

Mexican spotted owl
(Strix occidentalis lucida)

5-Year Review
Short Form Summary



Photo by Shaula Hedwall, U.S. Fish and Wildlife Service

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Phoenix, Arizona
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5-Year Review: Short Form Summary and Evaluation

Common Name Mexican spotted owl (*Strix occidentalis lucida*)

Current Classification: Threatened

**U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Phoenix, Arizona**

1.0 GENERAL INFORMATION

1.1 Reviewers

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1.2 Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service or FWS) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species 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 list of endangered and threatened species, be changed in status from endangered to threatened, or be 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 rule-making process including public review and comment.

1.3 Methodology used to complete the review:

The review of the science assessing the current status of the Mexican spotted owl was conducted in conjunction with the development of the Mexican spotted owl Recovery Plan, First Revision (USDI FWS 2012). Development of the Revised Recovery Plan involved the expertise of the Mexican Spotted Owl Recovery Team (including personnel from Mexico), Fish and Wildlife Service staff input and review, scientific peer-review, and two public comment periods. The Revised Recovery Plan addresses the current status, population trends, threats (including the five listing factors), recovery objectives, recovery criteria, and recovery actions needed for the species. This document was also reviewed by the Regional Migratory Birds Offices in Region 2 and in Region 6.

1.4 FR Notice citation announcing initiation of this review:

We provided notice of this status review on February 6, 2013, via the Federal Register (78 FR 8576), requesting information on the status of the Mexican spotted owl. We received two comment letters referencing information regarding survey data and project status updates on the Kaibab and Prescott National Forests. This was information that was available to the Recovery Team in developing the Revised Recovery Plan, which we used to conduct this 5-year review.

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) Policy:

The DPS policy is not applicable to the Mexican spotted owl as it is not listed as a DPS.

2.2 Review Summary:

Please refer to the Mexican Spotted Owl Recovery Plan, First Revision (USDI FWS 2012) for a complete review of the species' status (including biology, population trends, and habitat), threats, and recovery actions. The following is a summary of findings and recommendations from the Revised Recovery Plan (USDI FWS 2012).

In 1993, the FWS listed the Mexican spotted owl as threatened under the Act. The FWS appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican spotted owl in 1995 (USDI FWS 1995). The FWS released the final Mexican Spotted Owl Recovery Plan, First Revision (Recovery Plan) in December 2012 (USDI FWS 2012). Critical habitat was designated for the Mexican spotted owl in 2004 (USDI FWS 2004).

A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican spotted owl is found in the Final Rule listing the owl as a threatened species (USDI FWS 1993), in the original Recovery Plan (USDI FWS 1995), and in the revised Recovery Plan (USDI FWS 2012). The information provided in those documents is included herein by reference.

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States and Mexico (Gutiérrez et al. 1995). It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico. Although the owl's entire range covers a broad area of the southwestern United States and Mexico, it does not occur uniformly throughout its range. Instead, the Mexican spotted owl occurs in disjoint localities that correspond to isolated forested mountain systems, forested canyons, and in some cases steep, rocky canyon lands. When owls occur in forested areas, known owl locations indicate that the species has an affinity for older, uneven-aged forest, and the species is known to inhabit a physically diverse landscape scattered across the southwestern United States and Mexico.

In addition to this natural variability in habitat influencing owl distribution, human activities also vary across the owl's range. The combination of natural habitat variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the owl's range into smaller management areas. The 1995 Recovery Plan subdivided the owl's range into 11 "Recovery Units" (RUs): six in the United States and five in Mexico. In the revision of the Recovery Plan, RUs were renamed "Ecological Management Units" (EMUs) to be in accord with current FWS guidelines (USDC NMFS and USDI FWS 2010). The Mexican spotted owl's range within the United States is divided into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE). Within Mexico, the Revised Recovery Plan delineated five EMUs: Sierra Madre Occidental Norte, Sierra Madre Occidental Sur, Sierra Madre Oriental Norte, Sierra Madre Oriental Sur, and Eje Neovolcanico.

Mexican spotted owl surveys since the 1995 Recovery Plan have increased our knowledge of owl distribution, but not necessarily of owl abundance. For example, 758 owl sites were recorded for the period 1990–1993 (Ward et al. 1995). During a recent review for establishing Critical Habitat, 1,222 owl sites were recorded for the period 1990–2004 (USDI FWS 2004). A more recent tally through 2008 indicated 1,301 cumulative sites occupied by one or more Mexican spotted owls (USDI FWS 2012). An owl site is an area used by a single or a pair of adult or subadult owls for nesting, roosting, or foraging. The increase in number of known owl sites is mainly a product of new owl surveys being completed within previously unsurveyed areas (e.g., several National Parks within southern Utah, Grand Canyon National Park in Arizona, Guadalupe National Park in West Texas, Guadalupe Mountains in southeastern New Mexico and West Texas, Dinosaur National Monument in Colorado, Cibola National Forest and Gila National Forest in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USDI FWS 2012). However, we do assume that an increase in the number of areas considered to be occupied to be a positive indicator regarding owl abundance.

Reasons for Listing and Assessment of Threats

Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: (1) historical alteration of its habitat as the result of timber-management practices; and, (2) the threat of these practices continuing. The danger of stand-replacing fire was also cited as a looming threat at that time. Since publication of the original Recovery Plan (USDI FWS 1995), we have acquired new information on the biology, threats, and habitat needs of the Mexican spotted owl. Threats to its population in the United States (but likely not in Mexico) have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire. Recent forest management has moved from a commodity focus and now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, both of which have potential to benefit the spotted owl. Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present, compared to fires prior to 1995. Climate variability compounded with unhealthy forest conditions may increase negative effects to habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon overstocked forested habitats could result in even larger and more severe fires in owl habitat.

Historical and current anthropogenic uses of Mexican spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the owl and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that owls in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

Several fatality factors have been identified as particularly detrimental to the Mexican spotted owl, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus has the potential to adversely impact the Mexican spotted owl. The virus has been documented in Arizona, New Mexico, Utah, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of spotted owls and the lack of intensive monitoring of banded birds, we will most likely not know when owls contract the disease or the extent of its impact to the owl range-wide.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic, high-severity, stand-replacing wildland fire is probably the greatest threat to the Mexican spotted owl. As throughout the West, fire severity and size have been increasing within the range of the owl. Landscape level wildland fires, such as the Rodeo-Chediski Fire (2002), Wallow Fire (2011), and Whitewater-Baldy

Complex (2012), have resulted in the loss of tens of thousands of acres of occupied and potential nest/roost habitat across significant portions of the Mexican spotted owl's range.

Finally, global climate variability may also be a threat to the owl. Changing climate conditions may interact with fire, management actions, and other factors discussed above, such as grazing, to increase impacts to owl habitat. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Critical Habitat

The FWS designated critical habitat (CH) for the Mexican spotted owl in 2004, on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (USDI FWS 2004). Within the designated boundaries, CH includes only those areas defined as protected habitats (defined as Protected Activity Centers [PACs], unoccupied slopes >40 percent in the mixed conifer and pine-oak forest types that have not had timber harvest in the last 20 years, and steep-walled canyon areas) and restricted (now called "recovery") habitats (composed of owl foraging, dispersal, and future nest/roost habitat) as defined in the 1995 Recovery Plan (USDI FWS 1995). The primary constituent elements (PCEs) for Mexican spotted owl CH were determined from studies of their habitat requirements and information provided in the Recovery Plan (USDI FWS 1995). Since owl habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the owl within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the owl's habitat needs for nesting, roosting, foraging, and dispersing are:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 to 45 percent of which are large trees with diameter at breast height ([dbh] 4.5 ft above ground) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground and;
- Large, dead trees (snags) with a dbh of at least 12 inches;
- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and,
- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The PCEs usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type, productivity, and plant succession. These PCEs may also be observed in younger stands,

especially when the stands contain remnant large trees or patches of large trees. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Steep-walled rocky canyonlands occur typically within the Colorado Plateau EMU, but also occur in other EMUs. Canyon habitat is used by owls for nesting, roosting, and foraging, and includes landscapes dominated by vertical-walled rocky cliffs within complex watersheds, including many tributary side canyons. These areas typically include parallel-walled canyons up to 1.2 miles (2 kilometers) in width (from rim to rim), with canyon reaches often 1.2 miles (2 kilometers) or greater, and with cool north-facing aspects. The PCEs related to canyon habitat include one or more of the following:

- Presence of water (often providing cooler and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

Summary

Threats such as wildfire and forest management have the potential to adversely affect Mexican spotted owls and their habitat throughout their range. Implementation of management recommendations and monitoring (project-specific as well as rangewide population and habitat monitoring) (USDI FWS 2012) should aid the FWS in better understanding the current status of the species and its habitat rangewide and allow us to better refine management recommendations as we learn to enhance owl habitat across the landscape, while minimizing adverse effects to Mexican spotted owls.

3.0 RESULTS

3.1. Recommended Classification:

- Downlist to Threatened**
- Uplist to Endangered**
- Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No change is needed**

3.2. New Recovery Priority Number: No change, remain as 9C.

The Mexican spotted owl is currently classified as a 9C, a subspecies with a moderate degree of threat and a high potential for recovery. We recommend maintaining this recovery priority number as the threats of high-severity, stand-replacing wildfire and forest management are reversible with implementation of the Revised Recovery Plan and there is still a high potential for recovery. In addition, the Mexican spotted owl population remains somewhat widespread and well-distributed across its range, and is not in danger of extinction throughout all or a significant portion of its range. Therefore, no change is recommended at this time and the Recovery Priority Number should remain at 9C.

4.0. RECOMMENDATIONS FOR FUTURE ACTIONS

The Revised Recovery Plan (USDI FWS 2012) sets forth recommendations for both management and monitoring of the Mexican spotted owl and its habitat. Both sets of recommendations are key to the eventual recovery of the owl as management proceeds within an adaptive framework whereby monitoring is used to assess the efficacy of management actions. The Recovery Plan promotes a landscape scale approach to implementing owl recovery actions. The recovery objectives of the Revised Recovery Plan are to support the Mexican spotted owl throughout its range into the foreseeable future, and to maintain habitat conditions necessary to provide roosting and nesting habitat for the Mexican spotted owl.

Management recommendations represent a combination of protective and proactive measures. Areas currently occupied by owls require the greatest protection to ensure continued occupancy, reproduction, and survival. In some cases, protection of these areas requires active intervention to sustain desired conditions and to reduce risk of stand-replacing crown fires. These interventions should be done after careful analysis and planning to ensure that actions taken are necessary and prudent.

Forests do not retain their characteristics in perpetuity. They become established, grow, and then enter senescence and lose characteristics favored by owls. As a result, landscapes are dynamic and as nest/roost habitats are lost to natural and unnatural causes, recovery habitats should be in the queue ready for owls to occupy them. This is the intent of replacement nest/roost habitat within recovery habitats. Development of this habitat will require a balance between intervention and being allowed to develop naturally in absence of intervention. Management should strive to plan well into the future to ensure that an adequate proportion of the landscape remains in suitable nest/roost conditions to sustain owl populations.

Key habitat variables are those habitat components that comprise desired conditions in forest, riparian, canyon, and woodland cover types typically used by Mexican spotted owls for nesting and roosting. These desired conditions should guide management within PACs and recovery nest/roost replacement habitats. Key habitat variables include:

- A diversity of patch sizes with minimum contiguous patch size of 1 ha (2.5 ac) with larger patches near activity center; mix of patch sizes towards periphery, and between-patch heterogeneity (Peery et al 1999; Grubb et al 1997; May and Gutiérrez 2002).
- Contiguous patches consisting of trees of all sizes, unevenly spaced, with interlocking crowns and high canopy cover (Ganey et al. 2003).
- Patches with a diversity of tree species, especially containing a mixture of hardwoods and shade-tolerant species (Willey 1998b), and a diverse composition of vigorous native herbaceous and shrub species for prey habitat. For example, Gambel oak provides important habitat for woodrats and brush mice (Block et al. 2005, Ward 2001).
- Openings in forest patches between 0.04 - 1 ha (0.1 - 2.5 ac) in size. Small canopy gaps within forested patches provide for prey habitat diversity. Openings should be small in nest/roost patches and may be larger throughout the rest of the PAC.
- A minimum canopy cover within forest stands of 40% in pine-oak and 60% in mixed conifer (Ganey et al. 2003).

- A diversity of tree sizes, with the goal of having trees $\geq 16''$ dbh contributing $\geq 50\%$ of the stand basal area (Willey 1998, May and Gutiérrez 2002, Ganey et al. 2003, May et al. 2004).

Recovery actions developed to meet these objectives and criteria include protection of Mexican spotted owl sites and habitat, encouraging forest management practices that will develop future spotted owl habitat, and monitoring to assess the effectiveness of recovery actions.

Mexican spotted owls occupy rocky-canyon habitats that differ in many ways from forest habitats. Although rocky-canyon habitat is primarily located within the CP EMU, structurally similar canyon habitats also occur within other EMUs. Review of available studies suggests several habitat characteristics are closely associated with owl sites in rocky-canyon environments, especially steep canyon walls with large vertical cliffs. Cliff faces contain numerous caves and ledges that create protected microsites for nesting and roosting, and canyon walls are typically dissected by narrow, tributary canyons that provide relatively cool and humid roost and nest sites. In essence, rocky cliffs and slot canyons provide complex nesting and roosting habitat structure similar to that typically associated with late-seral forest (Rinkevich and Gutiérrez 1996, Johnson 1997, Willey 1998a).

Rocky-canyon environments that provide nest, roost, and foraging habitats for Mexican spotted owls are diverse, but also possess common emergent properties. These rocky-canyon habitats are associated with complex vertical and horizontal landscape structure, complex geomorphology, and canyon-forming geologic substrates. Rocky-canyon habitat is typically defined by:

- Canyon walls comprised of steep cliffs that usually extend for at least 1 kilometer (0.6 mile) along parallel sides of the canyon reach (Willey et al. 2007).
- Relatively narrow canyon widths (< 1 kilometer [0.6 mile] rim-to-rim) (Willey 1998b).
- Presence of large cliff faces with complex vertical structuring including numerous ledges and caves that provide locations with cool and shaded microclimates.
- Key geologic layers that form steep, narrow entrenched canyon and cliff complexes. In the CP EMU these formations generally consist of hard sandstones or limestone, but other forms of bedrock can create these conditions within the range of the owl.
- Forest vegetation, when present, that includes riparian, mixed-conifer, ponderosa pine, or pine-oak forests, or pinyon-juniper woodland. Late seral conditions including large trees and multi-storied canopies typically dominate.

Actions identified to ensure the recovery of the Mexican spotted owl include:

1. *Management.* Given that the owl is a widespread subspecies with a disjunct and somewhat fragmented distribution, management of the owl and its habitat must be conducted at the landscape scale. Landscape modeling and analysis are critical in evaluating the distribution of owls and habitats, identifying areas where threats are greatest, and then applying Revised Recovery Plan recommendations in such a way as to sustain and improve owl habitat. Three levels of management are recommended:

- Protected Activity Centers (PACs). PACs encompass a minimum of 600 acres surrounding known owl nest/roost sites. Management recommendations are most conservative within PACs, while recognizing that situations exist where treatments are needed to sustain or enhance desired conditions for the owl, including fire-risk reduction, as well as monitoring owl response. Mechanical treatments in some PACs may be needed to achieve these objectives; determining which PACs may benefit from mechanical treatments requires a landscape analysis to determine where the needs of fire-risk reduction and habitat enhancement are greatest.
- Recovery habitat. This habitat is primarily ponderosa pine-Gambel oak, mixed-conifer, and riparian forest that either currently is, or has the potential for becoming, nest/roost habitat or does, or could, provide foraging, dispersal, or wintering habitats. Nesting/roosting habitat typically occurs either in well-structured forests with high canopy cover, large trees, and other late seral characteristics, or in steep and narrow rocky canyons formed by parallel cliffs with numerous caves and/or ledges within specific geologic formations. Ten to 25 percent of forested recovery habitat should be managed as recovery nest/roost habitat varying by forest type and EMU. This habitat should be managed to replace nest/roost habitat lost due to disturbance (e.g., fire) or senescence and to provide additional nest/roost habitat to facilitate recovery of the owl. The remainder of forested recovery habitat should be managed for other needs (such as foraging, dispersing, or wintering) provided that key habitat elements are retained across the landscape.
- Other forest and woodland types include ponderosa pine forest, spruce-fir forest, and pinyon-juniper woodland. No specific management is suggested for these habitat types, recognizing that current emphasis for sustainable and resilient forests should be compatible with needs of the owl.

2. *Monitoring.* As management proceeds, monitoring assesses the efficacy of forest treatments. Thus, it is critically important to monitor owl populations and habitat to determine whether both are stable or improving. The delisting goals identified in the Revised Recovery Plan are: 1) Owl occupancy rates must show a stable or increasing trend after 10 years of monitoring; and 2) Indicators of habitat conditions (key habitat variables) must be stable or improving for 10 years in roosting and nesting habitat.

Monitoring population trends provides a real-time assessment of the owl's status, whereas habitat monitoring can predict if there will be adequate habitat to support a viable owl population in the future. As a surrogate for evaluating trends in actual owl numbers, owl occupancy will be monitored at a sample of fixed sites randomly selected throughout the U.S. range of the Mexican spotted owl. We do not currently have a specific design proposed for monitoring habitat, although Forest Inventory and Assessment data might have application to the owl. Combining owl occupancy and habitat monitoring provides an opportunity to examine relationships between habitat features and owl populations to assess whether a review of current management is warranted.

3. *Research.* The Recovery Team used available data, published papers, unpublished reports, and scientific expertise covering the U.S. and Mexico when developing the 2012 Recovery Plan.

During the process, it became clear that critical knowledge gaps exist. Four general areas require additional research: 1) habitat relationships, 2) biological interactions, 3) population structure, and 4) ecosystem structure. Under each of these subjects, the Recovery Team provided specific research recommendations. This research would increase our understanding of the effects of the Recovery Plan management recommendations on the owl and ecosystem composition, structure, and function.

4. Implementation. An implementation schedule is provided in the Recovery Plan that details recovery tasks, the entities responsible for implementing them, and the estimated costs. Moreover, a working team should be assembled for each EMU to oversee implementation and to provide feedback on successes and failures of the Recovery Plan.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Mexican spotted owl (*Strix occidentalis lucida*)

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

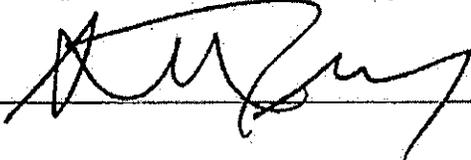
- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: No change is recommended at this time; the Recovery Priority Number should remain at 9C.

Review Conducted By: Shaula J. Hedwall, U.S. Fish and Wildlife Service, Arizona Ecological Services Flagstaff Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Arizona Ecological Services, U.S. Fish and Wildlife Service

Approve  Date 8/13/13

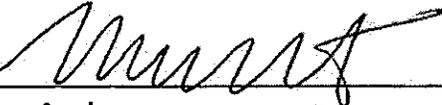
REGIONAL OFFICE APPROVAL:

Lead Assistant Regional Director, Ecological Services, U.S. Fish and Wildlife Service, Region 2

Approve  Date 8/16/13

Cooperating Assistant Regional Director, Ecological Services, U.S. Fish and Wildlife Service, Region 6

Concur Do Not Concur

Signature  Date 8/14/13
Acting ARD - ES