

**Renewable Energy Development
And
Common Raven Predation on the Desert Tortoise
May 2010**

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Summary

The desert tortoise is listed as a threatened species under the Federal Endangered Species Act (ESA). A large number of renewable energy projects are currently proposed in remote areas of the California and Nevada deserts where the desert tortoise occurs and human populations are generally small. Due to the locations of these projects, associated infrastructure, and the increase in human activities that will occur if these projects are approved, a corresponding increase in common raven (*Corvus corax*) presence and predation on desert tortoises (*Gopherus agassizii*) is anticipated throughout the region. During the past few decades, the population of the common raven has increased substantially in the California desert, primarily in response to human-provided subsidies of food, water, and nest sites.

The Bureau of Land Management (BLM) addressed the increase of ravens and the associated problems in each of the amendments to the California Desert Conservation Area Plan (CDCA). The CDCA, as amended, established that all new projects with the potential to increase raven populations would be required to implement mitigation measures to reduce or eliminate the opportunity for proliferation of ravens. The BLM's Biological Assessments and the US Fish and Wildlife Service's (USFWS) Biological Opinions for the CDCA reiterate the need to reduce or eliminate the opportunity for common ravens to increase in number. In addition to being listed under the Federal ESA, the desert tortoise is also protected under the California Endangered Species Act (CESA). The California Department of Fish and Game (DFG) requires mitigation measures in each desert tortoise CESA Incidental Take Permit, including measures requiring the permittee to develop a raven control plan and to implement measures off the project site to reduce the cumulative environmental effects of increased raven predation.

To minimize the impacts on desert tortoises, approved renewable energy projects and associated transmission should implement mitigation measures designed to reduce the raven predation on the species at both the local and the population level. Each project applicant should develop an on-site plan to minimize availability of food sources and the potential for ravens to occupy the project site.

The Raven Management Plan outlined below is a regional scale, adaptively managed program designed to address raven predation in the California desert region. Based on the information we have available on all future activities that will attract and increase raven populations in the California desert over the next 20 to 30 years, we have estimated that renewable energy projects with a 20-year term should contribute \$64 per acre impacted to the overall effort to reduce predation of ravens on the desert tortoise. Associated transmission lines that are expected to remain after the 20-year term of a given renewable energy project should contribute \$105 per acre impacted. These funds will be included as part of the required mitigation to minimize and offset the impacts of renewable energy projects. The funds would be used, as appropriate, to carry out the five primary actions listed below. If approvals are granted to extend the term of a renewable energy project past the initial permit term (i.e. 20 to 30 years), the applicable REAT agencies will re-evaluate whether the implementation of the regional scale Raven Management Plan should be continued, and assess any additional costs necessary to continue the program.

Raven Management Plan

The USFWS together with several cooperating agencies, including the BLM, National Park Service, Department of Defense, and the Department of Agriculture completed an environmental assessment for the implementation of a plan to reduce predation by the common raven on the federally threatened desert tortoise in the California desert (Raven EA; USFWS et al. 2008). This document was prepared because the common raven is a known predator of the desert tortoise and the Desert Tortoise (Mojave population) Recovery Plan identifies reducing predation on the species as an important recovery task.

The Raven EA is expected to be implemented in a phased approach in collaboration with the cooperating agencies and local partners. The program includes five primary actions:

- 1) Reduction of human provided subsidies (i.e., food, water, sheltering and nesting sites, etc.)
- 2) Education and outreach
- 3) Common raven nest removal
- 4) Common raven removal
- 5) Evaluation of effectiveness and adaptive management

The latter three activities are accomplished through a combination of identification of offending ravens by observers (whom also can remove nests) and then reporting those birds to Wildlife Services (WS) who are contracted to remove ravens. The evaluation of effectiveness is incorporated into subsequent years of survey effort. Therefore, the survey effort should remain consistent or increasing but should not decrease.

The Raven EA allows for the increase in the number ravens to be removed lethally after 3 years of effectiveness monitoring, thus the level of effort for this component will/could increase every 3 years up to a maximum level at year 6 (these are represented by levels 1-3 below). In addition, there is an understanding among agencies (BLM, CDFG, and FWS) that the entire program may not be implemented each year. For example, an education and outreach program from one year may not need to be repeated annually.

The USFWS estimated the cost of implementing three primary aspects of the Raven EA (removal (conducted by WS), outreach and education, and monitoring surveys):

- **Removal:** In 2010, a single year-round WS employee costs approximately \$92,000. For the first 3 years of the program, since we would only be using seasonal workers (during raven breeding season), this cost would be reduced. In 2009, \$30,000 covered one WS staff for approximately 2.5 months including training. The survey and removal efforts would be divided amongst the three desert tortoise recovery units in the California Desert. Assuming that the optimum use of WS employees would be one per recovery unit, a minimum of 3 personnel are needed at the lowest level of effort (approximately \$40,000/WS to cover the raven breeding season). After 3 years the removal efforts are no longer limited to raven breeding season and personnel would be needed year-round. We do not envision needing more than two personnel per recovery unit, even at maximum effort.

- Outreach and education position: Outreach and Education is an important component of the program. We believe 2 people can run the education and outreach program for the Raven EA. A base annual salary for a GS-11 position within the area would be approximately \$128,000. Education and outreach would also benefit from media support including pamphlets and radio and television broadcasts.
- Monitoring survey team: The effort, and therefore cost, of the monitoring survey team is dependent on the level of implementation of the Raven EA. Effectiveness monitoring is essential in determining the success of the program, and whether additional efforts will be needed. The three levels of survey effort we considered are compatible with the three levels of removal effort.

The table below estimates the annual cost of these activities at each of the three levels of implementation described in the Raven EA.

Annual budget estimates for implementation of the Raven EA

Primary Activities of the Raven EA	Level 1	Level 2	Level 3
Removal Staff	120,000	276,000	552,000
Outreach	128,000	128,000	128,000
Monitoring Survey Team	820,000	1,000,000	4,381,745
TOTAL	1,068,000	1,404,000	5,061,754

In addition, there are a multitude of additional activities identified in the Raven EA that could be conducted in the desert regarding reduction of raven subsidies. These include: identification and clean up of illegal dump sites, surveys of communities to identify business that do not adequately control their waste and surveys of landfills and transfer stations. Depending on the required level of implementation necessary above, funds to conduct these other activities may be available.

Citation:

U.S. Fish and Wildlife Service, U.S. Department of Agriculture, U.S. Department of Defense, Bureau of Interior. 2008. Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise. Ventura Fish and Wildlife Office. Ventura, California.