies and configuration of this project.

~~Golden eagle fatality rates at newer-generation wind energy projects are generally very low in comparison to Altamont. The American Wind Wildlife Institute recently synthesized the results of publicly available reports from 72 wind energy projects, representing more than 7,000 MW. All~~

[211] Bloom, P.H. 30 March 2006. *Fall 2005 Raptor Migration Study of the Proposed PdV Wind Energy Project, Kern County, California*. Santa Ana, CA.

[212] Madders, M., and D.P. Whitfield. 2006. "Upland Raptors and the Assessment of Wind Farm Impacts." *Ibis*, *148*: 43–56.

[213] De Lucas, M., F.E.J. Guyonne, D.P. Whitfield, and M. Ferrer. 2008. "Collision Fatality of Raptors in Wind Farms Does Not Depend on Raptor Abundance." *Journal of Applied Ecology*, *45*: 1695–1703.

[214] Noguera, J.C., I. Pérez, and E. Mínguez. 2010. "Impact of Terrestrial Wind Farms on Diurnal Raptors: Developing a Spatial Vulnerability Index and Potential Vulnerability Maps." *Ardeola*, *57*: 41–53.

~~[215] Hunt, G. 2002. Golden eagles in a perilous landscape: predicting the effects of mitigation for wind turbine balde-strike mortality. California Energy Commission~~

~~[216] Hunt, G. 2002. Golden eagles in a perilous landscape: predicting the effects of mitigation for wind turbine balde-strike mortality. California Energy Commission~~

~~72 projects conducted systematic carcass searches meeting specific selection criteria.[217] Of the 72 projects, 8 projects reported a total of 15 golden eagle fatalities between 2001 and 2010. The remaining 64 projects, all of which were located in areas that overlapped with golden eagle breeding and non-breeding ranges, had no reported golden eagle fatalities.[218]~~

Comment [FWS MB-TD78]: This information is incomplete and extraneous to the question of whether turbines on this project pose a risk to GOEA.

One method of predicting potential collision risk for golden eagle is to compare the level of golden eagle use and level of mortality at existing wind energy projects with that of the project. Preliminary analysis suggests that raptor abundance can explain much of the variability in fatality rates between wind energy projects.[219] The first 12 months of survey data at the project produced a golden eagle mean use of 0.00 eagle per plot per 20-minute period. Golden eagle use estimates from 12 other western state wind energy projects (selected because of similar geographical location and availability of both golden eagle use estimates and fatality reports) range between 0.01 and 0.30, placing the golden eagle use at the project at the very low end of the range (Table 4.1.10-1, *Golden Eagle Use Estimates and Reported Golden Eagle Fatalities at Thirteen Western Wind Energy Projects*). Based on preliminary analysis of data from 13 wind energy projects in the western U.S., there appears to be a wide gap in the preconstruction mean eagle use between those projects that have had golden eagle fatalities and those that have not. Of the 13 projects analyzed, those projects with high preconstruction eagle use (>0.25 golden eagle per plot per 20-minute survey) generally did have eagle fatalities, while those with low preconstruction use (generally <0.05 golden eagle per plot per 20-minute survey) did not have any recorded fatalities.[220]

Comment [FWS MB-TD79]: This is contradictory with the first sentence of this section. Better to reflect on the components of risk and to summarize individual factors.

Even at projects with high golden eagle use, few fatalities have been reported. Foote Creek Rim's golden eagle use is considered high, yet only one golden eagle fatality has been reported at the facility in more than a decade of operation. Golden eagle fatalities have been reported at wind energy projects within Southern California, though typically they occur on projects located in areas more conducive to high golden eagle use, with more concentrated turbine fields. At San Gorgonio (3,000 turbines), a single golden eagle wind turbine mortality was recorded between 1997 and 1998 (comprising 1.6 percent of all fatalities recorded), though golden eagles comprised 16.25 percent of raptors recorded during bird utilization surveys.[221] A 19-month mortality study conducted in the Tehachapi WRA (3,300 turbines) from 1996 to 1998 reported no golden eagle wind turbine mortalities, although approximately 43 individuals of other species of raptors (e.g., red-tailed hawk, great horned owl) were reported as fatalities, and golden eagles comprised 1.5 percent of raptors detected during bird utilization surveys at the site

Comment [FWS MB-TD80]: This discussion needs to include a discussion of the post-construction monitoring that occurred at each project.

~~[217] Allison, T.D. 2012. *Eagles and Wind Energy: Identifying Research Priorities*. White Paper, American Wind Wildlife Institute, Washington, DC.~~

~~[218] Allison, T.D. 2012. *Eagles and Wind Energy: Identifying Research Priorities*. White Paper, American Wind Wildlife Institute, Washington, DC.~~

[219] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.

[220] Allison, T.D. 2012. *Eagles and Wind Energy: Identifying Research Priorities*. White Paper, American Wind Wildlife Institute, Washington, DC.

[221] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

during the same time period.[222]

A total of ~~six~~ nine golden eagle fatalities were documented at the Pine Tree Wind Farm (80 turbines) between 2009 and ~~2011~~2012, a much higher rate of fatality than predicted by similar mortality estimates done for other wind projects within the Tehachapi WRA. The Pine Tree Wind Energy Project is located approximately 25 miles northeast of the proposed project. Pine Tree is located at a higher elevation with much different topography than the proposed project, including steep cliffs and outcroppings favored by nesting raptors, such as golden eagles, and prime golden eagle foraging habitat in the form of open, rolling grasslands. The Pine Tree Wind Farm is also located in close proximity to the Kelso Valley and Butterbredt Springs, prime golden eagle foraging habitat. In addition, the Pine Tree Wind Farm is located within 5 miles of at least two golden eagle nests documented by Sapphos Environmental, Inc. during aerial raptor surveys in 2010 and 2011.

~~At the majority of modern wind energy projects, raptor fatality rates are low, and it is yet to be proven whether any population-level impacts to species have occurred. The one wind energy project where population impacts have been studied in detail, in regard to golden eagle population response to collision fatalities, is at Altamont Pass.[223] Despite large numbers of golden eagle fatalities at this site (estimated at a total of 495, or approximately 15 to 50 eagles a year),[224] Hunt found that golden eagle populations seemed to be self sustaining.[225]~~

Under certain foraging conditions, such as when suitable prey (e.g., ground squirrels, jackrabbits, or prairie dogs) is concentrated, golden eagles seem to be susceptible to collisions with wind turbines. However, there appear to be no prey concentrations present within the project vicinity, particularly in close proximity to the turbine locations. No golden eagle nests were documented within 10 miles of the project; the closest active golden eagle nest was 15 miles northwest of the project boundary. In addition, ample suitable foraging habitat is located outside the project, particularly to the north in the Tehachapi Mountains, in close proximity to the occupied golden eagle nests. It is highly unlikely that specific prey sources on the project would draw golden eagles into the project once operation has commenced. While it is clearly possible that small numbers of golden eagle fatalities could, in fact, occur over the life of the project, such events are expected to be unusual and rare, and population-level impacts are anticipated to be insubstantial. Because of the low use of the project by eagles and the distance between the project and occupied golden eagle nests, in conjunction with the assurance of conservation measures taken and the proposed adaptive management techniques included in Section 5, the results of the studies conducted do not currently support the preparation of an Eagle Conservation Plan, and consequently an application for an eagle take permit will not be pursued at this time.

Comment [FWS MB-TD81]: This reference is dated. Hunt has presented data contrary to this conclusion more recently at the CA/NV GOEA working group meeting in Dec 2012.

Comment [FWS MB-TD82]: Extraneous.

Comment [JAR83]: However, there was documented foraging during surveys and prey was documented in species lists for the project as well.

Comment [FWS MB-TD84]: This is speculative. The Service approved Bayesian risk model should be used to assess collision risk. Eagle use data from nearby projects should be incorporated to provide a more robust estimate due to the improper design of the eagle use surveys.

Comment [JAR85]: We think the results of the studies and documented eagle mortalities at nearby wind facilities do support the preparation of an ECP and application for an eagle take permit.

[222] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

~~[223] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L. Morrison, J.A. Schaffer, and W. Warren-Hicks. 2011. *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. Prepared for: National Wind Coordinating Collaborative, Washington, DC.~~

~~[224] Allison, T.D. 2012. *Eagles and Wind Energy: Identifying Research Priorities*. White Paper, American Wind Wildlife Institute, Washington, DC.~~

~~[225] Hunt, W.G. 2002. *Golden Eagles in a Perilous Landscape. Predicting the Effects of Mitigation for Wind Turbine Bladestrike Mortality*. California Energy Commission (CEC) Consultant Report P500-02-043F. Prepared for: CEC, Public Interest Energy Research (PIER), Sacramento, CA. Prepared by: University of California, Santa Cruz.~~

Electrocution

Golden eagles have proven to be particularly susceptible to power line electrocution. In a synthesis of electric utility data from 1986 to 1996, golden eagles were the most frequently reported species, comprising 748 of 1,428 reported electrocutions (52.4 percent), with 66 percent of these being juvenile birds.[226] Due to their large size and wing span, golden eagles are easily able to bridge conductive elements on older style transmission structures, thus allowing for circuit completion.[227] ~~There are no overhead~~ T~~t~~ransmission lines ~~proposed for construction~~ within the project property will be buried except in~~, only~~ limited instances of overhead collector line crossings of streambeds to minimize electrocution risk to GOEA. APLIC~~)~~ standards will be used to construct any overhead collector lines.~~;~~ ~~therefore, there is a very low risk of electrocution with transmission lines for golden eagles on the project site~~.

[226] Harness, R.E. and K.R. Wilson. 2001. Electric-utility Structures Associated with Raptor Electrocutions in Rural Areas. Wildlife Society Bulletin 29: 612-623.

[227] Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

TABLE 4.1.10-1
GOLDEN EAGLE USE ESTIMATES AND REPORTED GOLDEN EAGLE FATALITIES AT THIRTEEN WESTERN WIND ENERGY PROJECTS

Facility	Facility MW Capacity	First Year of Operation	Golden Eagle Use Estimate[1]	Golden Eagle Fatalities Reported	Number of Turbines	Turbine Size (MW)	Data Source (1) Use Estimate; (2) Fatality Estimate
Tylerhorse, CA	60	TBD	0.00	-	40	1.5	
Klondike, OR	24	2001	<0.01	0	16	1.5	1) Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. May 2002. *Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon*. Final report prepared for Northwestern Wind Power, Goldendale, Washington. Prepared by: Western EcoSystems Technology, Inc. (WEST) Cheyenne, WY, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, OR. 2) Johnson, G.D., W.P. Erickson, and J. White. March 2003. *Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon*. Prepared for: Northwestern Wind Power, Goldendale, WA. Prepared by: WEST, Cheyenne, WY.
Nine Canyon, WA	48.1	2002	<0.01	0	37	1.3	1) Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. October 2001. *Wildlife Baseline Study for the Nine Canyon Wind Project*. Final Report May 2000–October 2001. Prepared for: Energy Northwest, Richland, WA. 2) Erickson, W.P., K. Kronner, and B. Gritski. October 2003. *Nine Canyon Wind Power Project Avian and Bat Monitoring Report*. September 2002–August 2003. Prepared for: Nine Canyon Technical Advisory Committee and Energy Northwest. Prepared by: WEST, Cheyenne, WY, and Northwest Wildlife Consultants (NWC), Pendleton, OR.
Hopkins Ridge, WA	150	2005	0.01	0	83	1.8	1) Young, D.P., Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. April 2003. *Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington*. Final Report, March 2002–March 2003. Prepared for: RES North America, LLC., Portland, OR. Prepared by: WEST, Cheyenne, WY. 2) Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. *Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring*. First Annual Report, January-December 2006. Prepared for: Puget Sound Energy, Dayton, WA, and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, WA. Prepared by: WEST, Cheyenne, WY.
Stateline, OR/WA	300	2001	0.01	0	454	0.66	1) Erickson, W. P., G. D. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR. 2) Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. December 2004. *Stateline Wind Project Wildlife Monitoring Annual Report*. July 2001–December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee. Prepared by: WEST, Cheyenne, WY.
Vansycle, OR	25	1998	0.01	0	38	0.66	1) Erickson, W. P., G. D. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR. 2) Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. *Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year*. Prepared by: WEST, Cheyenne, WY. Prepared for: Umatilla County Department of Resource Services and Development, Pendleton, OR.
Leaning Juniper, OR	100.5	2006	0.02	0	67	1.5	1) Kronner, K., B. Gritski, J. Baker, V. Marr, G.D. Johnson, and K. Bay. November 2005. *Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon*. Prepared for: PPM Energy, Portland, OR, and CH2MHILL, Portland, OR. Prepared by: Northwest Wildlife Consultants, Inc., Pendleton, OR, and WEST, Cheyenne, WY. 2a) Kronner, K., B. Gritski, Z. Ruhlen, and T. Ruhlen. 2007. "Leaning Juniper Phase I Wind Power Project, 2006-2007: Wildlife Monitoring Annual Report." Unpublished report prepared by: Northwest Wildlife Consultants, Inc., Pendleton, OR. Prepared for: PacifiCorp Energy, Portland, OR. 2b) Gritski, B., K. Kronner, and S. Downes. December 2008. *Leaning Juniper Wind Power Project, 2006 − 2008*. Wildlife Monitoring Final Report. Prepared for: PacifiCorp Energy, Portland, OR. Prepared by: Northwest Wildlife Consultants, Inc., Pendleton, OR.
Combine Hills, WA	41	2004	0.03	0	41	1.0	1) Young, D.P., Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. March 2003. *Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon*. Prepared for: Eurus Energy America Corporation, San Diego, CA, and Aeropower Services, Inc., Portland, OR. Prepared by: WEST, Cheyenne, WY.
Foote Creek Rim I, WY	41.4	1998	0.26	1	69	0.6	1) Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. August 2000. *Wildlife Monitoring Studies, Seawest Windpower Plant, Carbon County, Wyoming, 1995-1999*. Final report prepared for: SeaWest Energy Corporation, San Diego, CA, and the Bureau of Land Management, Rawlins, WY. Prepared by: WEST, Cheyenne, WY. 2) Young, D.P., Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. *Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002*. Prepared for: Pacificorp, Inc., Portland, OR, SeaWest Windpower Inc., San Diego, CA, and Bureau of Land Management, Rawlins District Office, Rawlins, WY.
Diablo Winds, CA	20.5	2005	0.27	2	31	0.66	1) WEST. 2006. *Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006*. Technical report submitted to FPL Energy and Alameda County California. Cheyenne, WY. 2) WEST. 2008. *Diablo Winds Wildlife Monitoring Progress Report: March 2005 – February 2007*. Cheyenne, WY.
Elkhorn Valley, OR	101	2007	0.27	4	61	1.65	1) WEST. 2005b. "Exhibit A: Ecological Baseline Study at the Elkhorn Wind Power Project." Draft final report prepared for Zilkha Renewable Energy, LLC, Portland, OR. Cheyenne, WY. 2) Allison, T.D. May 2012. *Eagles and Wind Energy: Identifying Research Priorities*. A white paper of the American Wind Wildlife Institute, Washington, DC.
High Winds, CA	162	2003	0.3	2	90	1.8	1) Kerlinger, P., L. Culp, and R. Curry. 2005. *Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report*. Prepared for: High Winds, LLC, and FPL Energy. Prepared by: Curry and Kerlinger, LLC, McLean, VA. 2) Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. April 2006. *Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report*. Prepared for: High Winds LLC, and FPL Energy. Prepared by: Curry and Kerlinger, LLC, McLean, VA.

NOTES: [1] Based on a the number of eagles observed /plot/20-minute survey period.

[2] NA indicates information is not available. This could indicate that either surveys were not conducted, studies were either not available or not completed, or for golden eagle fatalities, a wind project has not yet been built.

4.3.11 Merlin

The merlin is a CDFW Watch List species in its wintering range. It is a small falcon that breeds outside of California, yet is known as a regular visitor in the Antelope Valley during fall migration and winter. The entire 1,207-acre proposed project contains good-quality merlin foraging habitat. This species has been observed in limited numbers during both fall 2004 and fall 2005 raptor migration surveys in the adjacent Manzana Project; all individuals were passing through the site and were considered migrants, suggesting low use of the project property. One female merlin was observed hunting over nonnative grasslands in the northeast sector of the Pacific Wind Project at 50 feet above ground on April 5, 2008. In winter one observation was made of a merlin perched on a Joshua tree on January 27, 2009. One individual was observed flying through the project site at approximately 25 feet AGL during spring special-status plant surveys on April 10, 2012. Additionally, a single perched merlin was observed on October 30, 2012, on the project during the course of BUC surveys, resulting in a mean raptor use of 0.01 merlin/30-minute survey period.

Merlin do not breed in Southern California; therefore, construction and operation of the project and potential disturbance/displacement impacts would not affect breeding birds of this species. ~~Approximately 119.4 acres of foraging habitat for migrating or wintering birds would potentially be lost due to vegetation removal during construction and subsequent habitat fragmentation, though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.~~ Merlin typically hunt from a perch, or while flying rapidly below the tree line and close to the ground; however, the species is also capable of rapid and spectacular aerial flights when pursuing prey.[228] Few merlin fatalities as a result of wind turbine collision have been reported in the arid West. No merlin fatalities were reported in a postconstruction mortality study at the Tehachapi WRA between 1996 and 1998, nor were they detected during bird utilization studies during the same time period. Similarly, no merlin were recorded as fatalities as part of the San Gorgonio WRA fatality monitoring,[229] and no merlin fatalities have been recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon.[230] ~~Individuals of this species, specifically migrants and overwintering birds, would have some exposure to turbine mortality on the project during migration and, but with very low population numbers on the project, these events are expected to be rare, and population level impacts are not expected.~~

Comment [FWS MB-TD86]: This is redundant with previous sections. After the project is constructed there will be foraging habitat onsite that will put Merlins at risk.

Comment [FWS MB-TD87]: Speculative

4.3.12 American Peregrine Falcon

The American peregrine falcon was de-listed as an endangered species under the California ESA in 2008, but remains a fully protected state species. This species is adapted to open habitats, but shows a preference for nesting sites in proximity to water, with nearby vertical

[228] Warkentin, I. G., N. S. Sodhi, R. H. M. Espie, Alan F. Poole, L. W. Oliphant and P. C. James. 2005. Merlin (Falco columbarius), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/044

[229] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[230] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

structures, such as cliffs or ledges, to serve as breeding sites, and a nearby abundant food source.[231] American peregrine falcons are migratory and may pass through the project property during their autumn migration from the northern hemisphere to the southern hemisphere, and then return during their spring migration. The American peregrine falcon does not breed in Kern County,[232] but the entire project property provides suitable foraging habitat for migrants or dispersing young. A single peregrine falcon was observed during fall 2005 raptor migration surveys in the adjacent Manzana Project. The bird was recorded flying east at approximately 500 feet AGL, bringing it just above the rotor-swept zone. This species was not observed at the Pacific Wind Project as a result of spring 2008 through winter 2008–2009 avian surveys or at the project as a result of 2011–2012 avian surveys.

~~American peregrine falcon do not breed in the Southern California desert; therefore construction and operation of the project and potential disturbance/displacement impacts would not affect breeding birds of this species. Approximately 119.4 acres of foraging habitat for migrating birds would potentially be lost due to vegetation removal during construction and subsequent habitat fragmentation, though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.~~

Comment [FWS MB-TD88]: This is redundant with previous sections. After the project is constructed there will be foraging habitat onsite that will put Peregrines at risk.

The American peregrine falcon can range from ground level to over 1,000 feet AGL while foraging; thus, potential foraging heights within the project property can occur within the rotor-swept range of proposed wind turbines (91-460 feet). While migrating American peregrine falcons flying within the project property would have some exposure to turbine mortality, there have been no documented fatalities of this species at wind energy plants in the region. ~~While it is possible that small numbers of fatalities of American peregrine falcons could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial.~~

Comment [FWS MB-TD89]: Speculative

4.3.13 Prairie Falcon

The prairie falcon is listed on the CDFW Watch List in its nesting range.[233] The prairie falcon is an uncommon year-round resident of many open habitats throughout California, and it is most commonly found near perennial grasslands, savannahs, rangeland, agricultural fields, and desert scrub. Prairie falcons require cliff ledges for shelter and eyrie (nest) placement; these substrates do not occur within the project property. The prairie falcon was observed foraging within most habitats during both the winter raptor surveys and the spring and fall migratory surveys at the Manzana Project in 2004 and 2005. It was estimated that at least four individuals, floaters and migrants, resided on or near the Manzana Project; most observations were of individuals perched on cliffs. In contrast, only one prairie falcon was observed in the Pacific Wind Project during a year of avian surveys. The individual was observed in summer 2008 flying approximately 135 feet AGL. A total of three prairie falcons were observed on the project during the course of BUC surveys, making it the second most frequently observed raptor with a mean

[231] Comrack, L., and R. Logsdon. 2008. *Status Review of the American Peregrine Falcon in California*. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report 2008-06. Sacramento, CA: California Department of Fish and Game.

[232] Comrack, L., and R. Logsdon. 2008. *Status Review of the American Peregrine Falcon in California*. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report 2008-06. Sacramento, CA: California Department of Fish and Game.

[233] California Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database. January 2011. *Special Animals List*. Sacramento, CA.

raptor use of 0.04 prairie falcons/30-minute survey period. One prairie falcon was observed on January 20, 2012 flying at approximately 200 feet AGL; one was observed circling at over 100 feet AGL on July 20, 2012, and one was observed perched in a tamarisk on November 20, 2012.

~~There is no appropriate substrate on which prairie falcons could nest within the project; therefore construction and operation of the project, and potential disturbance / displacement impacts would not affect breeding birds of this species. Approximately 119.4 acres of foraging habitat for resident and birds would potentially be lost due to vegetation removal during construction, and subsequent habitat fragmentation; though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.~~

Comment [FWS MB-TD90]: Redundant to previous paragraph, except an individual PRFA was observed during Summer 2008, the breeding season, indicating that there may be risks to this species during the breeding season.

Comment [FWS MB-TD91]: Redundant

Prairie falcons have not been regularly reported as wind turbine collision fatalities at western wind energy projects. One prairie falcon fatality was reported during a postconstruction mortality study at the Tehachapi WRA, constituting 2.3 percent of raptor fatalities and 0.8 percent of total fatalities.[234] No prairie falcon collision fatalities were reported at the San Gorgonio WRA. Two prairie falcon fatalities, comprising 2 percent of total fatalities, have been recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon.[235] ~~While it is possible that small numbers of fatalities of prairie falcons could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial.~~

Comment [FWS MB-TD92]: Speculative

4.3.14 Burrowing Owl

The burrowing owl is a California Species of Special Concern and is considered in the West Mojave Plan.[236,237] The burrowing owl is a grassland- and desert-inhabiting species that nests underground, usually in ground squirrel burrows. This species nests in small numbers in the Antelope Valley. Their normal range includes the desert province of eastern Kern County in native desert and agricultural habitats.[238,239]

Burrowing owls were observed overwintering within grassland and open shrub habitats in the adjacent Manzana Project, but no nests were found. An abandoned burrowing owl (with

Comment [FWS MB-TD93]: Abandoned burrowing owl burrow? How was it determined that the burrow was abandoned? BUOW will use burrows throughout the year and a burrow may be occupied even if the owl is not observed.

[234] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[235] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[236] Shuford, W.D., and T. Gardali, eds. 2008. "California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California." In *Studies of Western Birds 1*. Camarillo, CA: Western Field Ornithologists; and Sacramento, CA: California Department of Fish and Game.

[237] Bureau of Land Management. 2005. *Final Environmental Impact Report and Statement for the West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment*. Volume 1. Available at: http://www.blm.gov/ca/st/en/fo/cdd/wemo.html

[238] Heindel, M.T. 2000. *Birds of Eastern Kern County*. Available at: http://fog.ccsf.cc.ca.us/~jmorlan/

[239] Shuford, W.D., and T. Gardali, eds. 2008. "California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California." In *Studies of Western Birds 1*. Camarillo, CA: Western Field Ornithologists; and Sacramento, CA: California Department of Fish and Game.

whitewash, but no owl) was observed during desert tortoise protocol surveys in spring 2005.

At the Pacific Wind Project, seven burrowing owl burrows were found at five sites during spring 2008 surveys, indicating the presence of at least five pairs of resident burrowing owls. Burrowing owls were observed flying between 0 and 40 feet AGL on the Pacific Wind Project, which is consistent with their general foraging strategy.

A total of four burrowing owl burrows were observed during the course of Phase I, II, and III burrowing owl surveys on the project between fall 2011 and summer 2012 (Figure 3.1.1.5-1, *Burrowing Owl Burrow Locations*). Burrowing owls are unusual in their dependence on burrows for shelter throughout the year.[240] As the species is migratory, different individuals may be present during the breeding season (spring and summer) as compared to the nonbreeding season (fall and winter). CDFW defines a burrow as occupied if at least one burrowing owl has been observed occupying a burrow there within the last 3 years.[241] Because of the importance of burrows to this species, impacts to burrows known to be occupied at any point during the past 3 years should be avoided or mitigated. Although only one of the four burrowing owl burrows monitored for summer breeding season occupancy in 2012 was determined to be active, based on CDFW's definition of occupancy, all four burrows monitored on the site would be designated as occupied, as at least one burrowing owl, or its sign, was documented within the last 3 years.

Comment [FWS MB-TD94]: This is not specific enough. Please detail where burrows are located in relation to planned activities onsite. This should be outlined in a Nesting Bird Monitoring and Management Plan that can be incorporated into this plan or in an appendix.

The project's design avoids crossing any drainages, and therefore avoids the known burrowing owl burrows on the project. Further, HW would abide by prescribed construction buffers, or mitigation for the closing of active owl burrows, as outlined within the project's EIS, for additional burrows potentially discovered during preconstruction sweeps. Therefore impacts to this species during construction would be minimized. Implementation of the proposed action would result in the direct disturbance of a small amount of Mojave Desert Wash Scrub and Non-native Grassland, which provide foraging and breeding habitat for this species; though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.

Comment [FWS MB-TD95]: This should be detailed in a Nesting Bird Monitoring and Management Plan.

Burrowing owls normally stay low to the ground, with hover-hunting generally occurring at approximately 30 feet above ground, while direct flights back to nest are typically 3-6 feet above ground; thus most flights would be expected to be below the proposed rotor-swept range of wind turbines (91-460 feet AGL) in the project.[242] Burrowing owls has previously been susceptible to collision mortality at small turbines with very low to low rotor-swept heights;[243] however, the project will only be utilizing larger, newer-generation turbines. No burrowing owls were killed during postconstruction mortality studies at the Tehachapi WRA.[244] A single burrowing owl collision fatality was documented at the San Gorgonio WRA, comprising 1.6

[240] Poulin, Ray, L. Danielle Todd, E.A. Haug, B.A. Millsap, and M.S. Martell. 2011. "Burrowing Owl (Athene cunicularia)." In *The Birds of North America Online*, ed. A. Poole. Ithaca, NY: Cornell Lab of Ornithology. Available at: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/061

[241] California Department of Fish and Game. March 2012. *Staff Report on Burrowing Owl Mitigation*. Sacramento, CA.

[242] Poulin, Ray, L. Danielle Todd, E. A. Haug, B. A. Millsap and M. S. Martell. 2011. Burrowing Owl (Athene cunicularia), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/061

[243] Smallwood, K.S., C.G. Thelander, M.L. Morrison, and L.M. Rugge. 2007. "Burrowing Owl Mortality in the Altamont Pass Wind Resource Area." *Journal of Wildlife Management*, *71*: 1513–1524.

[244] Anderson, R.L., J. Tom, N. Neumann, and J.A. Cleckler. 2004. *Avian Monitoring and Risk Assessment at Tehachapi Pass Wind Resource Area, California*. Sacramento, CA: California Energy Commission.

percent of total fatalities.[245] No burrowing owl fatalities have been recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon.[246] ~~While it is possible that small numbers of fatalities of burrowing owls could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial.~~

Comment [FWS MB-TD96]: Speculative

4.3.15 Vaux's Swift

Vaux's swift is a California species of special concern and is considered in the West Mojave Plan. Vaux's swift is a fairy common, but sporadic, migrant in eastern Kern County.[247] The Antelope Valley is outside of this species' published breeding range in the United States, which only includes portions of Washington, Oregon, Idaho, Montana, and northern to central California.

Several hundred individuals were observed during various field surveys in the adjacent Manzana Project between 2004 and 2005. Vaux's swifts were only observed during the spring or fall migration period, and almost all were recorded during midday (10:00 a.m. to 2:00 p.m.). At the Pacific Wind Project, individual Vaux's swifts were observed in the summer and autumn, but a total of 30 swifts (flock sizes: 1–16) were observed during spring migration. The largest flock, made up of 16 individuals, was detected flying at approximately 20 feet AGL. No Vaux's swifts were documented on the project during the course of directed and reconnaissance surveys in 2011-2012.

Vaux's swifts do no breed in southern California; therefore construction and operation of the project, and potential disturbance / displacement impacts, would not affect breeding birds of this species. Approximately 119.4 acres of foraging habitat for migrating birds would potentially be lost due to vegetation removal during construction, and subsequent habitat fragmentation; though ample foraging habitat remains to the east of the project and throughout the Antelope Valley. Vaux's swifts are diurnal migrants, and they generally fly at the limit of sight, though lower flights (1-2 meters above ground) may occur in cooler weather or in headwinds; thus flights can occur within the rotor-swept range of proposed wind turbines (91-460 feet).[248] No Vaux's swifts were recorded during postconstruction mortality studies at the Tehachapi WRA or the San Gorgonio WRA.[249,250] A total of 2 Vaux's swifts, comprising 0.3 percent of all bird

[245] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[246] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[247] Heindel, M.T. 2000. *Birds of Eastern Kern County*. Available at: http://fog.ccsf.cc.ca.us/~jmorlan/

[248] Bull, Evelyn L. and Charles T. Collins. 2007. Vaux's Swift (Chaetura vauxi), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/077

[249] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[250] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March

fatalities were recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon, which overlaps with the species' breeding range.[251] While Vaux's swifts migrating low within the project property would have some exposure to turbine mortality, the low number of birds expected to pass through the project would indicate a low risk of collision. ~~While it is possible that small numbers of fatalities of Vaux's swift could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial~~.

Comment [FWS MB-TD97]: Speculative

4.3.16 Loggerhead Shrike

Loggerhead shrike is a CDFG Species of Special Concern and is considered in the West Mojave Plan.[252] The loggerhead shrike is still fairly common in appropriate habitats in many areas of California and western North America, including the Mojave Desert.[253,254] A sharp decline of mainland populations of the loggerhead shrike occurred in parts of California, especially coastal Southern California, from 1968 to 1979, although statewide Breeding Bird Survey (BBS) trends were stable from 1980 to 2004.[255] Loggerhead shrikes are year-round residents in the Mojave Desert and may occur throughout the approximately 1,207-acre project property.

This species was observed during numerous surveys in the adjacent Manzana Project, and approximately 10 to 15 pairs were estimated to be breeding. Loggerhead shrike observations were numerous during avian surveys at the adjacent Pacific Wind Project, with most observations occurring in Joshua tree woodland in the eastern half of the property. Observations were relatively stable throughout the year, with shrikes being slightly more numerous during the summer breeding season. It is estimated that this site supported between 10 and 12 pairs of loggerhead shrikes; at least one active nest with eggs was found as well as several recently fledged young with adults. Between 4 to 10 loggerhead shrikes were detected during each season of BUCs on the project. Overall, this species accounted for 1.5 percent of all species detected on the project between winter 2011–2012 and fall 2012.

Loggerhead shrikes are year-round residents of the project, and nests of this species have been confirmed on adjacent wind energy projects; therefore construction and operation of the project, and potential disturbance / displacement impacts, would affect breeding birds of this species.

3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[251] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[252] Shuford, W.D., and T. Gardali, eds. 2008. "California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California." In *Studies of Western Birds 1*. Camarillo, CA: Western Field Ornithologists; and Sacramento, CA: California Department of Fish and Game.

[253] Sibley, D.A. 2000. *The Sibley Guide to Birds*. New York, NY: Knopf.

[254] Garrett, K., and J. Dunn. 1981. *Birds of Southern California: Status and Distribution*. Los Angeles, CA: Los Angeles Audubon Society, p. 408.

[255] Shuford, W.D., and T. Gardali, eds. 2008. "California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California." In *Studies of Western Birds 1*. Camarillo, CA: Western Field Ornithologists; and Sacramento, CA: California Department of Fish and Game.

HW will complete pre-construction sweeps of all construction impact zones in order to avoid actively nesting loggerhead shrikes, but human activity, vegetation removal, and habitat fragmentation may result in the displacement of some breeding pairs from the project. ~~Approximately 119.4 acres of foraging habitat for foraging birds would also be lost due to vegetation removal during construction; though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.~~

Comment [FWS MB-TD98]: This should be detailed in a Nesting Bird Monitoring and Management Plan.

Comment [FWS MB-TD99]: Redundant

The loggerhead shrike normally ranges from ground level to below 100 feet AGL during its daily foraging and roosting activities, and the mean flight height for this species as a result of BUCs was 10.4 feet AGL, well below the rotor-swept range (91-460 feet AGL) of proposed wind turbines at the project. Loggerhead shrikes are the most numerous and widely distributed avian species of special status that occurs and breeds at both of the adjacent renewable energy projects. Due to its healthy population and a foraging strategy that keeps it generally below the rotor-swept zone, it is expected that the level of collision risk associated with this species at the project is low. A single loggerhead shrike fatality, comprising 0.8 percent of all recorded fatalities, was recorded at the Tehahcapi WRA, despite being one of the most commonly detected passerine species during bird utilization surveys.[256] No Loggerhead shrike fatalities were recorded at the San Gorgonio WRA, though this species was consistently among the top five frequently occurring species between seasons and geographic areas within the project.[257] Similarly, no loggerhead shrikes were recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon. [258] ~~While it is possible that small numbers of fatalities of loggerhead shrikes could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial.~~

Comment [FWS MB-TD100]: Speculative

4.3.17 Le Conte's Thrasher

Le Conte's thrasher is a California species of special concern and is considered in the West Mojave Plan. It is a permanent resident throughout its range, which includes portions of the Mojave, Colorado, and Sonoran deserts of California, Nevada, Arizona, Utah, and central and coastal Mexico. Suitable habitat for the species exists within the Mojave Desert Wash Scrub, Mojavean Juniper Woodland and Scrub, and Joshua Tree Woodland plant communities within the project.[259]

Based on detailed avian surveys on both the adjacent Manzana and Pacific Wind Projects, it has been determined that Le Conte's thrasher is present and a year-round resident of the area. LeConte's thrasher was not recorded on the project as a result of directed and reconnaissance surveys in 2011 and 2012, though due to the secretive, ground-based nature of this species,

[256] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[257] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[258] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[259] Dobkin, D. and S. Granholm. 2005. "Le Conte's Thrasher." Prepared for: California Department of Fish and Game. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2077&inline=1

detection is difficult. The species is assumed to be present on the project based on suitability of habitat and confirmed presence at neighboring wind energy projects.

Suitable breeding and foraging habitat for this species exists on the project. No nests have been confirmed, but suitable nest sites, such as thorny desert shrubs or cholla cactus, are present; therefore construction and operation of the project, and potential disturbance / displacement impacts, would affect breeding birds of this species. HW will complete pre-construction sweeps of all construction impact zones in order to avoid actively nesting Le Conte's thrasher, but human activity, vegetation removal, and habitat fragmentation may result in the displacement of some breeding pairs from the project. ~~Approximately 119.4 acres of foraging habitat for foraging birds would also be lost due to vegetation removal during construction; though ample foraging habitat remains to the east of the project and throughout the Antelope Valley.~~

Comment [FWS MB-TD101]: This should be detailed in a Nesting Bird Monitoring and Management Plan.

Comment [FWS MB-TD102]: Redundant

The Le Conte's thrasher is a secretive ground forager that is rarely observed in flight. Maximum reported flight height is 50–65 feet; though vast majority of flights are below the height of dominant shrubs (e.g., 5-6.5 feet AGL) and it is expected that the level of collision risk associated with this species at the project is low. No Le Conte's thrasher fatalities were recorded at the Tehachapi WRA, or the San Gorgonio WRA, though this species was occasionally among the top five frequently occurring species between seasons and geographic areas within the San Gorgonio WRA.[260,261] Similarly, no Le Conte's thrashers were recorded between 1999 and 2010 during fatality monitoring programs at 23 wind energy projects in Washington and Oregon.[262] ~~While it is possible that small numbers of fatalities of Le Conte's thrasher could occur over the life of the project, such events are expected to be rare, and impacts are not expected to be substantial.~~

Comment [FWS MB-TD103]: Citation? Or is this from observations conducted on site?

Comment [FWS MB-TD104]: Speculative

4.4 IMPACTS TO GENERAL BAT SPECIES

4.4.1 Disturbance and Displacement

The construction and operation of the project may impact bats through disturbance or loss of habitat; however, only direct mortality as a result of turbine collision or barotrauma has been documented thus far.[263] Disturbance to bats from wind turbines is unknown. Increased human activity at wind turbines, or other nearby roosting sites, may disturb roosting bats, but as of yet, there are no empirical data on this phenomenon.[264] In fact, there is some evidence that bats can

[260] Anderson, R., N. Neumann, J. Tom, W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area. Period of Performance: October 2, 1996 – May 27, 1998. Prepared for National Renewable Energy Laboratory, Golden, CO.

[261] Anderson, R., J. Tom, N. Neumann , W.P. Erickson, M.D. Strickland, M. Bourassa, K.J. Bay, and K.J. Sernka. 2005. Avian Monitoring and Risk Assessment at the San Gorgonio Wind Resource Area. Phase I Field Work: March 3, 1997 – May 29, 1998, Phase II field Work: August 18, 1999- August 11, 2000. Prepared for National Renewable Energy Laboratory, Golden, CO.

[262] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[263] National Wild Coordination Collaborative. 2010. Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions. Available at: http://www1.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf

[264] Arnett, E.B., D.B. Inkley, D.H. Johson, R.P. Larkin, S. Manes, A.M. Manville, J.R. Mason, M.L. Morrison, M.D. Strickland, and R. Thresher. 2007. Impacts of wind energy facilities on wildlife and wildlife habitat. Wildlife Society Technical Review 07-2. The Wildlife Society, Bethesda, Maryland.

become habituated to noise and other maintenance operations around human erected structures.[265] There are few roosting opportunities on the project, such as tall trees, rocky outcrops, cliffs, or abandoned mines. Roosting opportunities would be limited to scattered Joshua trees (*Yucca brevifolia*) and California junipers (*Juniperus californica*), both of which provide marginal roosting habitat. ~~Removal of these trees could reduce some roosting habitat for bats, but due to the small amount of habitat disturbed by construction (119.4 acres), this is not anticipated to be a substantial impact.~~

Comment [FWS MB-TD105]: Speculative

Several studies have indicated that bats may even be attracted to wind energy projects.[266] Several hypotheses have been proposed to explain this apparent attraction: being relatively tall objects in a typically flat surrounding landscape, wind turbine towers may be perceived as potential roosts; bats are attracted to insect concentrations in areas of landscape alteration or due to the heat produced by wind turbine nacelles; or bats are attracted to audible and/or ultrasonic sound produced by wind turbines.[267] Although further research is warranted on many of these hypotheses to quantify the source of potential attraction, it appears that rather than displacing/disturbing bats, wind energy projects may effectively attract them.

4.4.2 Habitat Fragmentation

Little information exists on the impact of habitat fragmentation from wind energy projects on bats; however, modifications to vegetation structure and landscape as a result of wind energy project construction may benefit bats.[268] A study on the effect of small-scale habitat disturbance on insectivorous bat activity found that bat activity increased in disturbed areas, such as small tree harvest cutblocks areas and access roads in a forest setting.[269] Bats appear to forage readily in such small clearings, which are similar to those found around turbines. Furthermore, studies suggest that bat species use linear landscape elements, particularly edges created by clearings or roads built through habitat blocks, for improved navigation and travel, foraging,[270] echo-orientation,[271] and protection from predators or wind.[272] ~~This evidence suggests that the~~

[265] Keeley, B.W., and M.D. Tuttle. 1999. Bats in American Bridges. Bat Conservation International. Resoure Publication No. 4. 40 pp. Available online at: http://www.batcon.org/pdfs/bridges/BatsBridges2.pdf

[266] Horn, J. W., E. B. Arnett, & T. H. Kunz. 2008. Behavioral Responses of Bats to Operating Wind Turbines. *Journal of Wildlife Management*. 72: 123–132.

[267] Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007 Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecological Environments 5:315-324.

[268] Arnett, E.B., D.B. Inkley, D.H. Johson, R.P. Larkin, S. Manes, A.M. Manville, J.R. Mason, M.L. Morrison, M.D. Strickland, and R. Thresher. 2007. Impacts of wind energy facilities on wildlife and wildlife habitat. Wildlife Society Technical Review 07-2. The Wildlife Society, Bethesda, Maryland.

[269] Grindal, S. D., and R. M. Brigham. 1998. Short-term effects of small-scale habitat disturbance on activity by insectivorous bats. Journal of Wildlife Management 62: 996–1003.

[270] Grindal, S. D. 1996. Habitat use by bats in fragmented forests. Pages 260–272 in R. M. R. Barclay and R.M. Brigham, editors. Bats and Forest Symposium. British Columbia Ministry of Forestry, Victoria, British Columbia. Work Paper 23/1996.

[271] Verboom, B., A. M. Boonman, and H. J. G. A. Limpens. 1999. Acoustic perception of landscape elements by the pond bat (Myotis dasycneme). Journal of Zoology 248: 59–66.

[272] Verboom, B., and H. Huitema. 1997. The importance to linear landscape elements for the pipistrelle, Pipistrellus pipstrellus and the serotine bat, Eptesicus serotinus. Landscape

Ecology 12: 117–125.

~~construction and operation of the project would not negatively impact bats as a result of habitat fragmentation.~~

Comment [FWS MB-TD106]: This does not follow from the previous summary. If bats use small clearings near turbines then they would be at more risk, which could negatively impact bats.

4.4.3 Collision

Bat mortality has been associated with wind energy project operations, where bats can be killed or injured through collision with turbine blades or barotrauma. Large numbers of bat fatalities have occurred at some projects, particularly in the eastern United States.[273,274,275]

Although some roosting habitat and higher quality foraging habitat for bats has been documented in Tylerhorse Canyon, approximately 2 miles northwest of the project, the project itself lacks the topographic, physiographic, and habitat features to attract large numbers of bats transiting to other geographical areas, such as deep canyons and ridge systems, or areas with perennial water flow. In general, bat species prefer to forage over sites with woody plant coverage, near trees or water, as the presence of water increases the likelihood of insect abundance. Bats also prefer foraging in edge[276] and riparian areas because the open space can provide easier access to prey and allow for more maneuverability. These habitats are generally absent on the project. Water drainage within the project is limited to a network of ephemeral drainages; there are no perennial water sources within the project itself. In addition, the project contains few habitats that would serve as refuge or as stopover areas for migrating or resident bats, such as forests or riparian areas.

Over a year of acoustic data collected immediately adjacent to the project between October 2009 and 2010 resulted in a bat activity level of 0.66 bat pass per detector-night. This is comparable to the low activity rates (0.23 and 0.22 bat pass per detector-night in 2009/2010 and 2010/2011) recorded on the Alta East Wind Resource Area (AEWRA), located approximately 16 miles northeast of the project.[277] These rates, less than 1 bat pass per detector-night are appreciably lower than other bat activity estimates at projects throughout the United States, including 1.9, 2.2, 6.9, 23.7, 35.2, and 38.3 bat passes per detector-night documented during bat activity surveys at the Buffalo Ridge Wind Farm, MN;[278] Foote Creek Rim Wind Farm, WY;[279] Dry Lake Wind Farm, AZ;[280] Buffalo Mountain Wind Farm, TN;[281] Mount Storm Wind

[273] Fiedler, J. K. 2004. Assessment of bat mortality and activity at Buffalo Mountain wind facility, eastern Tennessee. Thesis, University of Tennessee, Knoxville, Tennessee, USA.

[274] Kerns, J., and P. Kerlinger. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: annual report for 2003. Curry and Kerlinger, LLC, McLean, New Jersey, USA.

[275] Arnett, E. B., editor. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International, Austin, Texas, USA.

[276] *Edge areas* are in reference to edges and linear elements in landscapes, as well as habitat edges. A prime example of an edge area would be woodland edges, which are used extensively by bats.

[277] WEST, Inc. 2012. Technical Memorandum: Results of Bat Acoustic Surveys at the Proposed Alta East Wind Resource Area, Kern County, California. WEST, Inc: Cheyenne, WY.

[278] Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32(4): 1278-1288.

[279] Gruver, J. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming. 149 pp.

[280] Thompson, J., D. Solick, and K. Bay. 2011. Post-Construction Fatality Surveys for the Dry Lake Phase I Wind Project. Iberdrola Renewables: September 2009 - November 2010. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 10, 2011.

Farm, WV;[282] and Mountaineer Wind Farm, WV,[283] respectively. Many of the sites with the highest bat activity have also experienced the highest recorded bat fatality rates, specifically Buffalo Mountain Wind Farm, Mount Storm Wind Farm, and Mountaineer Wind Farm.[284] Resident bat use, based on the results of directed surveys in the project vicinity, is expected to be low. ~~Furthermore, bat migration through the project property is likely to be generally diffuse and of light volume.~~

Comment [FWS MB-TD107]: Speculative

As of 2007, of the 45 bat species found north of Mexico, a total of 11 species of bats had been reported as fatalities at wind energy projects. Based on a review of 21 postconstruction fatality studies conducted at 19 facilities in five United States regions and one Canadian province, estimates of bat fatalities ranged between 0.2 and 53.3 bat fatalities / MW, and between 0.1 and 69.6 bat fatalities / turbine.[285] Estimates of bat fatalities were highest at wind energy facilities located on forested ridges in the eastern United States (7 projects; 31.5 to 53.3 annual bat fatalities per MW). The Pacific Northwest region, including one project in California, had among the lowest fatality rates (5 projects; 0.8 to 2.5 bat fatalities / MW).[286] The rates for these 5 projects closely aligns with the tighter range of fatality rates documented at a range of projects in arid environments in the Western United States containing similar habitats as the project (Table 4.4.3-1, *Estimates of Mean Bat Fatalities per Turbine and per Megawatt at Wind Energy Projects in the Arid Western United States*), which averaged 1.90 bats/MW/year. This average, in turn, is similar to the 1.14 bats/MW reported for Johnson and Erickson's 2011 synthesis of fatality reports from 23 wind energy projects in the Columbia Plateau Ecoregion (CPE) of Washington and Oregon, containing approximately 4,000 MW of wind energy.[287]

Three of the most important unifying patterns regarding bat fatalities that emerged during the analysis of the 21 North American postconstruction fatality studies mentioned above are: (1) bat fatalities are heavily skewed toward migratory species and are dominated by lasiurine species in most studies; (2) midsummer through fall is consistently reported as the peak of bat fatalities from all studies in North America, which corresponds with the typical fall migration period; and

[281] Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. M.S. Thesis. University of Tennessee, Knoxville, Tennessee. August, 2004. http://www.tva.gov/environment/bmw_report/bat_mortality_bmw.pdf

[282] Young, D.P. Jr., W.P. Erickson, K. Bay, S. Nomani, and W. Tidhar. 2009b. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring, July - October 2008. Prepared for NedPower Mount Storm, LLC, Houston, Texas. Prepared by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming. February 17, 2009.

[283] Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Final Report. Prepared for Bats and Wind Energy Cooperative, Bat Conservation International, Austin, Texas. June 2005.

[284] WEST, Inc. 2012. Technical Memorandum: Results of Bat Acoustic Surveys at the Proposed Alta East Wind Resource Area, Kern County, California. WEST, Inc: Cheyenne, WY

[285] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[286] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[287] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

(3) bat fatalities appear to be highest during periods of low wind speed.[288]

Of the fatalities reported within these 21 North American fatality studies, almost 75 percent of fatalities were composed of three species: foliage-roosting eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and tree cavity–dwelling silver-haired bats (*Lasionycteris noctivagans*).[289] Of these species, the hoary bat has a higher wind turbine impact mortality rate than all other species in the West.[290,291] In the six projects within the Pacific Northwest, species composition percentage ranged from 44.0 to 64.3 percent for hoary bats and 0.0 to 56.0 percent for silver-haired bats.[292] At the 23 wind energy projects in the CPE of Washington and Oregon, 556 bat fatalities were reported, of which 48.0 percent of fatalities were silver-haired bats and 46.4 percent of fatalities were hoary bats.[293] Remaining identified species made up only 2.0 percent of total recorded bat fatalities.

The data also show that bat fatalities are almost nonexistent during the breeding season and generally occur during migration and dispersal in late summer between July and September.[294,295] Higher mortality rates in fall migration, as compared to spring migration, were attributed to a lower migration concentration in spring because females leave earlier than males.[296] Migratory bat species may be more likely to be involved with collision mortality events because they fly higher in the air and in denser clusters when migrating.[297] This not only puts the bats at a height associated with the turbines' rotor swept area but, because bats migrate in groups, their ability to use echolocation is affected.[298] The evidence also shows that resident

[288] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[289] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[290] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[291] Gruver, J.C. 2002. "Assessment of Bat Community Structure and Roosting Habitat Preferences of the Hoary Bat (Lasiurus cinereus) Near Foot Creek Rim, Wyoming." Master's thesis, Department of Zoology and Physiology, University of Wyoming, Laramie, WY.

[292] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[293] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[294] Johnson, G.D., W.P. Erickson, D.A. Shepard, et al. 2002. *Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area: 2001 Field Season*. Palo Alto, CA: Electric Power Research Institute.

[295] Gruver, J.C. 2002. "Assessment of Bat Community Structure and Roosting Habitat Preferences of the Hoary Bat (Lasiurus cinereus) Near Foot Creek Rim, Wyoming." Master's thesis, Department of Zoology and Physiology, University of Wyoming, Laramie, WY.

[296] Gruver, J.C. 2002. "Assessment of Bat Community Structure and Roosting Habitat Preferences of the Hoary Bat (Lasiurus cinereus) Near Foot Creek Rim, Wyoming." Master's thesis, Department of Zoology and Physiology, University of Wyoming, Laramie, WY.

[297] Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Little Rock, AR: Arkansas Game and Fish Commission.

[298] Griffin, D.R. 1970. "Migrations of Homing Bats." In *Biology of Bats*. Volume 1. New York, NY: Academic Press.

bats foraging or commuting between roosts do not make up the bulk of collision mortality.[299,300] This is based on impact distribution data among turbines and observed forage habitat characteristics. Since resident bats would have a defined flight corridor between roosts, they should exhibit higher densities of fatalities in these corridors; but in a majority of the cases that were studied, there are no patterns; rather, there are no areas of appreciably higher densities in the distribution of fatalities.[301,302] In addition to flight corridor data, evidence from foraging behavior demonstrates that it is unlikely that fatalities would occur in resident bat populations.[303] Normally, bats do not forage at heights associated with turbine activity or in areas associated with wind turbine projects, since these areas generally are very flat and windy and have reduced insect populations. Rather, foraging locations are normally associated with areas that have less wind and more water.[304]

Finally, all studies that assessed the relationship between bats fatalities and weather patterns consistently found that fatalities appear to be highest during nights with low wind speed, when turbine blades were still moving.[305] At the Meyersdale, PA and Mountaineer, WY wind energy projects, 82 percent and 85 percent of all bat fatalities, respectively, were estimated to have occurred during nights with median wind speed of <6 m/s.[306] Surveys have also shown that fatalities increased immediately before and after passage of storm fronts.[307]

Due to their propensity to represent a high percentage of fatalities at other studied wind projects, two migratory, non-special-status species, hoary bats and silver-haired bats, would be expected to represent the majority of wind turbine–related bat fatalities from operation of the project. Hoary bats and silver-haired bats are widely distributed species that, in North America,

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[299] Crawford, R. L., and W. W. Baker. 1981. "Bats Killed at a North Florida Television Tower: A 25 Year Record." *Journal of Mammalogy*, *62*: 651–652.

[300] Johnson, G.D., D.P. Young, W.P. Erickson, et al. 2000. *Avian and Bat Mortality Associated with Initial Phase of the Foot Creek Rim Wind Power Project, Carbon County, Wyoming: November 3, 1998–October 31, 1999*. Technical Report Prepared for: SeaWest Energy Corporation, San Diego, CA, and Bureau of Land Management, Rawlins, WY.

[301] Johnson, G.D., D.P. Young, W.P. Erickson, et al. 2000. *Wildlife Monitoring Studies: Seawest Wind Power Project, Carbon County, Wyoming: 1995-1999*. Technical Report Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: SeaWest Energy Corporation, San Diego, CA, and Bureau of Land Management, Rawlins, WY.

[302] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[303] Erickson, W.P., G.D. Johnson, and M.D. Strickland, et al. 2000. *Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year*. Technical Report Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Umatilla County Department of Resource Services and Development, Pendleton, OR.

[304] Johnson, G.D., W.P. Erickson, D.A. Shepard, et al. 2002. *Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area: 2001 Field Season*. Palo Alto, CA: Electric Power Research Institute.

[305] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[306] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

[307] Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management*, *72*: 61–78.

are found within most of the United States and parts of Canada and Mexico.[308,309] As a result of directed bat surveys in the vicinity of the project, the hoary bat was determined to be present based on diagnostic recorded calls, while the silver-haired bat was determined to be potentially present, due to calls within this species frequency category (Q25).

[308] Bolster, Betsy, C. 2005. "Lasiurus cinereus Hoary Bat." Western Bat Working Group (WBWG) Species Accounts. Rapid City, ND: WBWG.

[309] Perkins, Mark. 2005. "Lasionycteris noctivagans Silver-haired Bat." Western Bat Working Group (WBWG) Species Accounts. Rapid City, ND: WBWG.

Based on the available information, larger, less maneuverable, migrating species are primarily associated with wind turbine mortality events. In addition, those species, most notably hoary and silver-haired bats in the western United States, migrating in large colonies in late fall, make up the majority of fatalities observed and recorded.[310,311] Although there have been limited quantifiable data about wind turbine / bat collision effects on bat populations, qualitative and circumstantial data suggest that turbine mortalities do not appreciably contribute to population declines,[312] at least in the West. Due to low bat passage rates on the project, combined with relatively low fatality rates experienced at wind energy projects in the western U.S., as opposed to the east, population level impacts to bat species as a result of construction and operation of the project are not expected.

4.4.4 Barotrauma

A large percentage of bat deaths at wind energy projects are not caused by actual collision with turbine blades, but caused by internal hemorrhaging consistent with trauma from the sudden drop in air pressure (barotrauma) at turbine blades.[313] Because bats can echolocate, they can typically avoid collision with objects; however, atmospheric pressure drops are not detectable by echolocation. Bat lungs are like balloons surrounded by capillaries. When outside pressure drops, their lungs can over expand, bursting the capillaries around them. A single study of bat fatalities at a wind energy project in southwestern Alberta, Canada, found that approximately 90 percent of bat fatalities showed signs of internal hemorrhaging consistent with barotrauma, whereas only half of the fatalities had injuries consistent with direct contact with turbine blades.[314]

Comment [JAR108]: However, see: http://www.nrel.gov/docs/fy14osti/60427.pdf and references therein

4.5 IMPACTS TO SPECIAL-STATUS BAT SPECIES

It has been determined that construction and operation of the project may result in potential impacts to four sensitive bat species that could be present within the project vicinity. Individual assessment of species' collision risk with wind turbines, as well as indirect impacts from construction and operation of the project, are presented below in taxonomic order. Although the potential of incidental loss of resident and migratory sensitive bats through barotrauma or collision with operational wind turbines exists, the project would not be expected to adversely affect the survival and recovery in the wild of the 4 sensitive bat species, which are all resident species.

[310] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[311] Johnson, G.D., D.P. Young, W.P. Erickson, et al. 2000. *Wildlife Monitoring Studies: SeaWest Wind Power Project, Carbon County, Wyoming: 1995-1999*. Technical Report Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: SeaWest Energy Corporation, San Diego, CA, and Bureau of Land Management, Rawlins, WY.

[312] Erickson, W., G. Johnson, D. Young, et al. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*. Prepared by: Western EcoSystems Technology, Inc., Cheyenne, WY. Prepared for: Bonneville Power Administration, Portland, OR.

[313] Baerwald, Erin F., Genevieve H. D'Amours, Brandon J. Klug, and Robert M.R. Barclay. 2008. "Barotrauma Is a Significant Cause of Bat Fatalities at Wind Turbines." *Current Biology*, *18*: 695–696.

[314] Baerwald, Erin F., Genevieve H. D'Amours, Brandon J. Klug, and Robert M.R. Barclay. 2008. "Barotrauma Is a Significant Cause of Bat Fatalities at Wind Turbines." *Current Biology*, *18*: 695–696.

4.5.1 Western Small-Footed Myotis

The western small-footed myotis is a BLM sensitive species and a commonly occurring resident bat of arid uplands in California. The western small-footed myotis occurs on the west and east sides of the Sierra Nevada Mountains and in Great Basin and desert habitats from Modoc to Kern and San Bernardino Counties. It occurs in a wide variety of habitats, primarily in relatively arid wooded and brushy uplands near water. This species is found from sea level to at least 8,900 feet. This bat seeks cover in caves, buildings, mines, crevices, and occasionally under bridges and under bark. Separate night roosts may be used and have been found in buildings and caves.[315]

The entire approximately 1,207-acre project provides potential suitable foraging habitat for the western small-footed myotis. No roost sites were identified as a result of the roost surveys conducted within the project. This species is listed as potentially present at the project, based on the results of the U.S. Forest Service (USFS) passive acoustic surveys in 2009–2010. Diagnostic calls of this species were not recorded, but calls within the 40k myotis group, which includes the western-small footed myotis, were.

No known publicly available fatality reports are available summarizing recent bat fatality rates or the species composition of fatalities in southern California; therefore collision risk for these species is analyzed by detailing the frequency of occurrence at two older WRAs within California where bats appear to only have been recorded incidentally during fatality monitoring, and at the CPE of Washington and Oregon, which contains habitats and species assemblages similar to Southern California. No western small-footed myotis bats were recorded as fatalities at either the Tehachapi or San Gorgonio WRAs. In the more extensively studied CPE of Washington and Oregon, no western small-footed myotis were documented, though a single unidentified myotis bat, making up 0.2 percent of the total 556 fatalities, was recorded.[316]

4.5.2 Yuma Myotis

The Yuma myotis is a BLM sensitive species and is a commonly occurring and widespread resident bat species in California. The species is found in a wide variety of habitats ranging from sea level to 11,000 feet, but it is uncommon to rare above 8,000 feet. Optimal habitats are open forests and woodlands with sources of water over which to feed. Maternity colonies of several thousand females and young of this species may be found in buildings, caves, mines, and under bridges.[317]

The entire approximately 1,207-acre project provides potential suitable foraging habitat for the Yuma myotis. No roost sites were identified as a result of the roost surveys conducted within the project. This species is listed as potentially present at the project, based on the results of the USFS passive acoustic surveys in 2009–2010. Diagnostic calls of this species were not recorded, but calls within the 50k myotis group, which includes the Yuma myotis, were.

[315] Harris, J. 1984. "Small-footed Bat." Prepared for: California Department of Fish and Game. Available at: http://www.sibr.com/mammals/M029.html

[316] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[317] Harris, J. 1984. "Yuma Myotis." Prepared for: California Department of Fish and Game. Available at: http://www.sibr.com/mammals/M023.html

No Yuma myotis bats were recorded as fatalities at either the Tehachapi or San Gorgonio WRAs, but bats appeared to have been recorded only incidentally during the course of these mortality studies. In the more extensively studied CPE of Washington and Oregon, no western small-footed myotis were documented, though a single unidentified myotis bat, making up 0.2 percent of the total 556 fatalities, was recorded.[318]

4.5.3 Pallid Bat

The pallid bat is a California species of special concern and a BLM sensitive species. The pallid bat is a locally common resident species of low elevations in California. It occurs throughout California, except for the high Sierra Nevada Mountains from Shasta County to Kern County and the northwestern corner of the State from Del Norte and western Siskiyou Counties to northern Mendocino County.[319] A wide variety of habitats are occupied by this species, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting. The pallid bat is a year-long resident in most of its range. Day roosts of pallid bats are in caves, crevices, mines, and occasionally in hollow trees and buildings. Night roosts may be in more open sites, such as porches and open buildings. Few hibernation sites are known, but pallid bats are likely to use rock crevices and mines.[320]

The entire approximately 1,207-acre proposed project property provides potential suitable foraging habitat for the pallid bat. No roost sites were identified as a result of the roost surveys conducted within the project; however, the pallid bat was determined to be present as a result of diagnostic calls recorded during 2009–2010 USFS passive acoustic surveys and during active surveys on the adjacent Manzana Project in 2005.

No pallid bats were recorded as fatalities at either the Tehachapi or San Gorgonio WRAs, but bats appeared to have been recorded only incidentally during the course of these mortality studies. In the more extensively studied CPE of Washington and Oregon, no pallid bats were documented in Johnson and Erickson's 2011 synthesis of fatality reports from 23 wind energy projects.[321]

[318] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

[319] Harris, J. 1984. "Pallid Bat." Prepared for: California Department of Fish and Game. Available at: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2349

[320] Harris, J. 1984. "Pallid Bat." Prepared for: California Department of Fish and Game. Available at: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2349

[321] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

4.5.4 Western Mastiff

The western mastiff bat, also known as the western bonneted bat, is a California species of special concern and a BLM sensitive species. It is an uncommon resident species in the southeastern San Joaquin Valley and the Coastal ranges from Monterey County southward through southern California, and from the coast eastward to the Colorado Desert. It occurs in a variety of open, semiarid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban environments. Western mastiff bats roost in cliff faces, high buildings, trees, and tunnels and require vertical faces to drop from in order to achieve flight.[322]

The entire approximately 1,207-acre proposed project property provides potential suitable foraging habitat for the western mastiff bat. No roost sites were identified as a result of the roost surveys conducted within the project; however, the pallid bat was determined to be present as a result of diagnostic calls recorded during 2009–2010 USFS passive acoustic surveys.

No western mastiff bats were recorded as fatalities at either the Tehachapi or San Gorgonio WRAs, but bats appeared to have been recorded only incidentally during the course of these mortality studies. In the more extensively studied CPE of Washington and Oregon, no western mastiff bats were documented in Johnson and Erickson's 2011 synthesis of fatality reports from 23 wind energy projects.[323]

[322] Ahlborn, G. 1984. "Pallid Bat." Prepared for: California Department of Fish and Game. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=2357

[323] Johnson, G.D., and W.P. Erickson. 2011. *Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon*. Prepared for: Klickitat County Planning Department, WA. Prepared by: WEST, Inc., Cheyenne, WY.

TABLE 4.4.3-1
ESTIMATES OF MEAN BAT FATALITIES PER TURBINE AND PER MEGAWATT AT WIND ENERGY PROJECTS IN THE ARID WESTERN UNITED STATES

Wind Energy Project and Location	Survey Years	Habitat	Estimated Mean Bat Fatality / Turbine/Year	Estimated Mean Bat Fatality / MW/Year	Reference
Alite, CA	2009–2010	Shrub/scrub grassland	n.d.	0.24	Chatfield, A., W.P. Erickson, and K. Bay. 2010. Final Report: Avian and Bat Fatality Study at the Alite Wind-Energy Facility, Kern County, California. Final Report: June 15, 2009-June 15, 2010. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. Prepared for CH2M Hill, Oakland, CA.
Biglow Canyon Phase I, OR	2008	Dryland agriculture, Conservation Reserve Program (CRP) grassland, shrub-steppe	3.29	1.99	Jeffrey, J.D., K. Bay, W.P. Erickson, M. Sonneberg, J. Baker, M. Kesterke, J.R. Boehrs, and A. Palochak. 29 April 2009. *Portland General Electric Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring First Annual Report, Sherman County, Oregon. January 2008 - December 2008*. Technical report prepared for Portland General Electric Company, Portland, OR. Prepared by Western EcoSystems Technology (WEST) Inc., Cheyenne, WY.
Biglow Canyon Phase II, OR	2010–2011	Dryland agriculture, CRP grassland, shrub-steppe	1.32	0.57	Enk, T., K. Bay, M. Sonnenberg, and J.R. Boehrs. 2012. *Year 2 Post-Construction Avian and Bat Monitoring Report, Biglow Canyon Wind Farm Phase II, Sherman County, Oregon. September 13, 2010 – September 15, 2011*. Technical report prepared for Portland General Electric, Portland, OR. Prepared by WEST, Cheyenne, WY.
Biglow Canyon Phase III, OR	2010–2011	Dryland agriculture, CRP grassland, shrub-steppe	n.d.	0.22	Enk, T., K. Bay, M. Sonnenberg, and J.R. Boehrs. 2012. *Draft Year 1 Avian and Bat Monitoring Report, Biglow Canyon Wind Farm - Phase III, Sherman County, Oregon, September 13, 2010 – September 9, 2011*. Technical report prepared for Portland General Electric Company, Portland, OR. Prepared by WEST, Cheyenne, WY.
Buena Vista, CA	2008–2009	Grassland, grazeland, sagebrush chaparral	n.d.	n.d.[2]	Insignia 2009. *2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project*. Report prepared for Contra Costa County. Insignia 540 Bryant Street Suite 200, Palo Alto, CA 94301.
Dillon, CA	2008–2009	Desert scrub	2.17	2.17	Chatfield, A., W. Erickson, and K. Bay. 2009. Avian and Bat Fatality Study, Dillon Wind-Energy Facility, Riverside County, California. Final Report: March 26, 2008 – March 26, 2009. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 3, 2009.
Dry Lake, AZ	2009–2010	Desert scrub and grazeland	9.01	4.29	Thompson, J., D. Solick, and K.Bay. 2011. Post-construction Fatality Surveys for the Dry Lake Phase I Wind Project, Iberdrola Renewables: September 2009-November 2010. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 10, 2011.
Elkhorn Valley, OR	2008	Dryland agriculture and grazeland	2.07	1.26	Jeffrey, J.D., W.P. Erickson, K. Bay, M. Sonneberg, J. Baker, J.R. Boehrs, and A. Palochak. 2009. *Horizon Wind Energy, Elkhorn Valley Wind Project, Post-Construction Avian and Bat Monitoring, First Annual Report, January-December 2008*. Technical report prepared for Telocaset Wind Power Partners, a subsidiary of Horizon Wind Energy, Portland, OR. Prepared by WEST, Cheyenne, WY.
Foote Creek Rim, Phase I	1999–2002	Mixed grass prairie, sagebrush shrubland	1.34	n.d.	Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. *Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002*. Prepared for Pacificorp, Inc. Portland, OR, SeaWest Windpower Inc. San Diego, CA, and Bureau of Land Management, Rawlins District Office, Rawlins, WY.
High Winds, CA	2003–2005	Agriculture, grassland	3.63	2.02	Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.
Hopkins Ridge, WA	2006	Agriculture, grassland	1.13	0.63	Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. *Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006*. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, WA. WEST, Cheyenne, WY.
Judith Gap, MT	2006–2007	Native Short-grass prairie, dryland agriculture, CRP grassland	13.4	8.9	TRC Environmental Corporation. January 2008. *Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana*. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416).
Judith Gap, MT	2009	Native Short-grass prairie, dryland agriculture, CRP grassland	7.2	4.80	Poulton, V., and W. Erickson. 2010. *Post-Construction Bat and Bird Fatality Study, Judith Gap Wind Farm, Wheatland County, Montana*. Prepared for: Judith Gap Energy LLC. Prepared by: Western EcoSystems Technology, Inc. (WEST), Cheyenne, WY.
Klondike I, OR	2001–2002	Dryland agriculture, grazeland, CRP grassland	1.16	0.77	Johnson, G.D., W.P. Erickson, and J. White. March 2003. *Avian and Bat Mortality during the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon*. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by WEST, Cheyenne, WY.
Klondike II, OR	2007–2009	Dryland agriculture and grazeland	0.63	0.41	Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. 17 July 2007. *Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon*. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, OR. Analysis conducted by WEST, Cheyenne, WY.
Klondike III, OR[3]	2007–2009	Agriculture, Columbia Basin shrub-steppe	2.07	1.17	Gritski, R., S. Downes, and K. Kronner. [21 April 2010] Updated September 2010. *Klondike III (Phase 1) Wind Power Project Wildlife Monitoring: October 2007-October 2009*. Prepared for Iberdrola Renewables, Inc. (IRI), Portland, Oregon, for Klondike Wind Power III LLC. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, OR.

TABLE 4.4.3-1
ESTIMATES OF MEAN BAT FATALITIES PER TURBINE AND PER MEGAWATT AT WIND ENERGY PROJECTS IN THE ARID WESTERN UNITED STATES, *Continued*

Wind Energy Project and Location	Survey Years	Habitat	Estimated Mean Bat Fatality / Turbine/Year	Estimated Mean Bat Fatality / MW/Year	Reference
Nine Canyon, WA	2002–2003	Dryland agriculture, CRP grassland, grazed shrub-steppe	3.21	2.46	Erickson, W.P., K. Kronner, and R. Gritski. October 2003. *Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003*. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, OR.
Stateline, OR/WA	2001–2003	Dryland agriculture, native grassland, CRP grassland, limited sagebrush	1.12	1.7	Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. December 2004. *Stateline Wind Project Wildlife Monitoring Annual Report. July 2001 - December 2003*. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee. WEST, Cheyenne, WY.
Stateline, OR/WA	2006	Dryland agriculture, native grassland, CRP grassland, limited sagebrush	0.63	0.95	Erickson, W.P., K. Kronner, and K.J. Bay. 2007. *Stateline 2 Wind Project Wildlife Monitoring Report, January - December 2006*. Technical report submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.
Vancycle, OR	1999	Dryland agriculture, grassland	0.74	1.12	Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. *Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon*. Technical Report prepared by WEST, Inc., for Umatilla County Department of Resource Services and Development, Pendleton, OR.
Wild Horse, WA	2007	Mixed grass prairie	0.70	0.39	Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. *Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington*. Prepared for Puget Sound Energy, Ellensburg, Washington, by WEST, Cheyenne, WY.
Mean Bat Fatalities per Turbine and per Megawatt			**3.05**	**1.90**	

NOTE: [1] Project data listed above as "n.d." did not have publicly available data for that particular fatality parameter, or not enough information was available to facilitate conversion between MW/year and turbine/year. The mean calculated for each of the four parameters was only made with projects for which data was available for that parameter).
[2] Single Hoary bat found during monitoring, but no fatality estimation given.
[3] Multiple fatality estimates provided. Fatality estimates using Huso Estimator is presented here.

4.6 CONCLUSION

The analysis of the potential for project impacts to bird and bat species due to disturbance, displacement, habitat fragmentation, and collision was conducted by taxonomic group and in the case of special-status species, individually by species. No bird or bat species listed as threatened or endangered by the USFWS have been detected on the project footprint; nor are any known to historically occupy the project vicinity. In addition, there is no evidence that the project vicinity is used as a migration corridor, or that it contains unique features that would attract either bird or bat species. ~~Although no population level impacts to bird and bat species from the construction and operation of the project are anticipated,~~ HW has taken a proactive approach to the avoidance and minimization of any potential impacts through the development of specific conservation measures, outlined in Section 5.

Comment [FWS MB-TD109]: This has not been shown.

SECTION 5.0
AVOIDANCE AND MINIMIZATION MEASURES
TIER 4.0 AND 5.0 POST-CONSTRUCTION STUDIES

Key considerations in the analysis of environmental impacts from wind energy projects are the potential for impacts to resident and migratory avian and bat species. Despite efforts to site and design the project in an attempt to avoid and minimize impacts to avian and bat species, the potential still exists for conflicts to occur as a result of project construction and operation.

Mitigation and conservation measures have been developed to address impacts to bird and bat species caused by construction and operation of the project. Postconstruction monitoring has been designed to evaluate the project during operation to determine the scope of actual impacts. Adaptive management methodologies have been designed to use monitoring data to evaluate whether impacts are greater than predicted and, if at unacceptable levels, to implement additional measures, after coordination with Bureau of Land Management (BLM) and US Fish and Wildlife Service (USFWS), to address those impacts. This section corresponds to Tier 4 and 5 of the *Final Guidelines*[324] and approximates Stages 4 and 5 of the *ECP Guidance.*[325] If HW later applies for a programmatic eagle take permit as described in Section 1.0 of the BBCS, HW will submit an ECP that satisfies all the specific USFWS recommendations of an ECP as outlined in the *ECP Guidance*.

This Bird and Bat Conservation Strategy (BBCS) conservation approach builds on commitments developed through the environmental compliance process. Best management practices (BMPs) for siting, construction, and operation of wind energy projects on BLM-administered land have been stipulated under Instruction Memorandum (IM) No. 2009-043, which further clarifies the *BLM Wind Energy Development Policies and BMPs* (Appendix B, BLM Wind Energy Development Policies and Best Management Practices) provided in the Wind Energy Development Programmatic Environmental Impact Statement of 2005. HW has also proposed an array of additional mitigation measures aimed at further avoiding and mitigating impacts to avian and bat species, particularly golden eagle and condor, that may interact with the project. Specific mitigation measures to avoid avian and bat mortality will also be specified in the EIS prepared for the project by the BLM, though the Draft EIS has yet to be released and the content of those measures is currently unknown. The measures described in this BBCS will be updated based on the BLM required measures that will be described in the Draft EIS and subsequent Final EIS.

Many of the avoidance and minimization measures described below are similar to ~~the advanced conservation practices (ACPs)~~conservation measures described in the U.S. Fish and Wildlife Service's *ECP Guidance*.[326] ~~This guidance defines ACPs as "scientifically supportable measures that are approved by the Service and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is~~

Comment [JAR110]: After review, what's being proposed appear to me to be more similar to "Conservation measures" as, per the guidelines regarding ACPs, "Because the best information currently available indicates there are no conservation measures that have been scientifically shown to reduce eagle disturbance and blade-strike mortality at wind projects, the Service has not currently approved any ACPs for wind energy projects." Whereas, conservation measures are "actions that avoid (this is best achieved at the siting stage), minimize, rectify, reduce, eliminate, or mitigate an effect over time."

[324] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[325] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA

[326] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA

~~unavoidable."~~ The measures described below will collectively serve to avoid and minimize general avian and bat mortality and disturbance, but more specifically they will avoid and minimize golden eagle mortality and disturbance. Furthermore, the implementation of an adaptive management program will provide a blueprint for future management actions, including compensatory mitigation, should they be deemed necessary.

The following sections identify avoidance and minimization measures that have been or will be incorporated into sequential phases of project development, including: project design, construction, and operation. Subsequent sections provide further descriptions of the proposed post-construction monitoring studies, as well as further description of the Adaptive Management Plan.

5.1 AVOIDANCE AND MINIMIZATION MEASURES

5.1.1 BLM Wind Energy Development Policies and Best Management Practices

The project proponent will adhere to the BMPs as identified in the BLM Wind Energy Program Policies and Best Management Practices (Appendix B) during the design, construction, and operation phases of the project.

5.1.2 Applicant Proposed Avoidance and Minimization Measures

Applicant proposed measures applicable to avoiding and minimizing impacts to birds and bats during the design, construction, and operation phases of the project are summarized below.

5.1.2.1 General Measures for Bird and Bat Species

Project Design Avoidance and Minimization Measures

- *Use Existing Infrastructure*. In an effort to minimize environmental impacts, the project has been designed to use existing infrastructure and previously disturbed areas from the adjacent operating Manzana Wind Project and Pacific Wind Project to the extent practical, including roads, transmission lines and substations.

- *Avoid Drainage Crossings*. In an effort to avoid impacts to riparian habitats that are normally associated with streams and ephemeral drainages, the project has been designed to use existing drainage crossings located in the adjacent Manzana and Pacific Wind Projects.

- *Minimize Perching or Nesting Opportunities*. To minimize perching or nesting opportunities for birds, the project will use tubular poles for any necessary overhead electrical poles and tubular towers for turbines.

- *Met Tower Design*. Permanent met towers will be free-standing and not contain guy wires. Bird diverters will be placed on all temporary met tower guy wires to minimize avian collision, per BLM-CA IM 2013-004.

- *Minimize Lighting*. Measures will be taken to avoid/minimize the impact of light

Comment [JAR111]: As such, coordination and consistent bird and bat conservation strategies for these projects infrastructure should be incorporated.

Comment [JAR112]: Also see Manville's tower standards.

Comment [JAR113]: Also see Manville's lighting standards

intrusion into adjacent native habitat. The BLM Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western U.S. recommends the following:

- Night lighting during construction would not occur to the maximum extent practicable;
- Any night lighting during construction and operation would be selectively placed, shielded, and directed away from all areas of native habitat to the maximum extent practicable; and
- All unnecessary lighting should be turned off at night to limit attracting migratory birds.

Construction Avoidance and Minimization Measures

- *Prevention of Erosion and Sedimentation.* Design measures such as straw waddles, silt fencing, aggregate materials, wetting compounds, and revegetation of native plant species will be implemented to decrease erosion and sedimentation.

- *Conduct Preconstruction Surveys.* Approved biologists will conduct pre-construction surveys for applicable biological resources in all construction impact areas and enact avoidance or minimization measures, such as buffers, to protect such resources from construction impacts.

- *Qualified Biologist.* A qualified biologist will regularly monitor construction activities to ensure construction is proceeding in compliance with HW proposed environmental mitigation measures as well as those measures required by the regulatory agencies.

- *Construction Environmental Training Program.* HW will develop an environmental training program for its construction contractors and personnel. The environmental training will cover the sensitive resources found on-site, flagging/fencing of exclusion areas, permit requirements, and other environmental issues. All construction site personnel will be required to attend the environmental training in conjunction with hazard and safety training prior to working on site.

- *Removal of Construction Materials.* At the completion of the project, all construction materials will be removed from the site.

- *Restriction to Existing Access Roads.* Except when not feasible due to physical or safety constraints, all project vehicle movement will be restricted to existing access roads and access roads constructed as a part of the project and determined and marked by the project proponent in advance of construction. Approval from a biological monitor will be obtained prior to any travel off of existing access roads.

- *Minimize Dust.* Implementation of active dust suppression measures during the construction period to minimize the creation of dust clouds; including, but not limited to: applying water at least once per day, or conduct watering as

Comment [JAR114]: Avoid using plastic erosion control netting as it has been shown to entangle wildlife

Comment [FWS MB-TD115]: Will GOEA nest surveys be conducted?

Comment [FWS MB-TD116]: Will a separate nesting bird monitoring and management plan be produced? We recommend one be prepared, either within this document or in an appendix.

necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction. Increase watering frequency to four times per day if winds exceed 25 mph. Non-toxic soil stabilizers may be utilized to control fugitive dust.

- *Restrict Vehicle Speeds***.** Restrict construction vehicle speeds to 25 mph on unpaved roads. Project personnel and visitors will be instructed to drive at the recommended speed limit and be alert for wildlife, especially in low visibility conditions.

- *Implement Good Housekeeping Procedures.* Maintain construction site with good housekeeping procedures. Project personnel will ensure standing water and trash, which may attract nuisance wildlife, do not accumulate on the project during the construction phase of the project.

- *Avoid Increasing Prey Abundance*. The project proponent will implement construction protocols to avoid increasing ground-dwelling prey abundance on the project, including minimizing cutting into hill slopes to avoid sudden berms or cuts to prevent underburrowing, minimization of the creation of rock piles, and placement of gravel around turbine foundations to prevent underburrowing.

- *Ground Cover Replacement.* Replace ground cover in disturbed areas as soon as feasible.

- *Follow APLIC Guidelines.* It is anticipated that only overhead collector lines over streambed crossings will be implemented on the project; however, all power lines approved for construction by the BLM for the project will be constructed to the most current APLIC Guidelines.[327] The project proponent(s) shall conform to the latest practices to protect birds from electrocution and collision, including line markers spaced per APLIC Guidelines.

Operations Avoidance and Minimization Measures

- *Habitat Restoration.* HW will restore native vegetation in the affected work areas after construction. Restoration will include planting or seeding native plants that were present prior to the work and/or are compatible with existing vegetation near the work area.

- *Restrict Vehicle Speeds***.** Restrict operations vehicle speeds to 25 mph on unpaved roads. Project personnel and visitors will be instructed to drive at the recommended speed limit and be alert for wildlife, especially in low visibility conditions.

- *Implement Good Housekeeping Procedures*. Maintain project site with good housekeeping procedures. Project personnel will ensure standing water and trash, which may attract nuisance wildlife, do not accumulate on the project

Comment [JAR117]: We suggest 15 consistent with Alta East measures

Comment [JAR118]: If installed to standards, inspected, and maintained, no need to monitor. Inspection and maintenance reports should be submitted to FWS.

Comment [FWS MB-TD119]: Repeatedly in other sections, it was stated that transmission lines would be buried, except for at streambed crossings. Please state this more explicitly here.

Comment [JAR120]: As above, suggest 15

[327] Avian Power Line Interaction Committee (APLIC). 2012. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2012*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

during the operations phase of the project.

- *Operations and Decommissioning Monitoring Program.* A monitoring program would be implemented to ensure environmental conditions are monitored during the operation and decommissioning phases. The monitoring program would include adaptive management strategies to reflect improved technology or the need to adjust to a better understanding of the data during the actual impacts of the project.

- *Conduct Postconstruction Mortality Monitoring.* The project proponent will conduct postconstruction bird and bat mortality monitoring surveys in the first and second years following the initial operation of the project to demonstrate the level of incidental injury and mortality to populations of avian or bat species in the vicinity of the project site (see details below in 5.2.1, Postconstruction Mortality Monitoring).

- *Conduct Long-Term Postconstruction Mortality Monitoring.* Starting in the third year of project operation and continuing for the life of the project, the project proponent's operations staff shall conduct annual Long-Term Post-Construction Mortality Monitoring in conjunction with other project monitoring. (see details below in 5.2.2, Long-Term Postconstruction Mortality Monitoring).

Comment [JAR121]: We recommend first three consecutive years post-construction within an adaptive management framework (i.e., to assess whether the risk assessment was correct and to determine whether additional monitoring is warranted, esp. if risk appears to be higher than expected and, if additional measures are implemented, the company will need to monitor the impact of those measures).

Comment [JAR122]: Long-term monitoring should be more robust than what is proposed. It should meet all the standards associated with a statistically robust monitoring plan, with some parameters adjusted for large-bodied birds.

5.1.2.2 *Specific Measures for California Condor*

Comment [JAR123]: To avoid confusion with other documents, the condor section of this bird plan should either be updated as needed as any measures are revised through public comment and consultation processes or put a placeholder here and refer to condor plan once it is finalized.

Project Design Avoidance and Minimization Measures

- *Condor Monitoring and Avoidance Plan.* The project proponent shall submit for review and approval a Condor Monitoring and Avoidance Plan that provides the details of a system that will detect and avoid condors in the project vicinity. The system currently being described is a Very High Frequency (VHF)–based Condor Monitoring System (ReCON) that has the capability to detect VHF-tagged condors at least 16 miles from the detection station. The system transmits an alert that prompts a response from project personnel when a VHF-tagged condor approaches within a 5-mile perimeter of project turbines. This system is augmented by human observation at a 2-mile perimeter of project turbines. The purpose of the plan is to outline the procedures and steps to be undertaken by the project proponent to implement focused curtailment of wind turbine generators if a California condor is detected within 2-mile perimeters of project turbines. An adaptive management plan will also be developed to ensure continued protection of condors if condor use patterns change such that the birds are more frequently entering either the 5-mile or 2-mile detection perimeter or if XX% of the Southern California flock is no longer marked with VHF transmitters.

Comment [JAR124]: It's not the entire flock but some percentage that will trigger the need to switch to an alternative detection.

Construction Avoidance and Minimization Measures

- *Implement Condor Monitoring and Avoidance Plan*. The Condor Monitoring and Avoidance Plan shall be implemented and demonstrated to be effective and fully operational prior to initiation of turbine testing and operations and shall remain

Comment [JAR125]: This should be demonstrated during the consultation process.

fully operational during daytime hours, which includes 30 minutes prior to sunrise and 30 minutes after sunset.

Operations Avoidance and Minimization Measures

- *Continue to Implement Condor Monitoring and Avoidance Plan*. The Condor Monitoring and Avoidance Plan shall remain fully operational during daytime hours, which includes 30 minutes prior to sunrise and 30 minutes after sunset. The project proponent will be responsible for regular communication with and reporting to the BLM and USFWS on condor use of the project, as stipulated in the Condor Monitoring and Avoidance Plan, in order to apply adaptive management measures as needed.

- *Report California condor sightings.* All California condor sightings during operations will continue to be reported directly to the USFWS and BLM within 24 hours.

- *Response to Condor Mortality.* If a California Condor were struck by a turbine blade, the project shall immediately be confined to nighttime-only operations and reinitiation of formal section 7 consultation will occur.

5.1.2.3 Specific Measures for Golden Eagles

Measures specifically designed to avoid and minimize impacts to golden eagles from construction and operation of the project are provided, based on those measures recommended in the *ECP Guidance*.[328] While included specifically for golden eagles, these measures would also benefit other bird and bat species on the project. Conversely, many of the applicant proposed measures for general bird and bat species would also provide benefit to golden eagles.

Comment [FWS MB-TD126]: Golden Eagle should be addressed in separate ECP.

Project Design Avoidance and Minimization Measures

- *Maximize Use of Developed or Degraded Land.* Prioritize locating development on lands that provide minimal eagle use potential including highly developed and degraded sites.

- *Utilize Existing Infrastructure*. Utilize existing transmission corridors and roads.

Comment [JAR127]: As above, we recommend existing infrastructure also implement conservation measures and monitor for mortalities in a comparable manner.

- *Avoid Ridge Areas.* Set turbines back from ridge areas.

- *Avoid High Eagle Use Areas.* Site structures away from high eagle use areas and the flight zones between them.

- *Minimize the Use of Above-Ground Lines.* Bury power lines to reduce avian collision and electrocution. The project will minimize the use of above-ground transmission lines. The majority of the project will utilize underground collector

[328] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA

lines and mark overhead lines per BLM per BLM-CA IM 2013-004 if applicable.

- *Minimize the Extent of the Road Network.*
- *Avoid Areas of Abundant Eagle Prey.* Avoid siting turbines in areas where eagle prey is abundant.
- *Avoid Water Resources.* Avoid areas with high concentrations of ponds, streams, or wetlands.

Construction Avoidance and Minimization Measures

- *Minimize Surface Disturbance*. Minimize the area and intensity of disturbances during pre-construction and construction periods.

Operations Avoidance and Minimization Measures

- *Dismantle Nonoperational Meteorological Towers.*

- *Minimize Attraction of Golden Eagle Prey Resources.* Maintain facilities and grounds in a manner that minimizes any potential impacts to eagles (e.g. minimize storage of equipment near turbines that may attract prey, avoid seeding forbs below turbines that may attract prey, etc.). Avoid practices that attract/enhance prey populations and opportunities for scavenging within the project area.

- *Reduce Vehicle Collision Risk.* Take actions to reduce vehicle collision risk to wildlife and remove carcasses from the project area (e.g. deer, livestock, etc.)

- *Implement No-Activity Buffers Surrounding Golden Eagle Nests*. As of 2013, there were no active golden eagle nests closer than 15 miles to the project. However, if eagle nests are discovered in the project vicinity, the Qualified Biologist may enact avoidance or minimization measures, such as no-activity buffers for eagle nests that have a direct line of sight to the work area. Nest buffers for eagles may be adjusted to reflect existing conditions including ambient noise, topography, and species' disturbance tolerance with the approval of USFWS.

5.1.3 Bureau of Land Management Required Mitigation Measures

The measures described in this BBCS will be updated based on the BLM required measures that will be described in the Draft EIS and subsequent Final EIS.

5.2 POSTCONSTRUCTION STUDIES

The project proponent proposes to conduct postconstruction monitoring studies to estimate project impacts. These provisions incorporate aspects of Tier 4 and 5 of the *Final Guidelines*[329] and the *ECP Guidance.*[330] Further details on these surveys are presented below:

5.2.1 Postconstruction Mortality Monitoring

Qualified biologists will conduct postconstruction bird and bat mortality monitoring surveys to document actual fatalities associated with wind turbines and other project-related activities and facilities, such as meteorological towers and overhead electrical collector lines. The

[329] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[330] U.S. Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. *Eagle Conservation Plan Guidance*. Module 1—"Land-Based Wind Energy." Version 2. Arlington, VA

postconstruction mortality monitoring will be conducted in the 1st and 2nd years following the first delivery of power.

Comment [JAR128]: As above, we recommend the first three years in an adaptive management framework.

Monitoring Protocols

The primary objectives of the postconstruction monitoring are to estimate avian and bat mortality rates on the project and to determine whether the estimated mortality is lower, similar, or higher than expected and to compare to the average mortality rates observed at other regional projects with similar habitat. Wind energy project fatality estimation is largely based on the number of carcasses found during carcass searches conducted under operating turbines. Monitoring protocols will be designed in accordance with the CEC's *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* and the USFWS' *Final Guidelines*.[331,332] Both the probability that a carcass persists on-site long enough to be detected by searchers (carcass persistence) and the ability of searchers to detect carcasses (searcher efficiency) can lead to imperfect detection of carcasses during standardized searches. Therefore, this postconstruction monitoring will include (1) standardized carcass searches to monitor potential injuries or fatalities associated with wind energy project operation; (2) searcher efficiency trials to assess observer efficiency in finding carcasses; and (3) carcass removal trials to assess seasonal, site-specific carcass persistence time. Annual fatality rates will then be calculated by correcting for the bias (i.e., underestimation and overestimation) due to searcher efficiency and scavenging rates by using an equation that accounts for the number of turbines searched, the carcass persistence, and searcher efficiency.

Carcass Searches

Comment [FWS MB-TD129]: We suggest that the turbines subsample be shifted each year, so that all turbines are searched for a year by the end of the three years of monitoring.

Postconstruction monitoring will be undertaken for approximately 30 percent of the total number of turbines installed in the project, .as recommended by the USFWS *Final Guidelines*.[333] Specifically, based on the most intensive development scenario of up to 40 1.5 MW turbines, searches would be undertaken of 12 turbines per search period. Carcass searches will be conducted in 14 day intervals throughout the year. It is estimated that approximately 26 carcass searches will be conducted in each year of monitoring. Reconnaissance-level carcass searches will also be conducted at least monthly at any project meteorological towers and overhead collector lines.

Comment [JAR130]: We also recommend monthly searches around all turbines.

Comment [JAR131]: Search interval should be informed by carcass persistence as noted below. Is there information from neighboring wind facilities to inform search interval?

Comment [JAR132]: Any post-construction monitoring should adopt appropriate search intervals informed by carcass removal trials.

To ensure representative sampling of the entire project and key local factors that might affect collision risk, a stratified random sample of turbines will be selected for use as carcass search plots, as recommended in the *Final Guidelines*.[334] Search turbines will remain constant over the course of the 3-year study, unless further guidance from the agencies is provided.

Carcass searches will be conducted within an appropriately sized circular plot with the turbine

Comment [JAR133]: We recommend, per the guidelines, two times the maximum turbine height.

[331] California Energy Commission. 26 September 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development*. Final Committee Report. Prepared for: California Department of Fish and Game, Sacramento.

[332] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[333] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

[334] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. 23 March 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. Available at: www.fws.gov/windenergy/docs/WEG_final.pdf

base at the center. Linear transects will be established within search plots approximately 6 to 10 m apart, adjusted as necessary for vegetation type and visibility. Searchers will walk along each transect searching both sides out to 3 to 5 m for fatalities. Personnel trained and tested in proper search techniques will conduct the carcass searches. Carcass removal trials will be conducted at least once each season, as noted below, to document the length of time carcasses remain in the search area available to be found by searchers, and to subsequently determine the appropriate frequency of carcass searches within the search plots. The spatial location of each carcass find will be evaluated at the end of the first year of carcass searches to determine the appropriate size of the search plot to maximize searcher efficiency.

Data—including the time, date, weather conditions, plot number, searcher identity, and other pertinent information—will be collected for each carcass plot search and recorded on a standardized data sheet. Each carcass will be photographed and its location will be recorded with a sub-meter global position system (GPS). For each bird or bat carcass encountered, the following information will be recorded, to the extent possible:

Comment [FWS MB-TD134]: Data monitoring should include data fields from SPUT reporting template.

1. Site
2. Date
3. Observer
4. Carcass identification number
5. Species
6. Sex
7. Age
8. Time
9. Condition category (intact, scavenged, or feather spot)
10. Description of injury(ies)
11. GPS location
12. Distance to nearest turbine
13. Bearing from nearest turbine
14. Whether closest turbine is mid- or end-of-row
15. Distance to plot center
16. Carcass description, including possible cause of death and other pertinent information
17. Estimated time of death (e.g., <1 day, 2 days)

The following condition descriptions will be used:

- **Intact**—a carcass that is completely intact, is not badly decomposed, and shows no sign of alteration by scavenger or predator
- **Scavenged**—an entire carcass, with signs of predator marks or scavenging, or a portion(s) of a carcass concentrated in one location (e.g., wings, legs, skeleton)
- **Feather spot**—10 or more feathers or 3 or more primaries concentrated in one location as a result of extended predation or scavenging

Fatalities attributed to the project may be discovered in three ways during the study: (1) by trained study personnel during formal standardized carcass searches; (2) incidentally by study personnel during other activities on the project, but within the formal search plots; or (3) incidentally by operations or maintenance personnel during project activities. All casualties located in the search plots will be included as fatalities, unless cause of death can be

determined to be unrelated to the project. Fatalities discovered by operations or maintenance personnel will be covered in Section 5.4.3, Long-Term Post-construction Monitoring.

Comment [FWS MB-TD135]: All mortalities should be reported if discovered on site. Cause of death can be noted in the SPUT reporting template.

Searcher Efficiency Trials

Unannounced searcher efficiency trials will be conducted in the same areas where carcass searches occur. Searcher efficiency trials will occur periodically during each season. Seasons are delineated as follows: winter (December 1–February 28); spring (March 1–May 31); summer (June 1–August 31); and fall (September 1–November 30). Bird and bat carcasses will be placed randomly beneath wind turbines scheduled for search before dawn on the day of the turbine search or late the evening before. This trial will determine searcher efficiency rates that take into account all searchers, as well as variability between bats and birds. Two size classes of birds will be used: (1) small (warblers and thrushes), which will also be used to approximate bats; and (2) large (hawks and waterfowl). Avian carcasses to be used in the searcher efficiency trials will include road- and window-killed birds, game farm birds, and bats previously killed by turbines in the project, as well as carcasses obtained from depredation and control programs operated or permitted by the appropriate state or federal agencies.

The direction and distance of carcass placement from turbines will be randomly selected for each carcass prior to the searcher efficiency trial. The number and locations of carcasses (direction and distance from the nearest turbine) will be plotted on a map of the project. Carcasses will be placed by the tester at each location and left in the position in which they fall (carcasses will be dropped from waist height). Test birds and bats will be discreetly marked so that they can be identified as test birds on recovery. Reasonable efforts will be made to conduct blind tests so that searchers do not know they are being tested. The number of carcasses placed prior to the trial (i.e., the number of carcasses available for detection) will be verified soon after the trial by the personnel in charge of carcass distribution. All trial carcasses will subsequently be removed and used for carcass removal trials.

Carcass Removal Trials

Comment [FWS MB-TD136]: Carcass removal trials should be conducted prior to construction to inform initial search intervals. Trials should be conducted for each season. Carcass removal trial will need to be conducted at regular intervals throughout the postconstruction monitoring period and analyzed seasonally. Search intervals should be adjusted appropriately based on carcass removal trials.

The objective of a carcass removal study is to determine the proportion of carcasses remaining after a search interval before being removed from the study area by scavengers. This proportion will be used to adjust for removal bias when estimating the total number of carcasses present. The carcass removal rates will be used to evaluate and inform the ongoing frequency of subsequent carcass searches.

Carcass removal trials will be conducted periodically during each season, as defined above. Carcass removal trials will be held outside, but in close proximity, to the sampled turbine search plots so that planted carcasses are not confused with project-related fatalities.

Carcasses will be checked daily for each of the first 4 days after placement, and afterward on day 7, day 10, day 14, day 21, and day 30. At each check of the carcass, presence/absence as well as body condition (e.g., lightly scavenged, heavily scavenged) will be recorded. At the end of 30 days, any remaining birds and feathers will be removed.

Large and small birds will be examined independently when calculating carcass removal rates.

Fatality Estimates

It has long been recognized that there are biases associated with carcass removal by scavengers and the varying ability of searchers to detect available carcasses when estimating

bird and bat fatality rates at wind energy projects; therefore, the estimation of avian and bat fatalities will be calculated using the actual number of carcasses found on carcass search plots, the detection probability (i.e., searcher efficiency and scavenger removal), and the ratio of searched turbines to the total number of turbines.

There have been numerous methods employed to estimate mortality at wind energy projects.[335,336,337,338,339,340] All estimators attempt to incorporate carcass removal rates and searcher efficiency; however, these estimator formulas can be biased by the search interval relative to the carcass removal time. Based on current research into these estimators, if the average carcass removal time is longer than the average search interval, both the Shoenfeld[341] or Huso[342] estimator is appropriate to use and results in comparable estimates.[343] Sapphos Environmental, Inc. proposes to use the Huso estimator to estimate fatality rates of birds and bats; however, based on the results of the carcass removal trials in comparison to the average search interval, the calculation method may be changed slightly or comparisons made with one or more other estimators.

Comment [FWS MB-TD137]: Has this been published in a peer-reviewed journal?

Fatality estimates will be calculated for the following categories:

- All species collectively
- Individual bird species
- Bats (all species collectively)

[335] Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992

[336] Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. March 2003. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming.

[337] Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality Monitoring at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority, Knoxville, Tennessee. https://www.tva.gov/environment/bmw_report/results.pdf

[338] Huso, M. 2009. Comparing the Accuracy and Precision of Three Different Estimators of Bird and Bat Fatality and Examining the Influence of Searcher Efficiency, Average Carcass Persistence and Search Interval on These. Schwartz, S.S., ed. Proceedings of the NWCC Wind Wildlife Research Meeting VII, Milwaukee, Wisconsin. Prepared for the Wildlife Workgroup of the National Wind Coordinating Collaborative by RESOLVE, Inc., Washington, D.C. October 28-29, 2008. 116 pp.

[339] Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001-December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004.

[340] Erickson, W.P., M.D. Strickland, G.D. Johnson, and J.W. Kern. 2000b. Examples of Statistical Methods to Assess Risk of Impacts to Birds from Windplants. Proceedings of the National Avian-Wind Power Planning Meeting III. National Wind Coordinating Collaborative (NWCC), c/o RESOLVE, Inc.,Washington, D.C.

[341] Shoenfeld, P. 2004. Suggestions Regarding Avian Mortality Extrapolation. Technical memo provided to FPL Energy. West Virginia Highlands Conservancy, HC70, Box 553, Davis, West Virginia, 26260.

[342] Huso, M.M.P. 2010. An Estimator of Mortality from Observed Carcasses. Environmetrics 21 (3): 318-329.

[343] Strickland, M.D., E.B. Arnett, W.P. Erickson, D.H. Johnson, G.D. Johnson, M.L., Morrison, J.A. Shaffer, and W. Warren-Hicks. 2011. Comprehensive Guide to Studying Wind Energy/Wildlife Interactions. Prepared for the National Wind Coordinating Collaborative, Washington, D.C.,USA.

- Individual bat species
- Raptors (all species collectively)
- Waterfowl (all species collectively)

- Passerines (all species collectively)
- Nocturnal migrants (all species collectively)

An approximate fatality rate per turbine and per MW will be calculated on the basis of carcass recoveries, scavenger proportions, and searcher efficiency.

Reporting

The project proponent will present the results of the monitoring in an annual report, in conjunction with appropriate agency guidance, documenting the results of each year's monitoring efforts. The report will be submitted to BLM and USFWS. The mortality analysis will, at minimum, consider the following four factors:

Comment [JAR138]: Additional factors to consider will be temporal and spatial distribution of mortalities.

- Number of annual avian and bat mortalities per turbine
- Disproportionate representation of a particular species
- Comparison to existing data on wind farm mortality
- Comparison to existing data on wind farm mortality from the Tehachapi Wind Resource area and the western United States

5.2.2 Long-Term Postconstruction Monitoring

Comment [JAR139]: As mentioned above, long-term monitoring should be more robust than what is proposed. It should meet all the standards associated with a statistically robust monitoring plan, with some parameters adjusted for large-bodied birds.

Also may need longer-term protocol monitoring if results of first three years of monitoring indicate greater than expected mortalities and/or if additional measures are implemented to minimize those mortalities to test the effectiveness of those measures.

Starting in Year 3 of project operation and continuing for the life of the project, the project proponent's operations staff shall conduct annual Long-Term Post-Construction Mortality Monitoring, focused on golden eagle and California condor mortality, in conjunction with other project monitoring. The project proponent will conduct life-of-project standardized surveys using operations personnel that will systematically monitor and report avian and bat fatalities to assess long-term operational impacts of the project, particularly for golden eagle and California condor. Carcasses of both species are very large and should persist in the environment for a considerable time; thus, carcass scavenging and searcher efficiency trials are unnecessary for this species, and postconstruction monitoring can be conducted at infrequent intervals, approximately every 28 days.

Comment [JAR140]: This interval should be based in the carcass removal trials for large bodied birds.

The project proponent will designate an Environmental Coordinator (EC) from the onsite operations staff to act as the on-site environmental representative for wildlife issues and implementation at the project. The EC would be trained in bird and bat identification, reporting, and other procedures to comply with state and federal permits. The EC would coordinate the collection of all federally listed endangered or threatened species with USFWS.

Comment [FWS MB-TD141]: We recommend the EC be a qualified avian biologist approved by the wildlife agencies.

Long-term post-construction monitoring will consist of Turbine Checks, Incidental Observations, and Wildlife Handling and Reporting and is summarized below.

Turbine Checks

Turbine checks will be conducted by operations personnel during regularly scheduled Spill Prevention Count-measures and Control (SPCC) monitoring. On a monthly basis, SPCC permit holders will conduct SPCC checks of each turbine. These personnel will be cross-trained in the recognition and recording of avian and bat carcasses so that personnel can concurrently conduct checks for bird and bat carcasses around the base of each turbine.

Personnel will conduct a visual check for bird and bat carcasses within a 10-20 meter radius circular plot around the turbine, focused particularly on the gravel pad surrounding the turbine base. Personnel will fill out a specialized form documenting each turbine check and the presence of any bird or bat carcass. Personnel will flag the location of the carcass, and report the carcass immediately to the onsite EC. The EC will subsequently visit the site to confirm the discovery, fill out an Incidental Wildlife Reporting Form, and appropriately report the incident to the Wildlife Mortality Reporting Program. Personnel will not handle or transport any birds or bats unless specifically permitted and trained.

Incidental Observations

Any carcasses discovered outside of the survey area and/or survey time period by project biologists, operations, or maintenance personnel will be recorded, photographed, and reported to the project biologists and EC, even if it is not believed to have been caused by interaction with project elements, such as wind turbines or electrical poles. If the fatality is on the standardized carcass search plot during the first two years of operation, it will be recorded by a permitted biologist, reported to the EC and included in the fatality estimation. If it is outside of a search plot, but during the first ~~two~~ three? years of operations, it will be recorded, photographed, and reported by a permitted biologist and reported to the EC These fatalities will not be included in the fatality estimation, but will be included in the annual summary report. Finally, if a carcass is discovered during regular operations and maintenance activities subsequent to the end of the first two years of operations, the EC will be notified and appropriately record and report the incident as described above for Turbine Checks.

Any fatality to a federally listed species will be reported to USFWS within 24 hours. No fatalities of a state or federally listed species will be collected until USFWS can be contacted for handling instructions. Any fatality found will be documented in an Incidental Wildlife Reporting Form. Operations personnel will not handle injured or dead wildlife unless they have been property trained and permitted.

If a potentially injured bird or bat is found, it should first be quietly observed to determine if it is in fact injured. Some raptors may occasionally walk on the ground in pursuit of prey, or "mantle" their wings when covering a captured prey item. These behaviors can make the wings appear injured or broken. Operations personnel should immediately contact a project biologist or the EC when an injury is confirmed. Personnel should report species (if known), condition, behavior, and location and subsequently fill out an Incidental Wildlife Reporting Form. The project biologist will work with a rehabilitation center to capture and transport the animal.

5.3 Adaptive Management Plan

This BBCS enumerates the steps taken by HW to design, site, construct, and operate the project in an environmentally sensitive manner, especially in its attempts to avoid and minimize impacts to birds and bats. Based on a multitude of data collected and analyzed historically, during pre-permitting studies for adjacent wind energy projects and within the last 3 years on the project itself, it is not anticipated that the construction or operation of the project will result in population-level impacts to bird and bat species. However, Aas the body of knowledge on impacts to birds and bats from wind energy development is continually growing, pursuing an adaptive management strategy to adjust to new study methods, results of monitoring, new

Comment [FWS MB-TD142]: This has not been demonstrated.

technology, and new behavioral information is crucial to ensuring that impacts are avoided and minimized to the greatest extent feasible. The adaptive management steps detailed in this section have been developed to proactively manage for ~~unexpected~~ potential impacts to birds and bats, the evidence of which may arise during postconstruction monitoring on the project.

If ~~the actual~~ estimated levels of mortality of any species significantly exceed the average mortality rates expected~~observed at other regional wind energy projects in similar habitats and with similar species composition~~, adaptive management measures should be enacted. In particular, evidence of golden eagle or California condor fatalities will trigger immediate adaptive management steps, as detailed below. This BBCS presents a suite of possible actions from which an appropriate response, in coordination with BLM and the USFWS, can be selected to best address the specific conditions on the ground.

Comment [FWS MB-TD143]: This is not an appropriate trigger. Monitoring is not consistent across projects and regional analyses are not conducted regularly.

An annual report summarizing the results of the postconstruction mortality monitoring program will be provided to BLM and USFWS. The report will include: (1) the number and species of birds and bats found as fatalities; (2) the estimates of total fatalities for the project adjusted for carcass removal and searcher efficiency rates; (3) any incidental fatalities; and (4) a comparison with preconstruction mortality estimates and postconstruction mortality results at other national and western wind energy projects. After reviewing the report, the agencies will provide guidance to HW on whether additional years of post-construction monitoring studies are justified, or if species-specific mitigation is recommended based on observed fatality rates.

Comment [JAR144]: And locations and dates.

Comment [FWS MB-TD145]: A process such as this could be used to trigger adaptive management based on estimated mortality on the project.

5.3.1 California Condor Adaptive Management

The implementation of a Condor Monitoring System on the project site, using both human observation and telemetric tracking, will allow the project proponent to proactively avoid potential California condor collisions with project WTGs through active condor monitoring and turbine curtailment. 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 change over the life of the project. To offset this potential increased risk, the project proponent proposes an adaptive management strategy using reasonable and feasible measures that would reduce the risk of condor injury and/or mortality given changing conditions. Further description of these adaptive management steps is included in the Draft Condor Avoidance and Monitoring Plan.

5.3.2 Golden Eagle Adaptive Management

Comment [FWS MB-TD146]: This should be included in separate ECP document.

Because of the low use of golden eagles in the project vicinity and the distance between the project and the nearest occupied golden eagle nest, and with the assurance of avoidance and minimization measures listen herein, the results of the studies conducted in the project vicinity suggest that there is a low risk of golden eagle collision with project elements. Nonetheless, HW has outlined specific biological triggers that could indicate the need for additional adaptive management actions if take does occur (Table 5.3.2-1, *Golden Eagle Adaptive Management Triggers and Proposed Implementation of Advanced Conservation Practices*). Advanced Conservation Practices (ACPs) are defined in the Final Eagle Take Permit Regulations under 50 CFR 22.3 as "scientifically supportable measures that are approved by the Service and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to

Comment [JAR147]: These measures do not eliminate the risk and therefore we still recommend a permit

a level where remaining take is unavoidable."[344] In the event golden eagle mortality occurs as a direct result of project operation ~~prior to the issuance~~ in the absence of a take permit issued by USFWS, HW will meet with the BLM and FWS to discuss the event and actions that may need to be taken, which may include implementing limitations on the operation of nearby turbines and/or other measures during hours when eagles are active on site. Such limitations and measures would apply until a take permit is issued, at which time the terms and conditions of that permit would control., Graduated adaptive management steps, which may include experimental Advanced Conservation Practices and compensatory mitigation, will be taken ~~depending on the increasing~~based on the level of eagle ~~fatalities~~mortality. Greater levels of eagle take will trigger more aggressive ACPs to avoid and minimize further take.

Comment [JAR148]: As the applicant has indicated it is not seeking a take permit, language seems a little inappropriate here. Also, continue to note that any take of eagles without a permit is a violation of the BGEPA.

Comment [FWS MB-TD149]: The amount of take that can be permitted will depend on amount of take already allocated and cumulative impacts to the regional eagle population. In addition, if allowable take has already been allocated, then more aggressive measures will be required.

[344] U.S. Fish and Wildlife Service. 11 September 2009. "Eagle Permits; Take Necessary to Protect Interests in Particular Localities; Final Rules." *Federal Register*, *74* (175): 46836–46879.

TABLE 5.3.2-1
GOLDEN EAGLE ADAPTIVE MANAGEMENT TRIGGERS AND PROPOSED IMPLEMENTATION OF ADVANCED CONSERVATION PRACTICES

Step	Trigger	Advanced Conservation Practices
BBCS	Agreement	• *Minimize Perching or Nesting Opportunities*. To minimize perching or nesting opportunities for birds, the project will use tubular poles for any necessary overhead electrical poles and tubular towers for turbines. • *Met Tower Design*. Permanent met towers will be free-standing and not contain guy wires. Bird diverters will be placed on all temporary met tower guy wires to minimize avian collision , per BLM-CA IM 2013-004 • *Minimize Lighting***.** Measures will be taken to avoid/minimize the impact of light intrusion into adjacent native habitat. The BLM Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western U.S. recommends the following: o Night lighting during construction would not occur to the maximum extent practicable; o Any night lighting during construction and operation would be selectively placed, shielded, and directed away from all areas of native habitat to the maximum extent practicable; and o All unnecessary lighting should be turned off at night to limit attracting migratory birds. • *Qualified Biologist*. A qualified biologist will regularly monitor construction activities to ensure construction is proceeding in compliance with HW proposed environmental mitigation measures as well as those measures required by the regulatory agencies. • *Restrict Vehicle Speeds***.** Restrict construction vehicle speeds to 25 mph on unpaved roads. Project personnel and visitors will be instructed to drive at the recommended speed limit and be alert for wildlife, especially in low visibility conditions. • *Avoid Increasing Prey Abundance*. The project proponent will implement construction protocols to avoid increasing ground-dwelling prey abundance on the project, including minimizing cutting into hill slopes to avoid sudden berms or cuts to prevent underburrowing, minimization of the creation of rock piles, and placement of gravel around turbine foundations to prevent underburrowing. • *Follow APLIC Guidelines.* It is anticipated that only overhead collector lines over streambed crossings will be implemented on the project; however, all power lines approved for construction by the BLM for the project will be constructed to the most current APLIC Guidelines.[345] The project proponent(s) shall conform to the latest practices to protect birds from electrocution and collision, including line markers spaced per APLIC Guidelines.. • *Habitat Restoration.* HW will restore native vegetation in the affected work areas after construction. Restoration will include planting or seeding native plants that were present prior to the work and/or are compatible with existing vegetation near the work area. • *Conduct Postconstruction Mortality Monitoring.* The project proponent will conduct postconstruction bird and bat mortality monitoring surveys in the first and second years following the initial operation of the project to demonstrate the level of incidental injury and mortality to populations of avian or bat species in the vicinity of the project site (see details below in 5.2.1, Postconstruction Mortality Monitoring). • *Conduct Long-Term Postconstruction Mortality Monitoring.* Starting in the third year of project operation and continuing for the life of the project, the project proponent's operations staff shall conduct annual Long-Term Post-Construction Mortality Monitoring in conjunction with other project monitoring. (see details below in 5.2.2, Long-Term Postconstruction Mortality Monitoring). • *Maximize Use of Developed or Degraded Land.* Prioritize locating development on lands that provide minimal eagle use potential including highly developed and degraded sites. • *Utilize Existing Infrastructure.* Utilize existing transmission corridors and roads. • *Avoid Ridge Areas.* Set turbines back from ridge areas. • *Avoid High Eagle Use Areas.* Site structures away from high eagle use areas and the flight zones between them. • *Minimize the Use of Above-Ground Lines.* Bury power lines to reduce avian collision and electrocution. The project will minimize the use of above-ground transmission lines. The majority of the project will utilize underground collector lines and mark overhead lines per BLM per BLM-CA IM 2013-004 if applicable.

Comment [FWS MB-TD150]: This table should be included in separate ECP document.

Comment [JAR151]: These, at least in the BBCS Step, are better described as "Conservation Measures" as ACPs have a specific definition in the ECPG and are experimental.

Also, as these are refined in text above, ensure changes are also made here.

Also, these appear to be the general bird measures, some of which are also good for eagles, but if this is an eagle-specific table, focus on those measures that are most meaningful to eagles. Or just eliminate this step as it is covered in the text.

[345] Avian Power Line Interaction Committee (APLIC). 2012. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2012*. Washington, DC: Edison Electric Institute and APLIC; and Sacramento, CA: California Energy Commission.

TABLE 5.3.2-1
GOLDEN EAGLE ADAPTIVE MANAGEMENT TRIGGERS AND PROPOSED IMPLEMENTATION OF ADVANCED CONSERVATION PRACTICES, *Continued*

Step	Trigger	
		• *Minimize the Extent of the Road Network.* • *Avoid Areas of Abundant Eagle Prey*. Avoid siting turbines in areas where eagle prey is abundant. • *Avoid Water Resources.* Avoid areas with high concentrations of ponds, streams, or wetlands. • *Minimize Surface Disturbance*. Minimize the area and intensity of disturbances during pre-construction and construction periods. • *Dismantle Nonoperational Meteorological Towers.* • • *Minimize Attraction of Golden Eagle Prey Resources.* Maintain facilities and grounds in a manner that minimizes any potential impacts to eagles (e.g. minimize storage of equipment near turbines that may attract prey, avoid seeding forbs below turbines that may attract prey, etc.). Avoid practices that attract/enhance prey populations and opportunities for scavenging within the project area. • • *Reduce Vehicle Collision Risk.* Take actions to reduce vehicle collision risk to wildlife and remove carcasses from the project area (e.g. deer, livestock, etc.) • • *Implement No-Activity Buffers Surrounding Golden Eagle Nests.* As of 2013, there were no active golden eagle nests closer than 15 miles to the project. However, if eagle nests are discovered in the project vicinity, the Qualified Biologist may enact avoidance or minimization measures, such no-activity buffers for eagle nests that have a direct line of sight to the work area. Nest buffers for eagles may be adjusted to reflect existing conditions including ambient noise, topography, and species' disturbance tolerance with the approval of USFWS.
Step I	One eagle taken	In the event of a take of a golden eagle ~~prior to the issuance~~in the absence of a take permit issued by USFWS, HW will meet with the BLM and FWS to discuss the event and actions that may need to be taken, which may include implementing limitations on the operation of nearby turbines and/or other measures during hours when eagles are active on site. Such limitations and measures would apply until a take permit is issued, at which time the terms and conditions of that permit would control. Absent an eagle take permit, the following steps outline Advanced Conservation Measures with each trigger.
Step II	Two eagles taken within any 12-month period or three eagles taken within a 5-year period	likelihood of future take. Consult with the applicable agencies on design of advanced conservation practices and how effectiveness will be evaluated.
Step III	Three eagles taken within any 12-month period or four eagles taken within any 5-year period	Biological monitors or approved advanced technology and methodologies will be employed on site during daylight hours. The method selected sill have the ability to curtail turbine(s) when an eagle(s)/large raptors approaches the rotor swept area (RSA). A sufficient number of qualified monitors or advanced technology devices will be stationed throughout he site, so as to provide unimpeded views of eagles/large raptors that may approach within one mile of any turbine. Additionally, monitors will report and remove carrion as it is encountered. HW, in coordination with the applicable agencies, will refine and evaluate the curtailment protocol utilizing data from monitoring efforts initiated in Step II.
Step IV	Four eagles taken within any 12-month period or five eagles taken within any 5-year period	Deploy radar system(s) or approved advanced technology designed to curtail turbine blade rotation as eagle(s)/large raptors approach RSA. HW, in coordination with the applicable agencies, will design and implement a protocol for determining the effectiveness of radar system(s).
Step V	Five eagles taken within any 24-month period or six eagles taken within the first 5 years of operation.	HW will initiate consultation with the applicable agencies to determine curtailment schedules based upon evaluation of data collected in previous steps. Options may include curtailment in 1) appropriate season; or 2) at identified problem turbines/strings; or 3) during certain portions of the day.
Step VI	Seven eagles taken within a five year period.	In consultation with the USFWS and BLM, determine other appropriate actions necessary to minimize and compensate for additional impacts to eagle populations.

Comment [JAR151]: These, at least in the BBCS Step, are better described as "Conservation Measures" as ACPs have a specific definition in the ECPG and are experimental.

Also, as these are refined in text above, ensure changes are also made here.

Also, these appear to be the general bird measures, some of which are also good for eagles, but if this is an eagle-specific table, focus on those measures that are most meaningful to eagles. Or just eliminate this step as it is covered in the text.

MB-TD152]: Any take of lid eagle take permit will be a d and Golden Eagle Protection

MB-TD153]: Keep in mind agle mortality found may es because the post-construction ample of the total turbines.

MB-TD154]: This should onjunction with whatever steps necessary after one eagle is r other levels of take should be ne box at a minimum.

SECTION 6.0
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APPENDIX A
BIRD AND BAT COMPENDIUM

TABLE A1
BIRD AND BAT SPECIES OBSERVED WITHIN THE PROJECT

Family/Species	Special Status	Residency Status	Bird Detection by Survey Type		Bat Detection by Survey Type	
			Bird Use Count (BUC)	Reconnaissance Only	Diagnostic Call Recorded	Bat Call Frequency Category Detected*
BIRDS						
Odontophoridae – New World Quail						
Callipepla californica California quail		Year-round	X			
Accipitridae—Hawks, Eagles, Kites, and Harriers						
Circus cyaneus Northern harrier	SSC, WeMo	Year-round	X			
Buteo swainsoni Swainson's hawk	ST, WeMo	Migrant, breeding		X		
Buteo jamaicensis Red-tailed hawk		Year-round	X			
Buteo regalis Ferruginous hawk	WL, WeMo	Migrant, Winter		X		
Falconidae—Falcons						
Falco sparverius American kestrel		Year-round	X			
Falco columbarius Merlin	WL	Migrant, Winter	X			
Falco mexicanus Prairie falcon	WL	Year-round	X			
Columbidae – Pigeons and Doves						
Streptopelia decaocto Eurasian collared-dove		Year-round	X			
Zenaida macroura Mourning dove		Year-round	X			
Cuculidae—Cuckoos						
Geococcyx californianus Greater roadrunner		Year-round	X			
Strigidae – Owls						
Bubo virginianus Great horned Owl		Year-round		X		
Athena cunicularia Burrowing owl	SSC, WeMo	Year-round		X		
Caprimulgidae—Nightjars						
Chordeiles acutipennis Lesser nighthawk		Migrant, breeding		X		

TABLE A1
BIRD AND BAT SPECIES OBSERVED WITHIN THE PROJECT, *Continued*

Family/Species	Special Status	Residency Status	Bird Detection by Survey Type		Bat Detection by Survey Type	
			Bird Use Count (BUC)	Reconnaissance Only	Diagnostic Call Recorded	Bat Call Frequency Category Detected*
Apodidae—Swifts						
Aeronautes saxatalis White-throated swift		Year-round	X			
Trochilidae—Hummingbirds						
Calypte anna Anna's hummingbird		Year-round	X			
Picidae—Woodpeckers						
Picoides scalaris Ladder-backed woodpecker		Year-round	X			
Colaptes auratus Northern flicker		Year-round	X			
Tyrannidae—Tyrant flycatchers						
Sayornis saya Say's phoebe		Year-round	X			
Myiarchus cinerascens Ash-throated flycatcher		Migrant, breeding	X			
Tyrannus verticalis Western kingbird		Migrant, breeding		X		
Laniidae—Shrikes						
Lanius ludovicianus Loggerhead shrike	SSC, WeMo,	Year-round	X			
Corvidae—Jays and Crows						
Aphelocoma californica Western scrub-jay		Year-round	X			
Corvus corax Common raven		Year-round	X			
Alaudidae—Larks						
Eremophila alpestris Horned lark		Year-round	X			
Hirundinidae—Swallows						
Tachycineta bicolor Tree swallow		Migrant, winter		X		
Tachycineta thalassina Violet-green swallow		Migrant		X		
Stelgidopteryx serripennis Northern rough-winged swallow		Migrant, breeding	X			
Petrochelidon pyrrhonota Cliff swallow		Migrant		X		
Paridae—Chickadees and Titmice						

TABLE A1
BIRD AND BAT SPECIES OBSERVED WITHIN THE PROJECT, *Continued*

Family/Species	Specia Status	Residenc y Status	Bird Detection by Survey Type		Bat Detection by Survey Type	
			Bird Use Count (BUC)	Reconnaissan ce Only	Diagnosti c Call Recorded	Bat Call Frequency Category Detected*
Baeolophus inornatus Oak titmouse		Year-round		X		
Troglodytidae—Wrens						
Campylorhynchus brunneicapillus Cactus wren		Year-round	X			
Salpincted obsoletus Rock wren		Year-round	X			
Thryomanes bewickii Bewick's wren		Year-round	X			
Troglodytes aedon House wren		Year-round	X			
Polioptilidae – Gnatcatchers						
Polioptila caerulea Blue-gray gnatcatcher		Year-round	X			
Regulidae—Kinglets						
Regulus calendula Ruby-crowned kinglet		Migrant, winter	X			
Sylviidae—Old World Warblers						
Chamaea fasciata Wrentit		Year-round	X			
Turdidae—Thrushes						
Sialia Mexicana Western bluebird		Migrant, winter	X			
Sialia currucoides Mountain bluebird		Migrant, winter, or transient	X			
Mimidae—Thrashers						
Mimus polyglottos Northern mockingbird		Year-round	X			
Oreoscoptes montanus Sage thrasher		Migrant, Winter	X			
Sturnidae– Starlings and Allies						
Sturnus vulgaris European starling		Year-round	X			
Parulidae – Wood Warblers						
Geothylpis tolmiei MacGillivray's warbler		Migrant		X		

TABLE A1
BIRD AND BAT SPECIES OBSERVED WITHIN THE PROJECT, *Continued*

Family/Species	Special Status	Residency Status	Bird Detection by Survey Type		Bat Detection by Survey Type	
			Bird Use Count (BUC)	Reconnaissance Only	Diagnostic Call Recorded	Bat Call Frequency Category Detected*
Setophaga coronata Yellow-rumped warbler		Migrant, winter	X			
Cardellina pusilla Wilson's warbler		Migrant		X		
Emberizidae – Buntings and Sparrows						
Spizella passerine Chipping sparrow		Year-round	X			
Pooecetes gramineus Vesper sparrow		Migrant, winter		X		
Chondestes grammacus Lark sparrow		Year-round	X			
Amphispiza bilineata Black-throated sparrow		Migrant, breeding	X			
Amphispiza belli Sage sparrow		Year-round		X		
Passerculus sandwichensis Savannah sparrow		Migrant, winter	X			
Melospiza lincolnii Lincoln's sparrow		Migrant, winter	X			
Zonotrichia leucophrys White-crowned sparrow		Migrant, winter	X			
Junco hyemalis Dark-eyed junco		Migrant, winter	X			
Cardinalidae—Cardinals, Tanagers, Grosbeaks, and Buntings						
Piranga ludoviciana Western tanager		Migrant		X		
Passerina amoena Lazuli bunting		Migrant		X		
Icteridae – Blackbirds						
Sturnella neglecta Western meadowlark		Year-round	X			
Euphagus cyanocephalus Brewer's blackbird		Year-round	X			
Icterus parisorum Scott's oriole		Migrant, breeding	X			
Fringillidae – Finches						
Carpodacus mexicanus House finch		Year-round	X			
Spinus tristis American goldfinch		Migrant, winter	X			

TABLE A1
BIRD AND BAT SPECIES OBSERVED WITHIN THE PROJECT, *Continued*

Family/Species	Special Status	Residency Status	Bird Detection by Survey Type		Bat Detection by Survey Type	
			Bird Use Count (BUC)	Reconnaissance Only	Diagnostic Call Recorded	Bat Call Frequency Category Detected*
BATS*						
Vespertilionidae–Vesper or Plain-nosed Bats						
Myotis californicus California myotis		Resident				X
Myotis ciliolabrum Western small-footed myotis	BLM	Resident				X
Myotis yumanensis Yuma myotis	BLM	Resident				X
Myotis lucifugus Little brown bat		Migratory				X
Myotis volans Long-legged myotis		Resident				X
Lasionycteris noctivagans Silver haired bat		Migratory				X
Pipistrellus hesperus Western pipistrelle		Resident			X	
Eptesicus fuscus Big brown bat		Migratory			X	
Lasiurus cinereus Hoary bat		Migratory			X	
Antrozous pallidus Pallid bat	CSC, BLM	Resident			X	
Molossidae–Free-tailed Bats						
Tadarida brasiliensis Mexican free-tailed bat		Migratory			X	
Eumops perotis Western mastiff bat	CSC, BLM	Resident			X	

KEY:
BLM=Bureau of Land Management Sensitive Species
CSC = California Department of Fish and Wildlife Species of Special Concern
WL= California Department of Fish and Game Watch List
WeMo=Considered under the Bureau of Land Management's West Mojave Plan
ST=Listed as Threatened under the California Endangered Species Act
* Specific species identification is problematic with any type of acoustic detectors because certain species share similar acoustic signatures. A complete sequence of calls or a visual confirmation is required to identify these species with certainty. Therefore, bat species are typically identified by their frequency category, which may contain more than one bat species.

2013 U.S. Fish and Wildlife Service (USFWS) Revised Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning -- Suggestions Based on Previous USFWS Recommendations to FCC Regarding WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds," Docket No. 08-61, FCC's Antenna Structure Registration Program, and Service 2012 Wind Energy Guidelines

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[Comm Tower 2013 Revised Guidance-to FCC-AMM.docx]

1. Collocation of the communications equipment on an existing communication tower or other structure (e.g., billboard, water and transmission tower, distribution pole, or building mount) is strongly recommended. Depending on tower load factors and communication needs, from 6 to 10 providers should collocate on an existing tower or structure provided that frequencies do not overlap/"bleed" or where frequency length or broadcast distance requires higher towers. New towers should be designed structurally and electronically to accommodate the applicant's antenna, and antennas of at least 2 additional users -- ideally 6 to 10 additional users, if possible -- unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or unguyed tower. This recommendation is intended to reduce the number of towers needed in the future.

2. If collocation is not feasible and a new tower or towers are to be constructed, it is strongly recommended that the new tower(s) should be not more than 199 feet above ground level (AGL), and that construction techniques should not require guy wires. Such towers should be unlighted if Federal Aviation Administration (FAA) regulations and lighting standards (FAA 2007, Patterson 2012, FAA 2013 lighting circular anticipated update) permit. Instead, we recommend using lattice tower or monopole structures. The Service considers this option the "gold standard" and suggests that this is the environmentally preferred industry standard for tower placement, construction and operation -- i.e., towers that are unlit, unguyed, monopole or lattice, and less than 200 ft AGL.

3. If constructing multiple towers, the cumulative impacts of all the towers to migratory birds -- especially to Birds of Conservation Concern (FWS 2008) and threatened and endangered species, as well as the impacts of each individual tower, should be considered during the development of a project.

4. The topography of the proposed tower site and surrounding habitat should be clearly noted, especially in regard to surrounding hills, mountains, mountain passes, ridge lines, rivers, lakes, wetlands, and other habitat types used by raptors, Birds of Conservation Concern, and state and federally listed species, and other birds of concern. Active raptor nests, especially those of Bald and Golden Eagles, should be noted, including known or suspected distances from proposed tower sites to nest locations. Nest site locations for Golden Eagles may vary between years, and unoccupied, inactive nests and nest sites may be re-occupied over multiple years. The Service's 2012 Draft Eagle Conservation Plan Guidance, Version 1 (Wind), available on our website, is a useful document (FWS 2011).

5. If at all possible, new towers should be sited within existing "antenna farms" (i.e., clusters of towers), in degraded areas (e.g., strip mines or other heavily industrialized areas), in commercial agricultural lands, in Superfund sites, or other areas where bird habitat is poor or marginal. Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., state of federal refuges, staging areas, rookeries, and Important Bird Areas), in known migratory, daily movement flyways, areas of breeding concentration, in habitat of threatened or endangered species, or key habitats for Birds of Conservation Concern (FWS 2008). Disturbance can result in effects to bird populations which may cumulatively affect their survival. The Service has recommended some disturbance-free buffers, e.g., 0.5 mi around raptor nests during the nesting season, and 1-mi disturbance free buffers for Ferruginous Hawks and Bald Eagles during nesting season in Wyoming (FWS WY Ecological Services Field Office, referenced in Manville 2007:23). The effects of towers on "prairie grouse," "sage grouse," and grassland and shrub-steppe bird species should also be considered since tall structures have been shown to result in abandonment of nest site areas and leks, especially for "prairie grouse" (Manville 2004). The issue of buffers is currently under review, especially for Bald and Golden Eagles. Additionally, towers should not be sited in areas with a high incidence of fog, mist, and low cloud ceilings.

6. If taller (> 199 ft AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless otherwise required by the FAA, only white strobe or red strobe lights (red preferable), or red flashing incandescent lights should be used at night, and these should be the minimum number, minimum intensity (< 2,000 candela), and minimum number of flashes per minute (i.e., longest duration between flashes/"dark phase") allowable by the FAA. The use of solid (non-flashing) warning lights at night should be avoided (Patterson 2012, Gehring et al. 2009). Current research indicates that solid red lights attract night-migrating birds at a much higher rate than flashing lights (Gehring et al. 2009, Manville 2007, 2009). Recent research indicates that use of white strobe, red strobe, or red flashing lights alone provides significant reductions in bird fatalities (Patterson 2012, Gehring et al. 2009).

7. Tower designs using guy wires for support, which are proposed to be located in known raptor or waterbird concentrations areas, daily movement routes, major diurnal migratory bird movement routes, staging areas, or stopover sites, should have daytime visual markers or bird deterrent devices installed on the wires to prevent collisions by these diurnally moving species. The efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated. For guidance on markers, see Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines -- State of the Art in*

2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp. And APLIC. 2012. *Reducing Avian Collisions with Power Lines -- the State of the Art in 2012.* Edison Electric Institute and APLIC. Washington, DC. 159 pp. Also see www.aplic.org, www.energy.ca.gov, or call 202-508-5000.

8. Towers and appendant facilities should be designed, sited, and constructed so as to avoid or minimize habitat loss within and adjacent to the tower "footprint." However, a larger tower footprint is preferable to the use of guy wires in construction. Several shorter, un-guyed towers are preferable to one, tall guyed, lighted tower. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, disturbance, and the creation of barriers, and to reduce above ground obstacles to birds in flight.

9. If, prior to tower design, siting and construction, if it has been determined that a significant number of breeding, feeding and roosting birds, especially of Birds of Conservation Concern (FWS 2008) and state or federally-listed bird species are known to habitually use the proposed tower construction area, relocation to an alternate site is highly recommended. If this is not an option, seasonal restrictions on construction are advised in order to avoid disturbance, site and nest abandonment, especially during breeding, rearing and other periods of high bird activity.

10. Security lighting for on-ground facilities, equipment and infrastructure should be motion- or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination, but still allow safe nighttime access to the site (FWS 2012, Manville 2011).

11. Representatives from the USFWS or researchers from the Research Subcommittee of the Communication Tower Working Group should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place above ground net catchments below the towers (Manville 2002); and to perform studies using radar, Global Position System, infrared, thermal imagery, and acoustical monitoring, as necessary. This will allow for assessment and verification of bird movements, site use, avoidance, and mortality. The goal is to acquire information on the impacts of various tower types, sizes, configurations and lighting protocols.

12. Towers no longer in use, not re-licensed by the FCC for use, or determined to be obsolete should be removed from the site within 12 months of cessation of use, preferably sooner.

13. In order to obtain information on the usefulness of these guidelines in preventing bird strikes and better understanding impacts from habitat fragmentation, please advise USFWS and TPWD personnel of the final location and specifications of the proposed tower, and which measures recommended in these guidelines were implemented. If any of these recommended measures cannot be implemented, please explain why they are not feasible. This will further advise USFWS in identifying any recurring problems with the implementation of the guidelines, which may necessitate future modifications.

Reference Sources:

Federal Aviation Administration,. 2007. Obstruction marking and lighting. Advisory Circular AC 70/7460-1K. U.S. Department of Transportation.

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Manville, A.M., II. 2002. Protocol for monitoring the impact of cellular telecommunication towers on migratory birds within the Coconino, Prescott, and Kaibab National Forests, Arizona. Protocol requested by U.S. Forest Service. 9 pp.

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Manville, A.M., II. 2007. Comments of the U.S. Fish and Wildlife Service Submitted Electronically to the FCC on 47 CFR Parts 1 and 17, WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds." February 2, 2007. 32 pp.

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U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pp. http://www.fws.gov/migratorybirds/>

U.S. Fish and Wildlife Service. 2011. Draft Eagle Conservation Plan Guidance. January 2011. 106 pp.

U.S. Fish and Wildlife Service. 2012. U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines. 71 pp

AVIAN INJURY AND MORTALITY REPORT FORM

Data Sheet Instructions and Information

***Please contact**
[INSERT APPROPRIATE R8 CONTACT INFORMATION] with any questions, problems, or suggestions for improvements to this form.

ABOUT THIS SPREADSHEET:

Priority fields are indicated by an astericks and columns are shaded in grey. **At the very least, please try to populate all these fields, and any other applicable fields where possible, if that information is available.**

Drop down boxes are provided with several of the fields for your convenience, and to support greater consistency of data for these fields.

Please try to use one of the options provided within the drop down boxes for these fields. However, if you can not find the appropriate match in the drop down, you may enter your own text in the field as well.

If the option you select is "other" or contains the word "other" or you have additional details about your choice: please try to provide additional details with your selection (again, all data entry cells in this spreadsheet will allow the entry of free text).

If you have been permitted to relocate a nest, you may also report that relocation in this spreadsheet. This activity can be reported by use of the following fields: "Species Common Name", "Condition of Bird/Carcass (or if Active Nest Relocation, please indicate that here)", "Number of individuals found or number of nests relocated (if active nest relocation) " and "Disposition" (select the "Nest relocated" option).

Instructions for Eagle Injuries/Mortalities

IF YOU DISCOVER AN EAGLE:

If the eagle is dead, please complete the following steps:

1. Call your USFWS Office of Law Enforcement (OLE) point-of-contact Resident Agent in Charge (RAC) identified in your Special Purpsoe Utility (SPUT) permit conditions for instructions and approval before collecting or moving the carcass or its parts. You must contact OLE as soon as possible, but no later than 24 hours after discovery, to report the mortality.
2. Fill out as many of the fields in this sheet as possible regarding the incident, and send the report to your Regional USFWS Migratory Bird Permit Office as soon as possible.

If the eagle is alive, please complete the following steps:

1. Do not handle the eagle. Call your local migratory bird rehabilitation facility or a licensed veterinarian immediately for assistance.

2. Call your Regional USFWS OLE RAC identitied in your SPUT permit as soon as possible, but no later than 24 hours after discovery, to report the injury.

3. Fill out as many of the fields in this sheet as possible regarding the incident, and send the report to your Regional USFWS Migratory Bird Permit Office as soon as possible.