GUIDELINES FOR RAPTOR CONSERVATION IN THE WESTERN UNITED STATES

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U.S. Fish and Wildlife Service, Region 9
Division of Migratory Bird Management, Washington DC

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Based upon and expanding the original work of Laura Romin and Jim Muck: Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances 2002

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We would also like to acknowledge the comments and feedback we received on the original Utah document from participants of a workshop held April 18-20, 2006 in Salt Lake City, Utah, where the subject of balancing energy development and raptor conservation in the western United States was explored. Workshop hosts were joined by invited participants from the energy industry, state natural resource agencies, universities, and non-governmental organizations. The organizing hosts were the Bureau of Land Management (BLM), U.S. Geological Survey (USGS), U.S. Forest Service (USFS) and U.S. Fish and Wildlife Service (USFWS).

Five themes emerged from the workshop as areas for advancing cooperative research, monitoring, and technical assistance to improve management of oil, gas, and coalbed methane development with raptor conservation. Workshop participants developed goals and objective under the following themes: 1) Status and trends of raptor populations, 2) Effectiveness of management practices, 3) Definition of management objectives, 4) Monitoring and data management and, 5) Communication.

Many of the revisions to the original Utah document are based upon comments received at the April 2006 workshop. In addition, some revisions are intended to serve as a framework to further some of the goals and objectives identified by the workshop participants. For example, the Species Prioritization Table, A-4, in Appendix A, meets a USFWS workshop commitment to identify and prioritize species of concern in potential areas of energy development. However, even though the workshop was focused on balancing energy development and raptor conservation, the themes identified are relevant to the conservation of raptors during all types of activities. Therefore, we wish to recognize and thank the workshop hosts and participants for the important role they played in the structure and contents of the current document.

Finally, we wish to thank (list individuals and/or affiliations?) who provided invaluable reviews of the document.

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SUMMARY OF RAPTOR GUIDELINES

Initially developed to assist federal land management agencies, this document may be used by anyone wishing to conserve raptors and their habitat. It is also intended to provide guidance to employees of the U.S. Fish and Wildlife Service (USFWS) engaging in land management activities and providing project review and assistance to other entities. The goals are to provide measures to: 1) minimize the risk of 'take' under various bird protection statutes, 2) avoid or minimize impacts to sensitive raptor species (see **Appendices A** and **B**), and 3) contribute to improvement in the status of raptor species which have been determined to be experiencing population declines or to be otherwise at risk. Land management agencies, in coordination with other entities such as state wildlife agencies, state natural heritage programs, and existing Coordinated Bird Monitoring (CBM) programs, should gather and maintain baseline information regarding local area populations. Private land owners should seek the assistance of state wildlife agencies for baseline information. Proponents[a] are responsible for determining potential impacts to migratory birds, including raptors, from their proposed activities. Appropriate management strategies for conservation and restoration of raptor populations and their habitats associated with the proposed actions should be devised. If the following steps become routine during initial project planning, agencies and proponents can more easily minimize impacts to raptors, streamline planning and permitting processes, and incorporate measures into an adaptive management program (Williams et al. 2007):

- Coordinate with appropriate USFWS offices, state wildlife resources management agencies, tribal wildlife resource managers, and/or land management agency wildlife biologists at the earliest stage of project planning.

- Identify species and distribution of raptors occurring within the project area by evaluating existing data and data sources (i.e. state wildlife agency, Natureserve, etc.) and /or conducting on-site surveys.

- Prioritizing raptor species of concern (See **Appendix A**), determine location and distribution of important raptor habitat, nests, roost sites, migration corridors and, if feasible, available prey base associated with proposed developments and activities.

- Document the type, extent, timing, and duration of existing activity within the proximity of raptor use areas to establish a disturbance baseline.

- Ascertain the type, extent, timing, and duration of development or human activities proposed to occur, and the extent to which the proposed activities differ from baseline conditions.

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[a] Within the document, proponents of land use activities (proponents) are considered to be agencies proposing an activity, or applicants proposing an activity which requires permission from an agency, e.g., a right-of-way or a permit to drill, in order to conduct the activity.

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- Consider cumulative effects to raptors of proposed projects when added to past, present, and reasonably foreseeable actions. Require and implement greater mitigation for projects determined to have significant cumulative effects.

- Minimize loss of raptor habitats and avoid long-term habitat degradation. Mitigate for unavoidable losses of high-valued raptor habitats, including (but not limited to) nesting, roosting, migration, and foraging areas.

- Plan and schedule short-term and long-term project disturbances and human-related activities to avoid raptor nesting and roosting areas, particularly during crucial breeding and wintering periods (see **Appendices B** and **C**).

- Monitor and document the status of raptor populations and, if feasible, their prey base post project completion, and evaluate the success of mitigation efforts.

- Document meaningful data and evaluations in a format which can be readily shared and incorporated into wildlife databases.

PREFACE

The following raptor protection guidelines were prepared by the USFWS Division of Migratory Birds, Washington Office, in coordination with various Federal, State, tribal, and private entities with an interest in raptor protection. Based in part upon a review of literature regarding the effects of human and land use disturbances upon raptors (**Appendix D**), these guidelines are intended to provide an advisory framework for consistent raptor management approaches in the western United States. They are also intended help USFWS staff meet, in part, their responsibilities to migratory birds as set forth in Service Manual (720 FW 2)(**Appendix E**). The USFWS regions covered by these guidelines are Regions 1, 2, 6, 7, and 8. The states in the USFWS regions are as follows: R1), Idaho, Oregon, and Washington, R2) Arizona, New Mexico, Oklahoma, and Texas, R6) Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming, R7) Alaska and R8) California and Nevada.

These guidelines are intended to provide land use planners with the means to avoid the direct or incidental take of raptors, their nests, or eggs (as prohibited under parts of the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (Eagle Act), and Endangered Species Act (ESA); see *Regulatory Authority* section and **Appendices F** and **G** for further information). These guidelines are complementary and supplementary to the National Bald Eagle Management Guidelines, that were final on June 5, 2007 (http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf) Implementation of the nest protection and habitat conservation measures in the raptor guidelines will help federal agencies meet their responsibilities to Executive Order 13186: The Responsibilities of Federal Agencies to Protect Migratory Birds; see *Regulatory Authority* section and **Appendix G** for further information. In addition, these guidelines provide upfront recommendations to assist land use planners through the National Environmental Policy Act (NEPA) process. Implementation of protective methodologies could reduce potential impacts to raptors and their habitat to insignificant levels and eliminate

the need for more extensive discussion of losses in an Environmental Impact Statement. Documenting baseline conditions and monitoring the effects of actions and effectiveness of mitigation can be part of an adaptive management approach (see **Appendix H** for suggested data forms).

We recommend incorporation of habitat management and nest/roost site protection measures into land use and other programmatic plans to ensure project compatibility with the biological requirements of raptors and regulatory statutes. These guidelines are not all-inclusive of available mitigation strategies, nor are all recommendations intended to apply to every project. **Appendix I** provides references for: additional habitat and species-specific management guidance, raptor-specific methods and management, and general avian and habitat resources. We recommend using this document in concert with such resources as the handbook, Raptor Research and Management Techniques (Bird and Bildstein 2007), which provides more in-depth information regarding techniques and resources. Agencies and project proponents should select applicable management recommendations and/or develop other protective measures based on the project and its potential impacts. Biologists from the USFWS, state wildlife resources management agencies, and land management agencies are available to assist with the identification of impacts (both positive and negative) and the selection and implementation of appropriate protective measures.

Guidelines are subject to modification on a site-specific and project-specific basis dependent on knowledge of the bird species and individual birds present; topography and habitat features; and type and magnitude of the proposed activity. Site-specific modifications should be coordinated with appropriate USFWS, state or tribal wildlife resources management agencies, and/or land management agency biologists to ensure that the intent of these guidelines is maintained. Revisions to these guidelines may also occur as our knowledge of raptor ecology improves.

It is important to realize that these are guidelines, therefore they are voluntary. However, they briefly outline regulatory requirements, to help users minimize the risk of violations. Use of these guidelines may reduce the likelihood of "take" as defined by statute. Although it is not possible to absolve individuals and entities from liability under the Eagle Act or the MBTA, the USFWS exercises enforcement discretion to focus on those individuals, companies, or agencies that take migratory birds without regard for the consequences of their action and the law, especially when conservation measures, such as these guidelines, are available, but have not been implemented.

INTRODUCTION

Purpose

Responsibility for protection of wildlife is rendered in part by the USFWS mission "to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of

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the American people". Raptors[b], or birds of prey, are all protected wildlife. Raptors include the hawks, falcons, and eagles in the Order Falconiformes, and owls, in the Order Strigiformes (See **Appendix A** for lists of raptor species of concern). Some have argued (Katzner et al. 2006, Sergio et al. 2003. Anderson 2001, Rodriguez-Estrella et al. 1998) that raptors are indicator species of environmental quality due in part to their position at the top of biological food chains. Throughout history, raptors have been held in high regard for their aesthetic qualities as well as for their religious and cultural symbolism.

The conservation concerns of raptors may vary among species, and may include such species-specific issues as reduced populations levels, low fecundity, narrow environmental niches and sensitivity to disturbance. In the Western United States, the status of raptors is considered stable for some species, declining for others, and uncertain for still others (White 1994, USFWS 2002). Certain life history characteristics, including typically long life spans, philopatry to nesting sites, relatively low reproductive rates, and specific habitat requirements for nesting and foraging, make raptor populations particularly vulnerable to disturbances and may retard recovery of some populations (Brown and Amadon 1968, Nelson 1979, Scott 1985, McCallum 1994). An increase in raptor-human interactions resulting from industrial, municipal, transportation, and recreational activities have thus prompted development of the USFWS *Guidelines for Raptor Protection from Human and Land Use Disturbances in the Western U.S.*

Objectives of these guidelines are to maintain raptor populations which are stable or improving and enhance raptor populations which are declining in the western U.S. by avoiding, minimizing, or mitigating effects of the following human induced impacts:

- Physical destruction of important raptor habitat components;
- Disturbance resulting in displacement of raptors from high-valued habitat and use of areas during crucial time periods (i.e., nesting, roosting);
- Direct human caused stress, physical impairment, or mortality; and
- Exposure to contamination.

These guidelines are intended to provide land use planners and resource managers with raptor protection recommendations within the area of influence of land use activities. Protection of nesting, wintering, and foraging activities is considered essential. Implementation of these guidelines is recommended whenever there is potential for an action or project to negatively affect these birds or their resources.

[b] New World vultures are no longer included in the Order Falconiformes, but in the Order Ciconiiformes (American Ornithologists' Union 1997), therefore the guidelines will not provide specific recommendations for their conservation. However, New World vultures are also protected wildlife and may be subject to threats similar to those of raptors.

Regulatory Authority Overview

Raptors as a group are migratory birds, which are identified in CFR 10.13. As such, Federal and State protection is provided for raptors and, if federally listed under the Endangered Species Act (see following discussion), their habitat through various legal mandates. Federal mandates include, but are not limited to:

- The Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703-712, which makes it unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Take is defined (50 CFR 10.12) as to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect
- Executive Order (EO) 13186, which establishes a process for Federal Agencies to conserve migratory birds by avoiding or minimizing unintentional take and taking actions to benefit species to the extent practicable. Agencies are expected to take reasonable steps that include restoring and enhancing habitat
- The Bald and Golden Eagle Protection Act (Eagle Act); 16 U.S.C. 668, which makes it illegal to take, possess, sell, purchase, barter, or transport any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. "Take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb (50 CFR 22.3)

  On June 5, 2007, in the Federal Register, 72:107, p.31131, the U.S. Fish and Wildlife Service clarified its regulations implementing the Bald and Golden Eagle Protection Act. The modifications to implementing regulations for the Bald and Golden Eagle Protection Act established a regulatory definition of "disturb," a term specifically prohibited as "take" by the Eagle Act. The final definition defines "disturb" as "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."

  Finalization of this section is pending completion of rulemaking process. *On June 5, 2007,Federal Register 72:107, page 31141, the USFWS proposed a rule which would establish a new permit to take bald and golden eagles ("where such permits are consistent with the preservation of the eagles, and the take is associated with, and not the purpose of, the activity and can not be practicably avoided") (http://www.fws.gov/policy/library/07-2697.pdf), Finally, these proposed regulations would authorize intentional take of eagle nests in rare cases where their location poses a risk to human safety or to the eagles themselves. An additional, "grandfathering", regulation would provide Eagle Act authorization comparable to the authorization granted under the Endangered Species Act (ESA) to ESA section 10 permittees who continue to operate in full compliance with the terms and conditions of their permits. We also proposed to establish a streamlined process for issuing Eagle Act permits to entities that take bald eagles in compliance with the terms and conditions of previously issued ESA incidental take statements issued under ESA section 7.*

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However, at the time of this writing, there is currently no permit for new actions incurring what might have been previously considered 'incidental take' under ESA (or take under Eagle Act). If agencies can not modify a project proposal to avoid take, using the steps below, the USFWS advises postponing the project until either a permit under Eagle Act becomes available, or the agency can work with the local ES Office to explore other measures to remove the potential for take.

- The Endangered Species Act (ESA); 16 U.S.C. 1513-1543, which provides protection to threatened and endangered raptors and their habitats
- Birds of Conservation Concern (BCC), which are identified by the USFWS per the mandate of the 1988 amendment to Fish and Wildlife Conservation Act as those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973"
- The National Environmental Policy Act of 1970 (NEPA); 42 U.S.C. 4321, which was enacted to help public officials make decisions that are based on an understanding of environmental consequences and take actions that protect, restore, and enhance the environment**.**

Appendix G contains additional descriptions of provisions included in applicable Federal mandates and references for state and tribal mandates.

Background

Each raptor nest, resident pair and their offspring, and supporting habitats are considered important to the long-term viability of raptor populations and are vulnerable to disturbance by many types of human activities. Existing literature details site- and species-specific raptor responses to human disturbances and habitat alteration. Background information on the effects of human activities on raptor life history requirements can be found in **Appendix D**.

Human activities can result in disturbance to raptors and their habitats, potentially resulting in declines in raptor populations. The USFWS Mitigation Policy (Fed. Reg. Vol. 46, No. 15, pp. 7644-7663) is to "seek to mitigate losses of fish, wildlife, their habitats, and uses thereof from land and water developments." Mitigation as defined [40 CFR Part 1508.20 (a-e)] by the President's Council on Environmental Quality has been incorporated into the USFWS Mitigation Policy to sequentially include avoidance, minimization, rectification, reduction over time, and compensation for negative impacts to wildlife and habitats.

To facilitate maintenance or enhancement of all raptor populations amid continued human encroachment into their habitats, the following guidelines, developed according to the USFWS Mitigation Policy, provide a framework to:

- Identify raptor resources potentially affected by proposed land use activities, including raptor nesting, wintering, migration, and foraging habitats.

- Assess potential magnitude of impacts (both positive and negative) to raptors and their habitats.

- Protect and enhance high-valued raptor habitat components.

- Provide reasonable protection for individual raptors and their nesting, winter-roosting, and foraging activities.

- Document changes in raptor populations in an area prior to, during, and following a proposed action.

GUIDELINES IMPLEMENTATION

NOTE: These guidelines are for protection and conservation of raptors which occur in much of the western U.S. Recommended conservation buffers (prior to modifications resulting from topography, climate, and other factors) can be found in Appendix B. Specific state or tribal guidelines or species-specific conservation documents of other agencies may be the same or more risk-averse than regional guidelines (see Appendix C). Raptors occurring in the states to which these guidelines currently apply are identified in Appendix B, Tables B.1-B.3. Statewide seasonal occurrences for each species are also presented as well as habitats considered important for breeding, wintering, and foraging activities. In addition, Tables A.1.a.-A.3 in Appendix A identify level of State and/or Federal protection provided for each species as of publication of this document (the USFWS and/or the State wildlife resource agencies should be contacted for the most current legal status of each species).

Recommendations provided herein for habitat protection and nest/roost site protection are intended to facilitate consistency in raptor management. As stated previously, it is important to also realize that these guidelines can be modified on a site-specific and project-specific basis based on field observations and knowledge of local conditions (See the Site-specific Analysis Tool, **Appendix H**). Revisions to these guidelines may also occur as our knowledge of raptor ecology improves. We will institute a five-year review process, in coordination with raptor experts and wildlife agencies to allow us to incorporate information from newly available peer-reviewed research and literature. The resulting management actions should always ensure protection of individual raptors and raptor populations.

Guideline modifications should be coordinated with appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency biologists to ensure that the intent of these guidelines is maintained. Guidance specific to certain activities continue to be developed and should be used in combination with these guidelines as appropriate. For example, the Avian Power Line Interaction Committee[c] (APLIC 1994, 2006) has developed practices for raptor protection on power lines and the Access Fund (Pyke 1997) provides guidance for raptor/rock climber interactions. In addition, the USFWS Division of Migratory Bird Management has developed voluntary communication tower siting guidelines for use by the industry (USDI Fish and Wildlife Service 2000), and interim

[c] APLIC is comprised of the Bonneville Power Administration, Edison Electric Institute, 13 electric utility companies, and the U.S. Fish and Wildlife Service.

guidance on avoiding and minimizing impacts from wind turbines (USDI Fish and Wildlife Service 2003a).

The following guidelines are not regulatory, and they do not supersede provisions of the MBTA, Eagle Act, USFWS Nest Destruction Policy, and ESA. Also, they do not supersede state, local, or tribal regulations that may be more restrictive. By following these guidelines, users will likely meet requirements under the aforementioned laws and policies. However, assessing legal compliance with laws and regulations is ultimately the authority and responsibility of USFWS law enforcement. While it is not possible under the MBTA and Eagle Act to absolve individuals or companies from liability by following these guidelines, enforcement will be focused on those individuals or companies that take migratory birds with disregard for the law, and where no legitimate conservation measures have been applied.

Briefly stated, the guidelines provide measures to assist with the following steps: (1) Identify resources (2) Document prior disturbance and raptor response (3) Evaluate effect of proposed action on raptors (4) Avoid or reduce negative impacts (5) Mitigate unavoidable impacts (6) Conserve nest and roost sites (7) Document the process in a consistent fashion.

Gather Raptor-specific Information

Identify Raptors and Habitat Affected by Proposed Action

Knowledge of baseline conditions is necessary in order to evaluate impacts of actions. In assessing the potential for land use to affect raptors, it is important to relate the current abundance and distribution of the birds and their habitat relative to the locations and extent of the proposed land use. We recommend that baseline conditions include a minimum of three years of data prior to commencement of activities up to and including immediately prior. A tiered approach, whereby the land management entities gather information at the resource area scale, and proponents gather information at the time they acquire access to an area, such as upon leasing, and/or at the project-specific scale, is the most practical. Early coordination with existing monitoring programs is essential to minimize costs.

Existing data

Proponents of land use activities should assess all existing data available on raptors, including their nests, winter roosts, migration corridors, and foraging habitats within and proximal to areas slated for development or increased human activity. Some State wildlife resource agencies maintain a computerized database on raptors (information may include approximate nest locations, species using the nest, dates of use, or reproductive statistics), which can be accessed for consultation purposes and project impact assessment. Other land management agencies (U.S. Bureau of Land Management, U.S. Forest Service, National Park Service, etc.) also possess site-specific information and should be consulted as appropriate. For example, the Bureau of Land Management (BLM) (Olendorff and Kochert 1992) has identified 223 Key Raptor Areas (KRAs) in 12 states for which they set inventory and monitoring objectives. We have included the list of KRAs in Olendorff and Kochert (1992), their Appendix 1, as our **Appendix J**. For the most recent information regarding the status of these areas and their raptor populations, contact and coordinate closely with the wildlife biologists

at the respective BLM Field Office, the BLM State Wildlife Lead, the appropriate USFWS offices, and state wildlife resources management agencies.

Identify and prioritize for greater conservation measures raptor species of concern (species which are USFWS Birds of Conservation Concern, Partners in Flight priority species, and species in the respective state Comprehensive Wildlife Conservation Strategy and Wildlife Action Plans)(see **Appendix A**).

Surveys

When existing raptor information is unavailable or determined to be insufficient, raptor surveys should be conducted to determine species occurrence and locate nests, winter roosts, migration corridors and important habitats (e.g., foraging). This will assist in a determination of potential impacts from the proposed action. Terrain and habitat types, as well as available resources, will determine the appropriate method for conducting raptor surveys (e.g., aerial surveys vs. ground surveys, walking transects vs. driving transects). Biologists from the USFWS, state wildlife resources management agency, and/or other land management agencies are available to assist with the selection of appropriate and site-specific survey techniques. Since surveys have the potential to disturb nesting raptors, Federal and State permits may be required.

- Surveys for broad-scale or permanent developments are advised for a minimum 3-year period prior to the start of construction unless there is sufficient existing information about the local raptor population. These surveys should include species use, status, and locations of raptor nest sites (occupied or unoccupied), winter roost sites, migration corridors, and associated habitat use areas

- When feasible, where the project or cumulative impacts will result in long-term disturbance or long-term or permanent loss of habitat, or where the raptor species affected are prey specialists rather than generalists, pre-project surveys should include at least one cycle of a known prey's population fluctuation since raptor densities are partly responsive to prey fluctuations. Microtine rodents have been documented with fluctuations of 3-4, 4-7, and 9-10 year intervals (Speirs 1939, Elton 1942, Dymond 1947, Keith 1963); prairie dogs and ground squirrels with population fluctuations of 3-5 years (Barnes 1982); and jackrabbit populations have been suggested to fluctuate at 7-10 year intervals (Clark 1972, Wagner and Stoddart 1972, Newton 1979, McAdoo and Young 1980, Thompson et al. 1982)(See **Appendix K** for additional species-specific information regarding main food items).

- For the life of the project, a qualified wildlife biologist should annually inventory and document raptor nesting and roosting status within the proposed land use impact area and at least 1-mile distance to external project boundaries**.**

- Data and overall results from baseline and annual surveys should be provided to the USFWS and the State or tribal wildlife resource agency for incorporation into the wildlife resource agency's computerized wildlife or raptor database. Publishing data and results should also be considered to develop information regarding raptor

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populations and responses to human activities and developments.

Document Prior Disturbance History and Tolerance of Raptors

Some individual and breeding pairs of raptors appear relatively unperturbed by some human disturbance and human-induced impacts and continue to breed successfully amid these activities. Nesting within or near human-altered environments may be a manifestation of the decreased availability of high-quality natural nest sites, indicative of high densities of breeding birds, indicative of abundant or available prey, or simply a display of higher tolerance for disturbance by certain individuals or breeding pairs. Accordingly, it is not the intent of these guidelines to restrict current land use activities in those situations where raptors appear to have habituated to the current level of disturbance and human-induce impacts. However, these Guidelines should be closely followed if proposed land use activities may result in exceeding the current levels and timing of disturbances.

- Document the existing level of human disturbance within the recommended buffers of the raptor use areas (see **Appendix B Tables B.1-B.3**), including such things as: road (or trail) type and density, traffic patterns and type; recreational use magnitude and type, ambient noise levels and frequency (hertz), and presence of industrial or residential structures with associated activities.

- Evaluate available raptor data such as nest-building, occupancy, and productivity in respect to the timing and magnitude of existing disturbance.

- Evaluate the difference between the baseline disturbance regime and the project-related disturbance regime in the environmental analysis of the proposed activity.

- Coordinate with USFWS, state or tribal wildlife resources management agency, and/or land management agency wildlife biologists when proposed land use activities will result in increasing the current disturbance or introducing a different disturbance in or near raptor use areas.

Evaluate Impact of Proposed Action on Raptors

Consequences of human activities to raptor populations will depend in large part on the proportion of nests and habitats affected by a disturbance. An assessment of raptor population status/trends in a project area will help determine current and projected levels of impact to raptors and their habitats. The potential level of impacts should be determined prior to proceeding with proposed land use activities (Kennedy 1980):

- Impacts to raptor habitat, with emphasis on habitat supporting raptor species of concern, should be assessed by quantifying and/or qualifying losses of <u>habitat value</u>. The USFWS Mitigation Policy considers habitat value to be the primary measure for determining impacts to wildlife habitat, including raptors. The USFWS Mitigation Policy further suggests application of Habitat Evaluation Procedures (HEP) and the associated Habitat Suitability Indices (HSI) or other evaluation methodologies agreed upon by the project proponents and actions agencies to evaluate project impacts to

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wildlife habitats, including raptor habitats as identified in **Tables B.1-B.3**. Whether a habitat alteration is an adverse impact to raptors and whether it requires mitigation should be determined in coordination with appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency wildlife biologists.

- Impacts to raptor population levels can be evaluated in part by determining the proportion of nests, roost sites, migration corridors, and associated habitat potentially affected by project activities for each species. Size of area selected for this analysis should be dependent on the type of disturbance, raptor species, and topographical and vegetation features.

To ensure comprehensive analysis of proposed project impacts to raptors, evaluations should address, but not necessarily be limited to the following:

- Direct and indirect impacts to raptor habitat, occupancy, and nesting success. Direct impacts may include, but are not limited to: loss of foraging habitat from the project footprint, direct mortality of raptors (e.g., due to collisions with vehicles, electrocution on power lines), noise disturbance and loss of nest sites or winter roost sites. Indirect impacts may include, but are not limited to noise disturbance, degradation of habitat adjacent to the project area, habitat fragmentation, contamination of food sources, and reduction or changes in available prey species.

- Cumulative impacts of the proposed project to raptor habitat and nesting success when added to past, present, and reasonably foreseeable future actions.

- Where the project or cumulative impacts may result in long-term disturbance or long-term or permanent loss of habitat for raptor species of concern, evaluate raptor population and habitat trends on control areas outside the proposed project area that are not impacted by similar actions as the proposed action.

Avoid, Minimize, or Compensate for Loss of Raptor Habitat

Evaluate and Minimize Impacts Occurring in Raptor Habitat

Habitat loss, degradation, and fragmentation are widely accepted causes contributing to raptor population declines worldwide (Snyder and Snyder 1975, Newton 1979, LeFranc and Millsap 1984). Availability of nest sites and food are considered limiting factors for raptor populations (Whitcomb et al. 1981, Temple 1986, Wilcove et al. 1986, Cline 1988, Watson and Langslow 1989). Raptors compensate for the loss of foraging and nesting habitat by abandoning established territories and/or attempting to utilize less productive or already occupied territories (Nelson 1979, Newton 1979). Other factors affecting raptor distributions and densities include human persecution, exposure to toxic chemicals, diseases, parasites, and predators (Mersmann and Fraser 1988, Newton 1989).

Nest locations for some raptor species may be associated with situations or substrates that place limits on nesting opportunities. For example, the breeding density of largely cliff-

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nesting species may be limited by the number of cliffs with suitable ledges (Newton 1979). Impacts to riparian habitats can also affect some raptors. Rich (2002) noted that a number of raptor species use riparian vegetation in the western United States, including the: bald eagle, common black-hawk, gray hawk, Mississippi kite, zone-tailed hawk, and elf owl. The decline of cottonwoods and willows in the arid West has been associated with hydrological alterations that deplete surface and ground water (Miller etal. 1995, Lite and Stromberg 2005, Birken and Cooper 2006). Common black-hawks are riparian-obligate nesters for which the greatest habitat threat has been clearing or alteration of riparian habitat, water diversion, lowering of water table by pumping, and livestock grazing practices that eliminate regenerative seedlings (Schnell 1994). Loss of riparian gallery forests due to habitat destruction and groundwater depletion is considered a concern for long term maintenance of gray hawks (Bibles et al. 2002). In Arizona, degradation of riparian nesting habitat for zone-tailed hawks, rendering it unsuitable, has occurred due to effects from water projects (Johnson et al. 2000).

Local area populations may be comprised of: pairs, which may or may not lay eggs, occupying a nesting territory, individuals that have secured a nesting territory but not a mate, and individuals that are unable to secure a nesting territory, or "floaters" (non-breeders). Although competition for nest sites and food between established breeders and floaters may reduce nest success, healthy populations over the long term may depend upon the presence of many floaters. An emphasis on only occupied territories may delay the detection of population declines (Kenward et al. 2000), but tracking the proportion of immature breeders drawn from the floater population can be used as an early-warning sign of population decline (Ferrer et al. 2003). Ensuring the availability of suitable settlement areas for dispersing floaters can increase the effectiveness of conservation efforts (Penteriani et al. 2005).

Sociality (group or gregarious behavior) such as cooperative breeding and hunting, nest associations, and communal roosts, has been identified in a number of raptor species (Smith and Hiestand 1990, Meyer 1995, Dunk 1995, Parker 1999, Marks et al. 2002, Kimball et al. 2003)(see **Appendix A**, **Table A.5**. for species information). Kimball et al (2003) synopsized factors which may favor cooperative breeding in diurnal raptors, including: a limited number of suitable territories, group hunting or foraging, thermoregulation, low reproductive success in pairs, and reduced average energetic expenditure for prey acquisition and delivery when the helpers are adults. Therefore, conservation of the habitat which supports all members of the population, and important use areas other than nests, may provide greater benefits to local area populations.

General Habitat Guidance

Habitat management manipulations should be planned to:

- Avoid or minimize impacts to habitats which could change raptor prey populations beyond the natural range of variation;

- Avoid or minimize impacts to habitats preferred by raptors for nest and roost locations;

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- Identify high-use habitat and nest aggregation areas for species which demonstrate group behavior (see Table A.5.), and avoid or minimize habitat fragmentation;

- Mitigate for unavoidable habitat losses; and

- Monitor to determine suitability and efficacy of mitigation.

Raptor Foraging Habitat

A variety of birds, small mammals, reptiles, amphibians, fish, and insects constitute the bulk of the prey base for raptor species (Steenhof 1983, Palmer 1988). Some species will forage on carrion as well as live prey; some are specialists that primarily take fish, while others are generalists (Steenhof 1983). Construction of facilities, transportation infrastructure, power lines, communications towers, and other actions are often required by many types of industrial and housing development. They contribute to habitat loss and fragmentation, and can directly and indirectly affect diversity, abundance, and availability of raptor prey populations. Road developments in particular have been shown to restrict movements of small mammals and birds which may affect their dispersal and population levels (Oxley et al. 1974). Management and mitigation efforts should be focused on maintaining and improving habitats sufficient to support healthy prey populations. However, some raptors, including burrowing owls, may use human-altered environments and artificial structures such as culvert drains and pipes for breeding (Botelho and Arrowood 1996), roosting (Williford et al. 2007), and the surrounding areas for foraging (Williford et al. 2007). In certain circumstances, these artificial features may be utilized in management and mitigation efforts.

Recommendations:

- Avoid disturbance to raptor habitats.

- In habitat supporting large woody vegetation, retain or increase snags and residual trees (Hunter and Bond 2001) within and adjacent to project areas as hunting perches for raptors. Prey species also utilize snags as nesting areas, food sources, and overwintering habitat.

- Minimize impacts over broad areas, to the extent feasible. Place proposed new construction and human activities within already disturbed areas whenever possible.

- Limit the project footprint to the smallest area necessary to meet project needs.

- Reclaim disturbed areas and obliterate roads as soon as possible following construction, operation, and completion of project activities.

- Close or reduce use of roads within known high-use raptor areas, particularly during crucial raptor breeding periods, to minimize displacement of raptors to less optimal or more distant foraging habitat.

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- During onsite reclamation, or as off-site mitigation, increase prey habitat through measures such as vegetation plantings or thinnings, depending on the target species, and with consideration and planning for other species that may use the project area.

Nesting and Roosting Habitat

Preservation of nesting and roosting habitat is important to maintaining raptor populations. Where feasible, actions should be taken to improve the nest stand structure and roosting habitat for raptors.

Recommendations:

- Place proposed project developments to avoid direct or indirect loss or modification of nesting and roosting habitat.

- Incorporate raptor nest and roost habitat requirements into riparian restoration plans, but schedule activities outside critical life history seasons.

- Close areas within line of sight of nesting and roosting sites to casual off-road vehicle use.

- Establish visitor thresholds and limits to use of tape recorders in sensitive raptor areas subject to high pressure from birding activities.

- Enhance nest and roost site availability to increase attractiveness to raptors. For some species, under some circumstances, artificial nest sites can be constructed to enhance use of previously or currently disturbed areas. In some situations, natural substrates can be modified or developed to attract nesting raptors.

    - Plant trees to expedite replacement in areas suffering effects of habitat degradation. Trees commonly utilized by nesting raptors include aspen, cottonwoods, willows, junipers, ponderosa pines, and other conifers. Where livestock grazing occurs, plantings may need to be protected from livestock damage until they become established. Livestock grazing strategies such as deferred or rest rotation and protecting nest trees should be developed to ensure maintenance or improvement of raptor nesting/roosting habitat (Kochert et al. 1988, Kochert 1989)

    - In habitat supporting large woody vegetation, retain or increase snags within and adjacent to project areas as nest sites for cavity nesting raptors, e.g. flammulated owls (McCallum 1994), boreal owl (Hayward and Hayward 1993), and Northern pygmy-owls (Holt and Peterson 2000).

    - Trees or snags with existing raptor nests can be stabilized by reinforcing structural integrity when appropriate, if alternative sites are limited.

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- Prune large trees so that junctures of tree limbs are accessible for nesting (Demarchi and Bentley 2005).

- Rock piles can be constructed to provide perches and nest sites for some raptor species. Prey species also benefit from the cover and denning values provided by rock piles.

- Artificial nest platforms and nest boxes can be constructed for some raptor species to increase potential nesting sites (Millsap et al. 1987). Call (1979) and Marti (2002) provide appropriate recommendations for tree-nesting, cavity nesting, and underground-nesting raptors. Additional guidance on artificial nests for owls was also developed by Dewar and Shawyer (1996). Individual artificial nest platform designs are available on a species by species basis for most raptors. For example, Smith and Belthof (2001) suggest specific dimensions and configurations which should be employed for artificial burrow structures for burrowing owls.

- However, the use of Artificial Nest Structures (ANS) should be evaluated on a case-by-case basis, and should not be used as a landscape-scale mitigation practice (see Considerations for Offsite Habitat Mitigation, below).

➢ Improve existing nest sites. Quality of existing nests may be more important than the quantity in some areas (Millsap et al. 1987). Evaluate unoccupied raptor nests and nest sites. If the usability of a nest is questionable, then contact the USFWS for possible procedures to improve the nest or nest site for future nesting.

- Remove excessive accumulations of nest material (primarily for cliff-nesting raptors). Long-term buildup of nest material can bring a nest into reach of a cliff top, increasing accessibility by predators.

- Remove rocks or other debris which have fallen into nests, rendering them unusable by raptors (primarily for cliff-nesting raptors).

- Reinforce and stabilize trees, snags, and cliff ledges which contain existing nests to perpetuate continued use of these established sites.

Human-caused Mortality within Habitat Use Areas

Of 25 types of land use actions identified by Olendorff et al. (1989), at least 8 (32%) of these are known to cause individual raptor mortalities, including: wind energy, roads/railroads, utility lines, fire, mechanical/chemical, illegal harvest, heavy metals, and rodent control agents/pesticides. Data from banding records analyzed by Keran (1981) indicated that mortality from vehicular collisions can be a significant cause of mortality for some raptor species. Information from 273 encounter records of banded raptors indicated that 42.5% of the human-caused mortalities were from road kills. Raptors foraging along roadside habitats or on road-killed carcasses increase the potential for raptor-vehicle collisions.

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For instance, in a two-year study, 26 observations were made of young ferruginous hawks eating dead jackrabbits on roads in northern Utah and southern Idaho (Howard 1975). Road-killed jackrabbits have also been identified as a primary food source for bald eagles wintering in Utah (Platt 1976). Houston and Schmutz (1995) analyzed Swainson's hawk banding records in North America to 1992 and reported many of the banded birds recovered in the first two months after banding were road kills. They attributed this to a tendency to feed in roadside ditches in sparsely treed areas. Traffic collisions are a significant factor of mortality for many species of owls and at certain levels may result in local population declines (Glue 1971, Shawyer 1987, Moore and Mangel 1996). Illner (1992) documented 21 times greater vehicle-owl collisions along roads with car speeds of more than 50 mph than on roads with slower traffic.

Other causes of direct mortality include improperly constructed power lines which can result in the electrocution of raptors attempting to utilize these structures for perching and nesting sites (Harness and Wilson 2001). In a ferruginous hawk banding effort over a 16 year period in Montana (Harmata et al. 2001), researchers found power lines and poles responsible for 13% of the mortality of recovered hawks. Of 4,300 human-caused eagle mortalities investigated by the Department of Interior from the early 1960s to 1995, electrocution was reported as the second greatest cause of mortality in Golden Eagles and the third greatest cause for Bald Eagles (LaRoe et al. 1995). A review of raptor mortality due to power lines asserted electrocution is the fourth leading cause of human-caused death for Bald Eagles, following accidental trauma, poisoning, and shooting (Lehman 2001). Globally, a large number of electrocution mortalities are from species classed as endangered or vulnerable (Bevanger 1998). Sergio et al. (2004) documented that eagle owls (*Bubo bubo*) in the Italian Alps abandoned territories have high electrocution risk. Collisions with transmission lines and towers also result in direct mortality of raptor species (APLIC 1994, 2006). In addition to the two APLIC documents referenced, the Avian Protection Plan (APP) Guidelines were released in April of 2005 (APLIC and USFWS, 2005) as a tool for utility companies when siting power line placement, designing transmission poles, and retrofitting existing structures.

Commercial wind turbine facilities and their impacts to birds are a recently identified phenomenon. The problem in the US surfaced in the late 1980s and early 1990s at the Altamont Pass Wind Resource Area ▪, a facility then containing some 6,500 turbines on 189 km^2 (73 mi^2) just east of San Francisco Bay, California (Davis 1995). Orloff and Flannery (1992) estimated that several hundred raptors were killed each year due to turbine collisions, guy wire strikes, and electrocutions. The most common fatalities were those of Red-tailed Hawks, American Kestrels (*Falco sparvarius*) and Golden Eagles, with fewer mortalities of Common Ravens (*Corvus corax*), and Barn Owls (*Tyto alba*).

In Montana, raptor mortality due to electrocution from and collision with small distribution power lines associated with oil and gas wells was documented in 2000 and 2001 within a small area in central Montana (Schomburg 2003). Data were collected from 4,090 power poles. Of 273 carcasses collected in 2000 and 2001, the cause of death of 23 raptor carcasses was attributed to mid-span collisions, with 21 identified as golden eagles and one as a bald eagle (Schomburg 2003). Cause of death of 280 raptors was attributed to electrocution, with 219 identified as golden eagles, 4 as bald eagles and 11 as either golden or bald eagles

(Schomburg 2003).

Raptor mortalities have also resulted from other facilities associated with oil and gas development. Waste fluids from oil production operations may be stored in pits and other site accessible to wildlife (Trail 2006). Based on analysis of remains recovered from 1992 to 2005, 8% of which were raptors, Trail (2006) estimated the annual avian mortality at oil pits ranges from 500,000 to 1 million birds. The decline from former mortality estimates of 2 million birds per year was ascribed to concerted enforcement efforts and proactive industry compliance.

The exhaust stacks of heater treaters, facilities used to prevent the formation of water, ice and natural gas hydrates in oil and gas production facilities and gas gathering systems, have caused mortalities in birds and bats. Death may result from carbon monoxide poisoning, incineration, or becoming trapped in the units. Recognizing the issue, the Bureau of Land Management (BLM) provided Notices to Lessee/Operators (NTLs) with recommendations for modifications to oil and gas facilities to minimize bird and other wildlife mortality from oil pits and exhaust stacks within Kansas, Oklahoma, Texas, and New Mexico in 1996 and 2004(USDI Bureau of Land Management 1996, 2004).

Many human activities and proposed developments increase human access to previously remote areas. Many projects include development of access roads which may remain following project completion. These roads encourage public use for recreational purposes, unfortunately resulting in illegal shooting and other types of persecution of raptors (Newton 1979). Shooting is the most commonly reported cause of mortality for adult prairie falcons (Steenhof 1998), and may still be a problem for wintering ferruginous hawks (Bechard and Schmutz 1995) and wintering rough-legged hawks in some areas (Bechard and Swem 2002). Shooting is the third leading cause of mortality in golden eagles (Franson et al. 2002)

Lead shot and bullet fragments in the carcasses and viscera of game and other animals can pose a hazard to raptors. Diurnal raptors are one of the main avian groups affected by lead toxicosis (Miller et al. 2002), and lead poisoning accounts for an estimated 10-15% of the recorded post-fledging mortality in bald and golden eagles in Canada and the United States (Scheuhammer and Norris 1996). Other North American raptor species documented to date to be subject to lead shot and poisoning include: great horned owl, long-eared owl, northern harrier, sharp-shinned hawk, Cooper's hawk, northern goshawk, red-tailed hawk, American kestrel, prairie falcon, and peregrine falcon (Fisher et al. 2006).

Recommendations to reduce mortality:

- Locate potentially lethal activities and permanent facilities outside high-value raptor nesting and foraging habitat or other known raptor concentration areas.

- Reduce maximum allowable speeds on project-related roadways as much as practicable, taking into account the type and service area of the road.

- Coordinate with county and state transportation agencies and state and/or tribal wildlife agencies to implement a removal program for wildlife carcasses along

roadways to avoid further mortality of raptors which are attracted to carcasses. Distribution of carcasses to appropriate areas could be considered to supplement food sources for some raptor species, especially during winter periods.

- Establish educational programs for project area employees to increase awareness of the potential for vehicular collisions and other encounters with raptor species within the project area.

- Close areas within line of sight of nesting and roosting to casual off-road vehicle use to minimize persecution and disturbance.

- Place road signs indicating sensitive species use areas at appropriate locations along existing and newly constructed roads. Much caution is warranted here, and this should be considered on a case-by-case-basis, in coordination with the USFWS and the state and/or tribal wildlife agency. It may be undesirable to alert the public to the presence of raptors in some areas where the potential for illegal take may increase because of such actions.

- Limit the number and extent of access roads to minimize recreational use of previously isolated areas, thus reducing human-raptor interactions and probable conflicts.

- Remove and reclaim roads as soon as possible after requirements for their use have ended.

- During inventory and evaluation of existing roads for closure determinations, prioritize roads near high-value raptor use areas.

- If new power lines are proposed, are a connected action, or are proposed for future projects, they could pose electrocution and line strike hazards if not properly constructed. Install and maintain power line facilities in a way that will reduce raptor collisions and electrocution, and encourage nesting/roosting use of properly constructed transmission towers and power poles where appropriate. Reference guidelines, including criteria and techniques, are outlined in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C., 128 pp (APLIC 2006). . Copies can be obtained via the Internet through: the Avian Power Line Interaction Committee www.aplic.org or the Edison Electric Institute http://www.eei.org/resources/pubcat/enviro/, and the California Energy Commission www.energy.ca.gov. Additional recommendations and references are provided in Musclow and Dalton (1990, Section H).

    - Bury distribution lines, wherever possible;

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- Install raptor-friendly structures on overhead power lines, including adequate spacing for relevant species. A minimum of 60-inch spacing between phases would cover all species, including the bald and golden eagles;
- Utilize insulated, covered jumpers and insulated bushing covers in equipment installations, including overhead service transformers, capacitors, and reclosers;
- Use covered (insulated) conductors or provide adequate separation for jumper conductor installations; and
- Employ covers at installation of arrestors and cutouts.

➢ Transmission lines and towers that are proposed to be located in known raptor concentration areas, daily movement routes, or in major diurnal migratory bird movement routes or stopover sites, should have daytime visual markers on the wires to prevent collisions by these diurnally moving species. (For guidance on markers, see *Avian Power Line Interaction Committee (APLIC) 1995. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Inst., Washington, DC. 103 pp.* Copies can be obtained via the Internet at http://www.eei.org/resources/pubcat/enviro/

➢ Adopt and implement wind turbine siting and operating practices consistent with the U.S. Fish and Wildlife Service Interim Guidance on Avoiding and minimizing Wildlife Impacts from Wind Turbines (http://www.fws.gov/habitatconservation/wind.htm).

➢ Evaluations for the siting and construction of communication towers should take into account potential impacts to raptors. The USFWS has developed interim guidelines that provide the best available information for avoiding bird strikes with communication towers. These guidelines and a tower site evaluation form are available at http://migratorybirds.fws.gov/issues/towers/comtow.html, and should be implemented where feasible.

- Avoid known bird migration corridors.
- Eliminate guy wires,
- Combine communication devices on existing towers,
- Restrict height of towers to less than 200 feet,
- Install minimum lighting with use of white strobe lights rather than red lights.

➢ Replace oil pits with closed tanks or other closed containment systems.

➢ If oil pits are retained, enclose with netting to exclude wildlife (USDI Fish and Wildlife Service 2003b). Deterrent methods such as flagging, strobe lights, reflectors, and noise makers have not been shown to reduce avian mortality in pits (Esmoil and Anderson 1995).

➢ Install exclusion devices on heater treater or other exhaust stacks to minimize the potential for use as perches by raptors.

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- Institute a regular maintenance and monitoring program to ensure effectiveness of measures.

- Educate public regarding the risks to raptors from lead ammunition.

- Recommend appropriate disposal of viscera or carcasses of animals shot with lead ammunition.

Including and in addition to the preceding measures for oil and gas operations, the Minerals, Realty, and Resource Protection Directorate, Division of Fluid Minerals, of the Washington Office of the BLM Fluid Minerals Group has developed best management practices for oil and gas operators (http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html), which may help minimize the risk of mortality and are intended to minimize impacts to wildlife habitat. In addition, we recommend use of the Oil and Gas Development Guidelines developed by the New Mexico Department of Game and Fish. They are extensive, offer more detail than this document, and can be acquired via their website: http://www.wildlife.state.nm.us/documents/oilandgasguidelines.pdf

Mitigate Unavoidable Impacts to Raptor Habitat

In accordance with USFWS Mitigation Policy, 46 FR 7656, we advise mitigation for replacement of raptor habitat values lost to unavoidable impacts. Mitigation can be accomplished by increasing habitat values of existing raptor use areas on or adjacent to project lands; restoring or rehabilitating previously altered habitat; acquiring land through fee title acquisition, conservation easements, legislative protective designations, and managing acquired land for raptor habitat values; and/or other land management strategies. In cases involving habitat enhancement, restoration or rehabilitation, individual site potential and microsite conditions (Elmasdottir et al. 2003) will determine the ultimate outcomes and the costs of achieving them. Where appropriate, mitigation should be developed to contribute toward implementation of other priority action items such as those included in conservation agreements and recovery plans.

STEP 1

Determine the extent and duration of unavoidable losses of raptor habitat (refer to discussion on *Potential Level of Impact to Raptor Populations*). All opportunities to avoid or minimize impacts should already have been considered and implemented as practicable.

STEP 2

Determine impacts and mitigation for all phases of proposed land use activities, including construction, operation, and reclamation. Generally, mitigation should be determined by the degree of impact to raptors. The duration of an activity (short-term or long-term) would be part of this determination as follows:

NOTE: For these guidelines, short-term is defined as an activity or its associated effects which would take place outside of the breeding season and end prior to initiation of the

nesting season ***(Appendix B, TablesB.1-B.3).*** *Long-term is defined as an activity which would continue into or beyond the nesting season, or an activity which, due to its type, magnitude, and timing, could have long-term effects.*

If the proposed project activity and effects thereof are short-term, reclamation of disturbed areas can be accomplished during and following project completion. Habitat reclamation should involve seeding and/or vegetation plantings with native materials to approximate or improve pre-project conditions. Determination of seed mixes and plant types should be coordinated with local natural resource managers to ensure selection of appropriate species. Seedlings and plantings should be selected which provide diverse and native vegetation, encouraging habitat diversity, which supports abundant prey populations. Restoration of native plants depends upon the identification and modification of environmental factors which may restrict succession (Elmasdottir et al. 2003). Fertilization, weed control, and/or watering programs may be necessary to successfully establish the vegetation (Chambers 2000, Monson et al. 2004, Roundy 2005). In areas where biological soil crusts are an integral part of natural systems, specialized reclamation techniques, including inoculation of reclaimed areas, may be required for more effective reclamation (Belnap et al. 2001, Hilty et al. 2004, and Pendleton et al. 2004).

If the proposed project and effects thereof are long-term or permanent, then upfront habitat acquisition, development, and/or improvement to mitigate for impacted areas should be considered. The amount and type of mitigation should be based on losses in habitat value. Onsite, in-kind mitigation is preferred; however, offsite and/or out-of-kind mitigation may be considered if the resulting benefits to raptor populations offset the predetermined losses for the project area.

STEP 3

Post-project monitoring to determine the effectiveness of habitat mitigation measures on raptor populations should be an integral component of the mitigation plan. Publishing data and results should also be considered to develop information regarding raptor populations and responses to human activities and developments.

Considerations for Off-site Habitat Compensation

The USFWS Mitigation Policy (Fed. Reg. Vol. 46, No. 15, pp. 7644-7663) provides a prioritization process, when considering compensatory mitigation:

- First priority will be given to recommendation of a mitigation site within the planning area.
- Second Priority will be given to recommendation of a mitigation site in proximity to the planning area within the same ecoregion section.
- Third priority will be given to recommendation of a mitigation site elsewhere within the same ecoregion section.

The USFWS Mitigation Policy further suggests application of Habitat Evaluation Procedures

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(HEP) and the associated Habitat Suitability Indices (HSI) or other evaluation methodologies agreed upon by the project proponents and actions agencies to derive compensation estimates for project impacts to wildlife habitats, including raptor habitats. When evaluating the potential for offsite habitat compensation, the mitigation should be an in-kind replacement of the resource or function lost or impacted.

We recommend using criteria outlined by Gibbons and Lindenmayer (2007) to help ensure that compensatory habitat mitigation (offsets) for land clearing activities would contribute to no net loss of a resource:

- Restoration of the values lost is feasible or the vegetation proposed for clearing is unlikely to persist.
- Clearing the vegetation does not constitute an immediate risk to a species, population or ecological process.
- There is adaptive management.
- Offsets provide values for periods commensurate with impacts from clearing.
- There is adequate compliance.

The use of and artificial nest structure (ANS) can be useful mitigation, particularly when replacing a dilapidated structure or attempting to relocate a nest from a potentially lethal situation. However, we recommend caution regarding the use of ANSs as a wholesale compensation for impacts to natural nest sites. Nest success in ANS may not be the same as that in natural sites (Steenhof and Newton 2007). In addition, use of ANS on a large scale may have unintended ecological impacts that would not occur on a smaller scale. Determination of whether to use an ANS should be on a case-by-case basis, and each determination should include an evaluation of such things as: the presence of a sufficient prey base, the proposed location of the ANS relative to other raptors, resources allocated for the long-term monitoring, repair, and replacement of ANSs (HawkWatch 2007).

Conserve Nest and Roost Sites

General Guidance on Nest and Roost Sites

Coordination with appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency biologists should occur when implementing nest/roost site protective measures to ensure that the intent of these guidelines and associated State and Federal regulations are realized. However, for optimal conservation, no temporary or permanent surface occupancy should occur within species-specific spatial and seasonal buffer zones.

Raptors typically demonstrate a high degree of fidelity to nesting locations. Protection of unoccupied nest sites is important in areas where nest site availability for raptor species of

concern is limited, or where a territory contains few alternate nests. Successful habitat management should be complemented by efforts to attain natural or predevelopment nesting success of local raptor populations and protection of roosting activities. Spatial and seasonal buffer zones have regularly been used to protect individual nest sites/territories to ensure successful breeding and to maintain high use areas by raptors. In addition, species exhibiting gregarious behavior may be sensitive to impacts to or loss of use areas other than nests. For example, swallow-tailed kites, which, in suburban settings tolerate human activity near nests, do not tolerate disturbance when roosting at communal roost sites, and are vulnerable to harassment and vandalism (Meyer 1995). Disturbance at communal roosts has also caused localized abandonment by white-tailed kites (Dunk 1995).

Buffer zones are defined as seasonal or spatial areas in association with individual nests or nesting territories, within which no disturbing activities are allowed. *Spatial buffers* are defined as radii from known occupied and unoccupied nest sites as well as winter roost sites. *Seasonal buffers* are restrictions on the times when human activities should be allowed to occur within the spatial buffers.

Raptor nesting information and buffer recommendations provided in these guidelines were developed following review of pertinent literature and coordination with knowledgeable wildlife professionals (Call 1979, Jones 1979, Fitzner 1980, Wood 1980, Dubois 1984, USDI Fish and Wildlife Service 1984, White and Thurow 1985, Palmer 1988, Johnsgard 1988, Johnsgard 1990, Dalton et al. 1990, Harmata 1991, USDI Fish and Wildlife Service 1995, Richardson and Miller 1997, Calif. Burr. Owl Cons. 1997).

Recommended buffers should be considered as optimal conditions intended to protect nesting and roosting under a wide range of activities. However, not every recommendation will be applicable for each site-specific condition or project. Land use planners should evaluate the type and duration of the proposed activity, position of topographic and vegetative features, habituation of breeding pairs to existing activities in the proposed project area, and the local raptor nesting density when determining site-specific buffers.

Nest and roost site recommendations are devised to:

- Provide reasonable levels of protection during the raptor nesting and wintering periods by applying appropriate spatial and seasonal buffers zones to nest and roost sites.

- Preclude impacts to nest sites where possible.

- Mitigate unavoidable impacts to nest sites.

Protection of both occupied and unoccupied nests is important since not all raptor pairs breed every year or utilize the same individual nest within a nesting territory (Scott 1985, Crocoll 1994, Bechard and Schmutz 1995, Bednarz 1995). Individual raptor nests left unused for a number of years are frequently reoccupied. Megown et al. (*paper in press*), reviewed the available literature and reports regarding nest use by raptors. Of the thirty species for which data was available, three species are not likely to use an old nest: northern harrier, Cooper's

hawk, and sharp-shinned hawk. There are six species for which there was no conclusive data: long-eared owl; western screech-owl; zone-tailed hawk; common barn owl; short-eared owl; and Mexican spotted owl. Limited information was available for seven raptor species: prairie falcon; merlin; red-shouldered hawk; red-tailed hawk; and great horned owl. The following twelve species have been studied in depth: northern goshawk, common black-hawk, Swainson's hawk, ferruginous hawk, osprey, golden eagle, bald eagle, American kestrel, peregrine falcon, flammulated owl, northern pygmy-owl, and burrowing owl.

Table 1. Longest recorded intervals between nest use periods.

Species	Interval (yrs)	Species	Interval (yrs)
Bald Eagle	17 years	Northern Goshawk	8 years
American Kestrel	15 years	Common Black-Hawk	9 years
Peregrine Falcon	30 years	Swainson's Hawk	7 years
Flammulated Owl	11 years	Ferruginous Hawk	3+ years
Northern Pygmy-Owl	11 years	Osprey	3+ years
Burrowing Owl	7 years	Golden Eagle	22 years

The importance of individual nest site(s) to overall population stability is unknown, but it is likely that individual sites are selected by breeding pairs for the preferred attributes provided at that location.

Occupied Nests are defined as those nests which are used for breeding in the current year by a pair. Presence of raptors (adults, eggs, or young), freshly molted feathers or plucked down, or current years' mute remains (whitewash) suggest site occupancy. Additionally, for the purposes of these guidelines, all breeding sites within a breeding territory are deemed occupied while raptors are demonstrating pair bonding activities and developing an affinity to a given area. If this culminates in an individual nest being selected for use by a breeding pair, then the other nests in the nesting territory will no longer be considered occupied for the current breeding season. A nest site remains occupied throughout the periods of initial courtship and pair-bonding, egg laying, incubation, brooding, fledging, and post-fledging dependency of the young.

Unoccupied Nests are defined as those nests not selected by raptors for use in the current nesting season. Nests would also be considered unoccupied for the non-breeding period of the year (**Table B.2**). The exact point in time when a nest becomes unoccupied should be determined by a qualified wildlife biologist based upon observations and that the breeding season has advanced such that nesting is not expected. Inactivity at a nest site or territory does not necessarily indicate permanent abandonment.

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Avoid and Minimize Impacts to Nests and Roost Sites

STEP 1: Determine Appropriate Buffers

Determine the appropriate species-specific spatial and seasonal buffer zones as presented in **Tables B.2 and B.3** for raptors that may be impacted by the proposed land use activity. Actual dates and size of buffers vary between and within States.

Nesting

Seasonal buffers represent the outermost dates known in each State for the arrival of adult birds at nesting territories through post-fledging dependency of the young. Actual dates for each stage of nesting can vary by region, elevation, and weather conditions, as well as by individual pairs. Routine, annual surveys of nesting localities may provide more precise onsite information regarding individual nests. Survey results should be clearly documented to augment available information on raptors. Biologists from the USFWS, state or tribal wildlife resources management agency, and/or land management agency should be consulted for site-specific nesting chronology which would allow adjustment of these recommended seasonal buffers.

Winter Roosting

Spatial buffer zones recommended for raptor nesting protection are also encouraged for activities occurring proximal to raptor winter concentration areas from *November through March*. We recommend maintaining a spatial buffer equal to one-half the radius of the recommended buffers for nests (**Table B.3**) unless site-specific topography or vegetation, which would provide visual screening or noise attenuation, allow for smaller buffers. Appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency biologists should be consulted prior to adjusting buffers for winter concentration areas.

Daily activities which must occur within recommended spatial buffers at winter night roost sites should be scheduled *after 0900 hours*, after which most raptors have vacated their roost. Likewise, daily activities should terminate *at least one hour prior to official sunset* to allow birds an opportunity to return to the roost site undisturbed (Call 1979). In Montana, temporal and special closures are recommended for winter roost sites for eagles from 15 October to 1 April (Montana Bald Eagle Working Group 1994).

STEP 2: Determine if Character of Activity Warrants Buffer Modification

Determine whether the type, magnitude, or duration of an activity would lead to different buffer applications based upon nesting chronology. Consider all direct, indirect, and cumulative impacts when making this determination. For example, if the temporary activities related to construction of a road would result in a new road with disturbance above baseline conditions, then buffer modifications would not be warranted. Consult **Table D.1.** for application of buffer recommendations to avoid and/or minimize human impacts to raptor nesting success from temporary, unavoidable incursions into recommended spatial buffers during the breeding season. Recommendations in the **Table D.1** are NONE, HALF, and

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FULL, referring to the proportion of the spatial buffer (as presented in **Table B.3**) recommended to minimize impacts from activities during the breeding season during progressive points in the nesting chronology.

Aircraft flight paths should also respect recommended spatial and seasonal buffer zones. Where intrusions within the recommended buffers must occur, flights should maintain an elevation of no less than 1,000 feet above ground level (AGL) and fly at speeds *no less than* 30 mph during overflights to minimize disturbance to raptors and raptor nest sites. Rather than prescribing flight paths, which could pose a human safety threat, we recommend notification to pilots of avoidance areas or 'bubbles' 1000 feet high and the width of the recommended species-specific spatial buffer.

STEP 3: Apply Information from Steps 1 & 2 to Nest Protections

Apply the information attained in Steps 1 and 2 to the following guidelines for occupied and unoccupied nest sites to avoid or minimize effects of proposed land use activities to nesting raptors:

Occupied Raptor Nests

If possible, activities should not occur within the spatial/seasonal buffer of any nest (occupied or unoccupied) when raptors are in the process of courtship and nest site selection. Egg laying, incubation, brooding, fledging, and post-fledging dependency periods should be protected by varying seasonal and spatial buffers (**Tables B.1-B.3**).

Short-term land use and human use activities should only proceed outside the seasonal buffer, when they are proposed to take place within the spatial buffer of an occupied nest. They should only proceed after coordination with appropriate USFWS, State or tribal wildlife resources management agency, and/or land management agency biologists. If, after coordination, it is determined that due to human or environmental safety or otherwise unavoidable factors, activities require temporary incursions within the spatial and seasonal buffers, those activities should be planned and monitored to minimize impacts (see **Table B.4**). Mitigation for habitat loss or degradation should be planned. Long-term land use activities and human use activities should not occur within the species-specific spatial buffer zone of occupied nests.

Unoccupied Raptor Nests

Recommendations regarding unoccupied nests are guidelines only, based upon the best available biological information. They are important when: nest substrates or nest site opportunities are limited for a raptor species of concern which is known to reuse nests; if a territory of such a species has few alternate nest sites; or if significant cumulative impacts have limited nesting opportunities for local area populations. If a nest site within a territory is deemed unoccupied after sufficient time has elapsed in a specified breeding season and prior to the beginning of the next year's breeding season, human activity could be allowed within the nesting area. This period varies dependent on raptor species.

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Short-term land use and human activities may progress near a nest or nest territory designated as unoccupied. For long-term land use activities, unoccupied nests of raptor species of concern should be conserved as recommended in **Table B.5**., or for the period a known preferred prey species fluctuates from population highs to lows. Unoccupied nests of species which are not raptor species of concern should be conserved for 2 years. At the end of the species-specific recommended period, each nest should be evaluated by a qualified wildlife biologist as to its potential future use. Criteria could include the raptor species current population trend in the local area; the corresponding prey species population levels and trends; past, current, and future impacts of the proposed action; and cumulative impacts from other projects in the area. Nests could also be considered permanently abandoned if the nest has been physically damaged past the point of repair by raptors.

STEP 4: Implement Post-Project and Post-Mitigation Monitoring

Establish and ensure implementation of post-project and post-mitigation monitoring plans to determine possible impacts to the populations of raptor identified in the pre-project planning as well as success of mitigation measures. Monitoring should include documentation of raptor nesting success, use of historical roost concentration areas, recovery of habitat, and, when feasible, recovery of affected prey base when the identified raptor species are prey-specialists.

Determine Existence and Applicability of Permits for Unavoidable Impacts

Situations may arise where human activity must occur within recommended spatial and seasonal buffers provided for raptors. It is important, whenever possible, to have predicted during early planning the potential for this type of situation, in order to determine whether a permit exists or would be required or authorized. For instance, a raptor may decide to construct a new nest in an area already threatened by mining subsidence or within an area previously unused by raptors and scheduled for development. However, there are no existing permits for these examples of take that occurs during the carrying out of an otherwise lawful activity. Therefore, it is critical in these circumstances to be able to provide evidence of concerted efforts to: avoid impacts to individuals and nests; and conserve local area populations. In addition, when taking of nests **with eggs or young** is determined necessary for health and human safety, application for Federal and State permits can and must be made through the appropriate authorities. Taking of a golden eagle nest, currently only available for resource recovery activities and only for inactive nests, always requires a permit under Eagle Act. For instance, fencing of a cliff and nest to keep golden eagles from occupying and reproducing during anticipated coal mine-related cliff subsidence requires a permit. Coordination with appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency biologists should occur to ensure compliance with State and Federal wildlife regulations.

Federal Permits

If deemed appropriate or available for the circumstance, Migratory Bird permits and Eagle Act permits must be obtained through the USFWS Migratory Bird Permit Office for take of raptor nests with eggs or young (50 CFR 13, 21-22, USFWS Nest Destruction Policy, April 15, 2003). The USFWS will determine upon application whether there is a valid justification

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for the permit. A list of reasons for permits not to be issued can be found under 50 CFR 13.21. For instance 50 CFR 13.21 (b) (4) states that permits will not be issued if they would potentially threaten a wildlife or plant population. Permits may be revoked as listed under 50 CFR 13.28. Particular to this document, 50 CFR 13.28 (a) (5) states that a permit may be revoked if continuation of the permitted activity for the subject wildlife or plant would be detrimental to maintenance or recovery of the affected population. Golden eagle nests may only be taken for resource recovery activities when they are inactive[d] and only if the taking is compatible with the preservation of the area nesting population [50 CFR 22.25(c)]. The applicant is responsible for determining population level and habitat impacts of the proposed project and developing mitigation measures. For instance, mitigation measures may include reclaiming disturbed land to enhance golden eagle nesting and foraging habitat as per 50 CFR 22.25 (a) (9).

State or Tribal Permits

Take of protected wildlife may not be allowed without having obtained necessary state or tribal permits and/or certificates or registration. Contact the respective wildlife resource management agency to determine state permitting requirements and to determine, upon application, whether there is a valid justification for the permit.

Mitigate Unavoidable Impacts

Mitigation Techniques

Examples of techniques to mitigate unavoidable impacts to raptors and their habitats follow. These recommendations are not all-inclusive of available strategies, but provide a framework for land use planners to follow. In addition, the categories of techniques are presented in the order in which they should be considered. Project proponents should coordinate with the USFWS, or the state or tribal wildlife resources management agency to select management recommendations and/or develop other techniques based on the raptor species, the project and its potential impacts. Success of these techniques is generally varied and somewhat dependent on the species, individual raptors, individual breeding pairs, and type of disturbance:

Reduce line-of-sight disturbance factors

Coordinate with USFWS, the state or tribal wildlife resources management agency, and/or resource management wildlife biologists, as well as other program specialists and engineers to determine or design the most practicable methods to reduce the potential for line-of-sight disturbances. Recommended steps include:

- Conduct a line-of-sight analysis from the nest, roost, or concentration area to all areas within the species-recommended spatial buffer. Use of Visual Resource Management

[d] Inactive nest in this context means a golden eagle nest that is not currently used by golden eagles as determined by the absence of any adult, egg, or dependent young at the nest during the 10 days before the nest is taken (50 CFR 22.3).

tools or three-dimensional analysis in a GIS package can be a first step, followed by a detailed onsite analysis.

- Locate activities and facilities outside the determined line of sight.

- Minimize impact of energy development by employing the following, as practicable and applicable.

  - Use low-profile or ultra-low structures such as tanks or pumps.

  - Co-locate wells.

  - Use directional drilling.

  - Employ centralized tank batteries.

  - Use remote monitoring to minimize inspection visits.

Including and in addition to the preceding measures for oil and gas operations, the Minerals, Realty, and Resource Protection Directorate, Division of Fluid Minerals, of the Washington Office of the BLM Fluid Minerals Group has developed best management practices for oil and gas operators (http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html), which are intended to minimize impacts to wildlife and wildlife habitat. In addition, we recommend use of the Oil and Gas Development Guidelines developed by the New Mexico Department of Game and Fish. They are extensive, offer more detail than this document, and can be acquired via their website: http://www.wildlife.state.nm.us/documents/oilandgasguidelines.pdf

Relocation of young and nests

Extensive coordination with USFWS, the state wildlife resources management agency**,** and/or resource management wildlife biologists is highly encouraged when attempting relocation of young and nests of raptors. Techniques involving relocation of raptor young and nests have been successfully accomplished for some species and are intended to maintain a breeding pair's use of their home range despite disturbance or loss of the traditional nest site (Postovit et al. 1982). The following recommendations from Postovit and Postovit (1987) have been provided to foster successful relocation efforts. Migratory bird permits must be obtained from the USFWS prior to the relocation of nests that contain young or eggs or prior to possessing a nest during transport to a new location**:**

- Determine a raptor pair's home range and movement patterns.

- Select a relocation site as far from disturbance as possible, but within the home range and near preferred use areas such as roosts, perches, and foraging sites.

- Line of sight visibility to original nest sight should be considered. If distant or not visible from original nest, the relocation may be made in stages with a mobile platform. Moves greater than 1/4 mile distant from the original nest are not recommended. Selection of previously used nest locations or natural substrates for relocation is preferred.

- Establish new nest sites at least two years prior to planned relocation to allow acclimation by the adult birds.

- Schedule nest relocations to occur outside the raptor's breeding season.

- Nestlings should only be moved when they are one-half way through the nestling period since they no longer require continuous brooding by the adults.

Deterring use of an existing nest

(Although allowed under 50 CFR 21.41 (a) if it does not result in take, we do not recommend this practice except in extreme circumstances)

Extensive coordination with USFWS, state or tribal wildlife resources management agency, and/or resource management wildlife biologists is necessary when attempting to discourage use of an existing nest by raptors. Deterrence measures are restricted to non-lethal methods intended to prevent nesting in areas under active development and at nests where destruction or high levels of disturbance are likely to occur. Nesting raptors should be afforded complete protection until fledging of young is completed. Deterrence is not always successful; consideration should be given to whether other potential nests or nests sites are available within the area. In addition, monitoring should be conducted to ensure deterrence is effective and the birds do not attempt to nest on deterrence structures. Postovit and Postovit (1987) recommended the following deterrence methods:

- Block access to nests with welded wire to prevent egg-laying.

  - Blocking access to nests has resulted in breeding pairs building new nest sites, usurping nests, and accepting existing alternate nests (Parrish et al. 1994). At a coal mine in southeastern Utah, a golden eagle pair succeeded at removing the nesting material from beneath the wire cage, to rebuild the nest at a nearby location (B. Bates, UDWR, 1998, pers. comm.).

- Remove nest starts or rendering a nesting substrate unusable, in cases where a nest with eggs or young is likely to be lost during the breeding season due to an unavoidable impact.

- Create repeated disturbance using loud noises.

  - Some wildlife may become habituated over time to loud noises or scare tactics, so this may provide only short-lived deterrence.

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Habituating raptors to increased disturbance or noise levels

Beginning land use, human activities, or construction prior to the breeding season will allow a pair of raptors to "choose" whether the nest site is still acceptable considering the disturbance. Warning sirens at regular intervals have also been used to alert raptor pairs to potentially startling noises such as blasting. This technique has generally been used where there is no acceptable alternative to the proposed action. While loss of the nest site may occur, the goal of this technique is to avoid the loss of eggs or young and allow the adults an opportunity to select an alternate nesting site.

Monitoring and documentation of results is recommended following any of the aforementioned techniques to maximize success of efforts. Publishing data and results should also be considered to widely circulate information regarding success of raptor mitigation techniques.

Collect Meaningful Data in a Consistent Manner and Format; Share with Appropriate Agencies

The Raptor Guidelines were developed to provide an advisory framework for consistent and effective raptor management on a project-specific, landscape, and regional basis. Ensuring effective raptor management requires the ability to review and analyze the data collected for actions taken while implementing these guidelines. An adequate assessment of the relative importance of potential impacts from individual proposals depends upon adequate baseline information from surveys extending beyond the area of proposed land use change.

In 1978, the USFWS published the outcome of a multi-agency, multi-disciplinary effort (States et al.) to provide a comprehensive guideline for ecological baseline studies for energy development projects. The manual, A Systems Approach to Ecological Baseline Studies, was a primer for modeling, measuring, and analyzing ecosystem parameters to inform the decision and facilitate post-development monitoring of impacts. Citing States et al. (1978), Kennedy (1980) recognized the need to include raptors in environmental baseline studies, but noted the need to gather more than: lists of raptor species, general statements of seasonal and annual distributions, indices of relative abundance of observed species, and general statements of nesting success and habitat requirements. Recommendations to describe local raptor populations included: species composition on the development area, each species' productivity, and the expected yearly changes in species' population size and productivity (Kennedy 1980).

A minimal strategy land management agencies can use for accumulating baseline data can consist of surveys for data to use for occupancy-based modeling (e.g., MacKenzie et al. 2005, *Occupancy Estimation and Modeling*, Academic Press/Elsevier). Results from such an effort can be used to predict raptor occurrence in areas in which to conduct more intensive on-the-ground surveys for addressing the objectives of assessing potential effects of changes. The design of a survey must provide a reasonable sample of the areas of interest, accounting for the vegetation associated with the relevant species. The survey design should employ random or stratified sampling, and include gathering data over the period during which the changes

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are made and a subsequent period to assess the long-term effects of change and of management to minimize negative effects.

More intensive monitoring can be expensive, and data adequacy and relevance to the questions being asked are crucial. However, determinations of abundance, nesting success, and productivity can provide valuable information regarding the status of raptor population. Adoption of standard terminology and use of common statistical methods will contribute to national and regional efforts to integrate datasets (Bart 2005, Steenhof and Newton 2007). Such programs should be developed in coordination with state wildlife agencies, USFWS, and USGS.

To ensure maximum effectiveness, document the process, including site-specific data, in a consistent manner (see **Appendix G** for suggested form). Use a format which will facilitate data-sharing with the respective state wildlife agencies or natural heritage programs and with national data collecting and database efforts such as the Intermountain West Coordinated Bird Monitoring Project or with the project lead for the Continental Raptor Monitoring Strategy (see **Appendix H**). Data collection should be designed both to meet administrative requirements and to contribute to efforts to conduct landscape-scale analyses of species information, impacts from actions, and mitigation effectiveness.

Contracts and statements of work for proponents and contractors should specify data collection standards for deliverables. The permitting agency should submit or ensure contracts require submission of, in a readily usable format, the reports or data generated to the respective state or tribal wildlife agencies or natural heritage programs.

Data acquisition relative to raptors and management actions should continue during and post-project implementation. This will provide useful information regarding the efficacy of mitigation, or the accuracy of predicted impacts if mitigation was not implemented. Within the context of an adaptive management approach (Williams et al. 2007), agencies may want to include additional measurable metrics in order to evaluate management decisions.

CONCLUSION

It has been the intent of these guidelines to provide USFWS staff and land use planners with the tools to develop successful raptor management approaches and effective mitigation strategies for disturbances from land use activities. Raptor survey information obtained through implementation of these guidelines will also provide a means to track raptor population trends and document population responses to human use of their environments.

Research regarding raptor responses to human activities and land use is not comprehensive, particularly with respect to long-term population responses to habitat degradation. However, the literature indicates that under many circumstances, human land use patterns can have a negative affect on individual raptors and raptor populations. The concern is compounded when cumulative effects of various land use activities are considered. It is likely that some threshold level of land use could be reached in a given area beyond which raptor and other wildlife populations could be seriously impacted.

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The guidelines have presented suggestions for protection of raptor life stages (i.e., nesting and wintering) as well as raptor habitats. The suggestions are hardly exhaustive of available protective strategies, nor are all suggestions intended to be incorporated on every proposed project. Coordination with appropriate USFWS, state or tribal wildlife resources management agency, and/or land management agency biologists is important during the analysis of project impacts and selection of protective measures.

Project proponents should seek first to avoid or minimize impacts. Where there are inevitable losses or degradations of habitat or disturbance to individual birds, mitigation can be incorporated to lessen the impact. Overall, these guidelines have been designed to maintain viable raptor populations amid continued human use of the environment.

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Appendix A

Raptor Species of Concern

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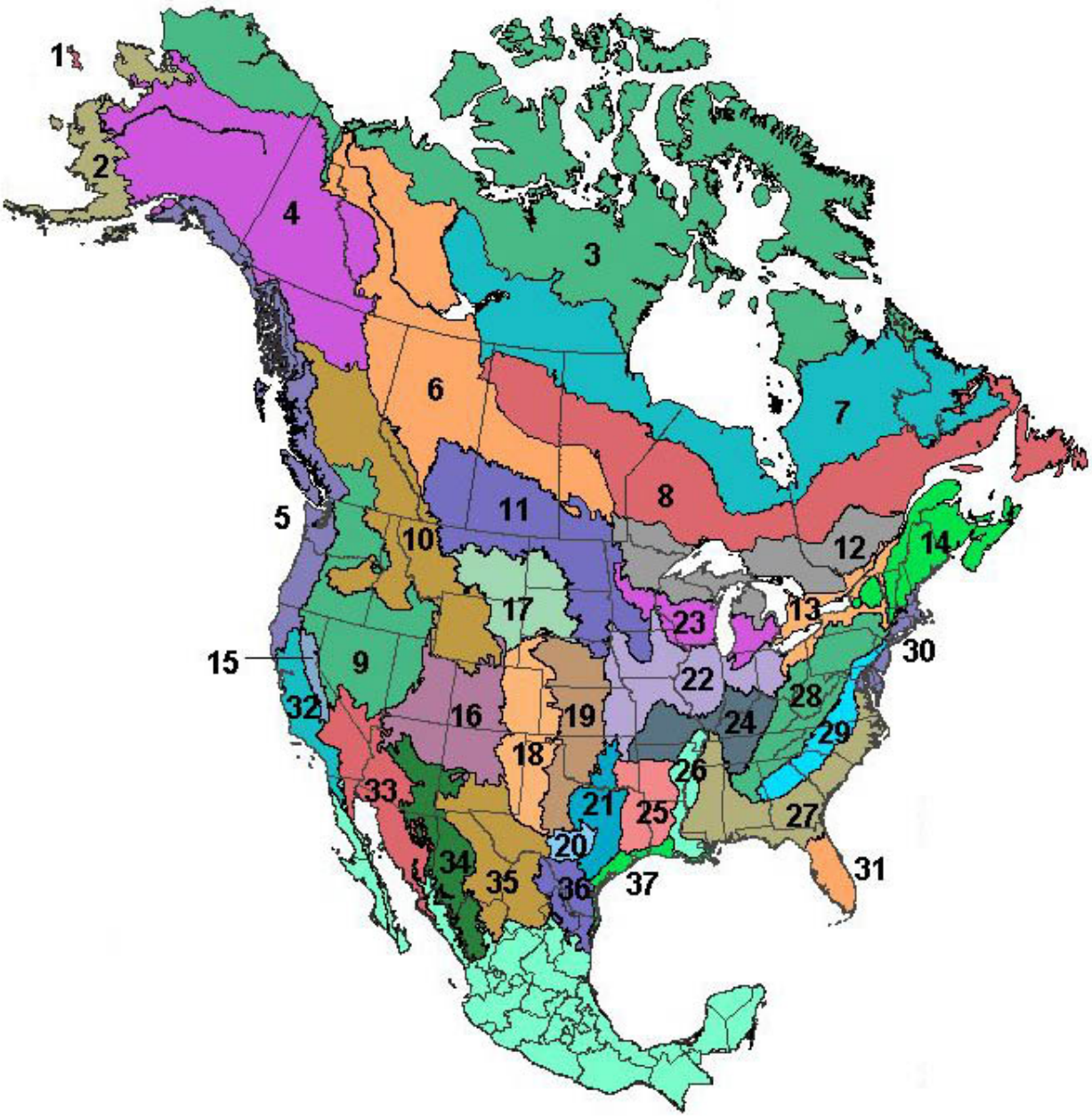
The tables with USFWS Raptor Priority Lists for the Western United States (Regions 1, CNO, 2, 6, and 7) were developed to assist the planner in prioritizing mitigation efforts. They are listed by state and by the Bird Conservation Regions (BCRs) found in each state. The states appearing in bold are those with a USFWS Ecological Services Office commitment to adopt the Guidelines. The states in the USFWS regions are as follows: R1), Idaho, , Oregon, and Washington, CNO) California and Nevada, R2) Arizona, New Mexico, Oklahoma, and Texas, R6) Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming, and R7) Alaska.



Map of Bird Conservation Regions in North America (http://www.nabci-us.org/map.html), for use with tables in **Appendix A**. A key to the regions is on the next page.

Key to North American Bird Conservation Regions Occurring in the U.S (bolded regions include areas addressed in this document).

1. Aleutian/Bering Sea Islands
2. Western Alaska
3. Arctic Plains and Mountains
4. Northwestern Interior Forest
5. Northern Pacific Rainforest
6. Boreal Taiga Plains
7. Taiga Shield and Hudson Plains
8. Boreal Softwood Shield
9. Great Basin
10. Northern Rockies
11. Prairie Potholes
12. Boreal Hardwood Transition
13. Lower Great Lakes/St. Lawrence Plain
14. Atlantic Northern Forest
15. Sierra Nevada
16. Southern Rockies/Colorado Plateau
17. Badlands and Prairies
18. Shortgrass Prairie
19. Central Mixed-grass Prairie
20. Edwards Plateau
21. Oaks and Prairies
22. Eastern Tallgrass Prairie
23. Prairie Hardwood Transition
24. Central Hardwoods
25. West Gulf Coastal Plain/Ouachitas
26. Mississippi Alluvial Valley
27. Southeastern Coastal Plain
28. Appalachian Mountains
29. Piedmont
30. New England/Mid-Atlantic Coast
31. Peninsular Florida
32. Coastal California
33. Sonoran and Mohave Deserts
34. Sierra Madre Occidental
35. Chihuahuan Desert
36. Tamaulipan Brushlands
37. Gulf Coastal Prairie

On the NABCI web page, the images of the individual BCRs are hot-linked to information pages on each BDR. There are also hot-links to the bird plans relevant to each BCR.

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Table A.1.a.

USFWS BCC (2002) Species[a]		BCR REGION					
		1-Aleutian/Bering Sea Islands	**2-Western Alaska**	**3-Arctic Plains and Mountains (US portion only)**	**4-Northwestern Interior Forest (US portion only)**	**5-Northern Pacific Rainforest (US portion only)**	**15-Sierra Nevada**
		Alaska	Alaska	Alaska	Alaska	Alaska, Washington, Oregon, California	California
Falconiformes							
Bald eagle	*Haliaeetus leucocephalus*	*	*	*	*	*	*
Northern goshawk	*Accipiter gentilis ssp. laingii*					x	
Peregrine falcon	*Falco peregrinus ssp. pealei*	x				x	
Peregrine falcon	*Falco peregrinus*		x	x	x	x	x
Strigiformes							
Flammulated owl	*Otus flammeolus*					x	x

a The goal of the USFWS Birds of Conservation Concern 2002 is to prevent or remove the need for additional Endangered Species Act (ESA) bird listings by implementing proactive management and conservation actions. The list derives primarilly from conservation assessment scores fomr three different bird conservation initiatives: Partners in Flight (PIF) Assessment Scores; U.S. Shorebird Conservation Plan (USSCP); and the North American Waterbird Conservation Plan (NAWCP). All three plans used the same seven rating factors, with slightly different criteria: breeding distribution; non-breeding distribution; relative abundance; threats in breeding season; threats in non-breeding season; population trend; and area importance. The lists are presented at three geographic scales, North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), USFWS Regions, and National. This table includes species from the BCR lists.

b Because it was recently delisted from the endangered Species Act, the bald eagle will be evaluated for inclusion on the 2007 Birds of Conservation Concern list. As of the date of this draft, September 2007, it is known that the bald eagle will be included, but not for which BCRs. Therefore, we are denoting it as on the National list, with an asterisk in each BCR.

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Table A.1.b.

USFWS BCC (2002) Species[a]		BCR REGION						National List
		9-Great Basin	10-Northern Rockies (US portion only)	11-Prairie Potholes (US portion only)	16-Southern Rockies/Colorado Plateau	17-Badlands and Prairies	18-Shortgrass Prairie	
		(Utah, Idaho, Washington, Oregon, Nevada, California)	(Colorado, Montana, Utah, Wyoming, Idaho)	(Montana)	(Colorado, Utah, Wyoming, Idaho)	(Montana, Wyoming, N. Dakota, S. Dakota, Nebraska)	(Colorado, Wyoming)	
Falconiformes								
Bald eagle[b]	*Haliaeetus leucocephalus*	*	*	*	*	*	*	x
Northern harrier	*Circus cyaneus*			x	x		x	x
Swainson's hawk	*Buteo swainsoni*	x	x	x	x			x
Ferruginous hawk	*Buteo regalis*	x	x	x	x	x	x	x
Golden eagle	*Aquila chrysaetos*	x	x		x	x		
Peregrine falcon	*Falco peregrinus*	x	x	x	x	x	x	x
Prairie falcon	*Falco mexicanus*	x	x		x	x		x
Strigiformes								
Flammulated owl	*Otus flammeolus*	x	x		x			x
Elf owl	*Micrathene whitneyi*							
Burrowing owl	*Athene cunicularia*	x		x	x	x	x	x
Short-eared owl	*Asio flammeus*			x	x	x		x

a The goal of the USFWS Birds of Conservation Concern 2002 is to prevent or remove the need for additional Endangered Species Act (ESA) bird listings by implementing proactive management and conservation actions. The list derives primarilly from conservation assessment scores fomr three different bird conservation initiatives: Partners in Flight (PIF) Assessment Scores; U.S. Shorebird Conservation Plan (USSCP); and the North American Waterbird Conservation Plan (NAWCP). All three plans used the same seven rating factors, with slightly different criteria: breeding distribution; non-breeding distribution; relative abundance; threats in breeding season; threats in non-breeding season; population trend; and area importance. The lists are presented at three geographic scales, North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), USFWS Regions, and National. This table includes species from the BCR and National lists.

b Because it was recently delisted from the Endangered Species Act, the bald eagle will be evaluated for inclusion on the 2007 Birds of Conservation Concern list. As of the date of this draft, September 2007, it is known that the bald eagle will be included, but not for which BCRs. Therefore, we are denoting it as on the National list, with an asterisk in each BCR.

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Table A.1.c.

USFWS BCC (2002) Species[a]		BCR REGION					
		19-Central Mixed-grass Prairie	**20-Edwards Plateau**	**21-Oaks and Prairies**	**22-Eastern Tallgrass Prairie**	**24-Central Hardwoods**	**25-West Gulf Coastal Plain/Ouachitas**
		S. Dakota, Nebraska, Kansas, Oklahoma, Texas	Texas	Texas, Oklahoma	S. Dakota, Nebraska, Kansas, Oklahoma	Oklahoma	Oklahoma, Texas
Falconiformes							
Bald eagle	*Haliaeetus leucocephalus*	*	*	*	*	*	*
Swallow-tailed kite	*Elanoides forficatus*						x
Mississippi kite	*Ictinia mississippiensis*	x					
Northern harrier	*Circus cyaneus*	x		x			
Swainson's hawk	*Buteo swainsoni*	x					
American kestrel	*Falco sparverius ssp. paulus*						x
Peregrine falcon	*Falco peregrinus*	x	x	x	x	x	x
Strigiformes							
Elf owl	*Micrathene whitneyi*		x				
Short-eared owl	*Asio flammeus*				x	x	x

a The goal of the USFWS Birds of Conservation Concern 2002 is to prevent or remove the need for additional Endangered Species Act (ESA) bird listings by implementing proactive management and conservation actions. The list derives primarily from conservation assessment scores fomr three different bird conservation initiatives: Partners in Flight (PIF) Assessment Scores; U.S. Shorebird Conservation Plan (USSCP); and the North American Waterbird Conservation Plan (NAWCP). All three plans used the same seven rating factors, with slightly different criteria: breeding distribution; non-breeding distribution; relative abundance; threats in breeding season; threats in non-breeding season; population trend; and area importance. The lists are presented at three geographic scales, North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), USFWS Regions, and National.

b Because it was recently delisted from the Endangered Species Act, the bald eagle will be evaluated for inclusion on the 2007 Birds of Conservation Concern list. As of the date of this draft, September 2007, it is known that the bald eagle will be included, but not for which BCRs. Therefore, we are denoting it as on the National list, with an asterisk in each BCR.

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Table A.1.d.

USFWS BCC (2002) Species		BCR REGION					
		32-Coastal California (US portion only)	**33-Sonoran & Mojave Deserts (US portion only)**	**34-Sierra Madre Occidental (US portion only)**	**35-Chihuahuan Desert (US portion only)**	**36-Tamaulipan Brushlands (US portion only)**	**37-Gulf Coastal Prairie (US portion only)**
		California	(Utah, Nevada, California, Arizona)	Arizona, New Mexico	New Mexico, Texas	Texas	Texas
Falconiformes							
Bald eagle	*Haliaeetus leucocephalus*	*		*	*	*	*
Northern harrier	*Circus cyaneus*				x	x	x
Northern goshawk	*Accipiter gentilis*			x			
Common black-hawk	*Buteogallus anthracinus*			x	x		
Harris's hawk	*Parabuteo unicinctus*					x	
Gray hawk	*Buteo nitidus*			x			
Swainson's hawk	*Buteo swainsoni*	x				x	
White-tailed hawk	*Buteo albicaudatus*						x (TX only)
Ferruginous hawk	*Buteo regalis*			x	x		
Peregrine falcon	*Falco peregrinus*	x	x	x	x	x	x
Prairie falcon	*Falco mexicanus*	x					
Strigiformes							
Flammulated owl	*Otus flammeolus*	x		x	x		
Whiskered screech-owl	*Megascops trichopsis*			x			
Ferruginous pygmy owl	*Glaucidium brasilianum*					x	x (TX only)
Elf owl	*Micrathene whitneyi*		x	x	x	x	
Burrowing owl	*Athene cunicularia*	x	x		x	x	x
Spotted owl	*Strix occidentalis*	x					
Short-eared owl	*Asio flammeus*						x

a The goal of the USFWS Birds of Conservation Concern 2002 is to prevent or remove the need for additional Endangered Species Act (ESA) bird listings by implementing proactive management and conservation actions. The list derives primarilly from conservation assessment scores fomr three different bird conservation initiatives: Partners in Flight (PIF) Assessment Scores; U.S. Shorebird Conservation Plan (USSCP); and the North American Waterbird Conservation Plan (NAWCP). All three plans used the same seven rating factors, with slightly different criteria: breeding distribution; non-breeding distribution; relative abundance; threats in breeding season; threats in non-breeding season; population trend; and area importance. The lists are presented at three geographic scales, North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCRs), USFWS Regions, and National.

b Because it was recently delisted from the Endangered Species Act, the bald eagle will be evaluated for inclusion on the 2007 Birds of Conservation Concern list. As of the date of this draft, September 2007, it is known that the bald eagle will be included, but not for which BCRs. Therefore, we are denoting it as on the National list, with an asterisk in each BCR.

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Table A.1.e.

Raptor Species Listed under the Endangered Species Act (ESA) of 1973[b]		
		State
Falconiformes		
Northern aplomado falcon	*Falco femoralis*	NM, TX
Strigiformes		
Northern spotted owl	*Strix occidentalis caurina*	CA, OR, WA
Mexican spotted owl	*Strix occidentalis lucida*	AZ, CO, NM, TX, UT

b The factors for listing a species as threatened or endangered are: the present or threatened destruction, modification, or curtailment of the species' habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; other natural or manamade factors affecting the species' survival.

Table A.2. Raptor Species on the Navajo Endangered Species List (NESL)		
Species		**Rank[a]**
Falconiformes		
Northern goshawk	*Accipiter gentilis*	G4
Ferruginous hawk	*Buteo regalis*	G3
Golden eagle	*Aquila chrysaetos*	G3
Peregrine falcon	*Falco peregrinus*	G4
Strigiformes		
Flammulated owl	*Otus flammeolus*	G4
Burrowing owl	*Athene cunicularia*	G4
Mexican spotted owl	*Strix occidentalis lucida*	G3
Northern saw-whet owl	*Aegolius acadicus*	G4
Northern pygmy-owl	*Glaucidium gnoma*	G4

a Ranks on the NESL are ordered in the following Groups: G1) species which no longer occur on the Navajo Nation; (G2 & G3 are "Endangered"), G2) species or subspecies whose prospects of survival or recruitment are in jeopardy; G3) Species or subspecies whose prospects of survival or recruitement are likely to be in jeopardy in the foreseeable future; and G4) any species or subspecies for which the Navajo nation Department of Fish and Wildlife (NNDFW) does not currently have sufficient information to support their being listed in G2 or G3 but has reason to consider them.

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STATE PRIORITY LISTS

Initial Four Ecological Services State Offices in Region 6 Adopting Guidelines

Table A.3.a.

Partners in Flight Priority or Focal Species[c]		Colorado	Montana	Utah	Wyoming
Falconiformes					
Bald eagle	*Haliaeetus leucocephalus*		x		x
Northern harrier	*Circus cyaneus*	x	x	x	
Sharp-shinned hawk	*Accipiter striatus*		x		
Northern goshawk*	*Accipiter gentilis*		x		x
Swainson's hawk	*Buteo swainsoni*	x	x	x	x
Ferruginous hawk	*Buteo regalis*	x	x	x	x
Golden eagle	*Aquila chrysaetos*				x
Merlin	*Falco columbarius*				x
Peregrine falcon	*Falco peregrinus*	x	x	x	x
Prairie falcon	*Falco mexicanus*	x		x	x
Strigiformes					
Flammulated owl	*Otus flammeolus*	x	x		
Western screech-owl	*Megascops kennicottii*		x		x
Eastern screech-owl	*Megascops asio*		x		x
Burrowing owl	*Athene cunicularia*	x	x	x	x
Mexican spotted owl**	*Strix occidentalis lucida*	x			
Great gray owl	*Strix nebulosa*		x		x
Short-eared owl	*Asio flammeus*	x	x	x	x
Boreal owl	*Aegolius funereus*		x		x

*** Conservation agreement species in Utah (http://www.fs.fed.us/r4/goshawk/strategy-wo-lp-as.pdf)**

**** Federally listed under the Endangered Species Act (ESA) of 1973, as amended**

c Information on the Partners in Flight program can be found at www.partnersinflight.org; and the Partners in Flight Avian Conservation Plans can be found via that site or directly at : http://www.blm.gov/wildlife/pifplans.htm

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STATE PRIORITY LISTS

Table A.3.b.

Species in State Wildlife Action Plans of Greatest or Moderate Conservation Need[d]		Colorado	Montana	Utah	Wyoming
Falconiformes					
Osprey	*Pandion haliaetus*	x			
Bald eagle	*Haliaeetus leucocephalus*	x	x	x	x
Northern harrier	*Circus cyaneus*	x	x		
Sharp-shinned hawk	*Accipiter striatus*		x		
Cooper's hawk	*Accipiter cooperii*		x		
Northern goshawk*	*Accipiter gentilis*	x	x	x	x
Swainson's hawk	*Buteo swainsoni*	x	x		x
Ferruginous hawk	*Buteo regalis*	x	x	x	x
Golden eagle	*Aquila chrysaetos*	x	x		
Merlin	*Falco columbarius*		x		x
Peregrine falcon	*Falco peregrinus*	x	x		x
Prairie falcon	*Falco mexicanus*	x	x		
Strigiformes					
Flammulated owl	*Otus flammeolus*	x	x		
Northern pygmy-owl	*Glaucidium gnoma*		x		x
Burrowing owl	*Athene cunicularia*	x	x	x	x
Mexican spotted owl**	*Strix occidentalis lucida*	x		x	
Barred owl	*Strix varia*		x		
Great gray owl	*Strix nebulosa*		x		x
Short-eared owl	*Asio flammeus*	x			x
Boreal owl	*Aegolius funereus*	x	x	x	x
Northern saw-whet owl	*Aegolius acadicus*		x		

*** Conservation agreement species in Utah**

**** Federally listed under the Endangered Species Act (ESA) of 1973, as amended**

d The State Wildlife Action Plans (available at : www.wildlifeactionplans.org) were developed, at the charge of Congress, in order to make the best use of the federal funds provided through the Wildlife Conservation and Restoration Program and State Wildlife Grants Program, administered by the USFWS. Criteria for placing species on the list include: low populations; formally identified as a conservation priority; or showed other signs of imminent decline. A major component of plans is the definition and prioritization of essential habitats.

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STATE PRIORITY LISTS

Table A.3.c.

Partners in Flight Priority or Focal Species[c]		Alaska	OR/WA	California	Nevada	Idaho
Falconiformes						
White-tailed kite	*Elanus leucurus*			x		
Northern harrier	*Circus cyaneus*		x	x		
Sharp-shinned hawk	*Accipiter striatus*					x
Cooper's hawk	*Accipiter cooperii*		x		x	
Northern goshawk	*Accipiter gentilis*				x	x
Red-shouldered Hawk	*Buteo lineatus*		x			
Swainson's hawk	*Buteo swainsoni*		x	x	x	x
Ferruginous hawk	*Buteo regalis*		x	x	x	x
Golden eagle	*Aquila chrysaetos*					x
American kestrel	*Falco sparverius*		x			
Gyrfalcon	*Falco rusticolus*	x				
Prairie falcon	*Falco mexicanus*		x		x	x
Strigiformes						x
Flammulated owl	*Otus flammeolus*			x	x	x
Western screech-owl	*Megascops kennicottii*	x	x			
Snowy owl	*Bubo scandiacus*	x				
Burrowing owl	*Athene cunicularia*		x	x	x	
Great gray owl	*Strix nebulosa*	x				
Short-eared owl	*Asio flammeus*				x	x
Boreal owl	*Aegolius funereus*	x				

c Information on the Partners in Flight program can be found at www.partnersinflight.org; and the Partners in Flight Avian Conservation Plans can be found via that site or directly at : http://www.blm.gov/wildlife/pifplans.htm

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STATE PRIORITY LISTS

Table A.3.d.

Species in State Wildlife Action Plans of Greatest or Moderate Conservation Need[d]		Alaska	Oregon	Washington	*California*[e]	Nevada	Idaho
Falconiformes							
Osprey	*Pandion haliaetus*	x					
Bald eagle	*Haliaeetus leucocephalus*	x	x	x	x	x	x
Northern harrier	*Circus cyaneus*						
Cooper's hawk	*Accipiter cooperii*					x[f]	
Northern goshawk	*Accipiter gentilis*	x	x	x		x	
Queen Charlotte goshawk							
Swainson's hawk	*Buteo swainsoni*		x		x	x	x
Rough-legged hawk	*Buteo lagopus*	x					
Ferruginous hawk	*Buteo regalis*		x	x		x	x
Golden eagle	*Aquila chrysaetos*						
Merlin	*Falco columbarius*	x					x
Gyrfalcon	*Falco rusticolus*	x					
Peregrine falcon (American)	*Falco peregrinus anatum*	x		x	x	x	x
Peregrine falcon (Arctic)	*Falco peregrinus tundrius*				x		
Prairie falcon	*Falco mexicanus*			x		x[f]	
Strigiformes							
Flammulated owl	*Otus flammeolus*		x	x		x[f]	x
Western screech-owl	*Megascops kennicottii*	x					
Great horned owl	*Bubo virginianus*	x					
Snowy owl	*Bubo scandiacus*	x					
Northern pygmy-owl	*Glaucidium gnoma*	x				x[f]	
Elf owl	*Micrathene whitneyi*				x		
Burrowing owl	*Athene cunicularia*		x	x			x
California spotted owl	*Strix occidentalis*					x	
Northern spotted owl**	*Strix occidentalis caurina*		x	x	x		
Great gray owl	*Strix nebulosa*	x	x	x	x		
Short-eared owl	*Asio flammeus*		x			x	x
Boreal owl	*Aegolius funereus*	x					x
Northern saw-whet owl	*Aegolius acadicus*	x					

**** Federally listed under the Endangered Species Act (ESA) of 1973, as amended**

d The State Wildlife Action Plans (available at : www.wildlifeactionplans.org) were developed, at the charge of Congress, in order to make the best use of the federal funds provided through the Wildlife Conservation and Restoration Program and State Wildlife Grants Program, administered by the USFWS. Criteria for placing species on the list include: low populations; formally identified as a conservation priority; or showed other signs of imminent decline. A major component of plans is the definition and prioritization of essential habitats.

e There are no raptors in the California State Wildlife Action Plan. Included here are the raptor species which are on the state list of threatened or endangered species

f Raptor species considered Stewardship Species in Nevada's Wildlife Action Plan

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STATE PRIORITY LISTS

There are no additional state-specific lists for PIF priority species. To view priority species by PIF physiographic regions, go to http://www.blm.gov/wildlife/pifplans.htm

Table A.3.e.

Species in State Wildlife Action Plans of Greatest or Moderate		North Dakota	South Dakota	Nebraska	Kansas
Falconiformes					
Osprey	*Pandion haliaetus*		x		
Bald eagle	*Haliaeetus leucocephalus*	x	x	x	x
Northern harrier	*Circus cyaneus*	x			
Northern goshawk*	*Accipiter gentilis*		x		
Swainson's hawk	*Buteo swainsoni*	x			x
Ferruginous hawk	*Buteo regalis*	x	x	x	x
Golden eagle	*Aquila chrysaetos*	x			x
Peregrine falcon	*Falco peregrinus*		x		x
Prairie falcon	*Falco mexicanus*	x			
Strigiformes					
Common barn owl	*Tyto alba*			x	x
Burrowing owl	*Athene cunicularia*	x	x	x	x
Short-eared owl	*Asio flammeus*	x		x	x
Barred owl	*Strix varia*			x	

d The State Wildlife Action Plans (available at : www.wildlifeactionplans.org) were developed, at the charge of Congress, in order to make the best use of the federal funds provided through the Wildlife Conservation and Restoration Program and State Wildlife Grants Program, administered by the USFWS. Criteria for placing species on the list include: low populations; formally identified as a conservation priority; or showed other signs of imminent decline. A major component of plans is the definition and prioritization of essential habitats.

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Table A.3.f.

Species in State Wildlife Action Plans of Greatest or Moderate Conservation Need[d]		Arizona	New Mexico	Oklahoma	Texas
Falconiformes					
Osprey	*Pandion haliaetus*	x	x		
Bald eagle	*Haliaeetus leucocephalus*	x	x	x	x
Swallow-tailed kite	*Elanoides forficatus*				x
Mississippi kite	*Ictinia mississippiensis*	x			
Northern harrier	*Circus cyaneus*		x		x
Sharp-shinned hawk	*Accipiter striatus*	x			
Cooper's hawk	*Accipiter cooperii*	x			
Northern goshawk	*Accipiter gentilis*	x	x		
Common black-hawk	*Buteogallus anthracinus*	x	x		
Harris's hawk	*Parabuteo unicinctus*				x
Gray hawk	*Buteo nitidus*	x			
Swainson's hawk	*Buteo swainsoni*	x		x	
Zone-tailed hawk	*Buteo albonatus*	x			x
Ferruginous hawk	*Buteo regalis*	x	x	x	x
Golden eagle	*Aquila chrysaetos*		x		x
Crested Caracara	*Caracara cheriway*	x			
American kestrel (southeastern)	*Falco sparverius*				x
Northern aplomado falcon	*Falco femoralis*		x		
Peregrine falcon	*Falco peregrinus*	x	x	x	x
Prairie falcon	*Falco mexicanus*	x		x	
Strigiformes					
Common barn owl	*Tyto alba*			x	x
Flammulated owl	*Otus flammeolus*	x			x
Whiskered screech-owl	*Megascops trichopsis*		x		
Ferruginous pygmy owl	*Glaucidium brasilianum*	x			
Elf owl	*Micrathene whitneyi*	x	x		x
Burrowing owl	*Athene cunicularia*	x	x	x	x
Short-eared owl	*Asio flammeus*	x		x	x
Mexican spotted owl**	*Strix occidentalis lucida*	x	x		
Boreal owl	*Aegolius funereus*		x		

**** Federally listed under the Endangered Species Act (ESA) of 1973, as amended**

d The State Wildlife Action Plans (available at : www.wildlifeactionplans.org) were developed, at the charge of Congress, in order to make the best use of the federal funds provided through the Wildlife Conservation and Restoration Program and State Wildlife Grants Program, administered by the USFWS. Criteria for placing species on the list include: low populations; formally identified as a conservation priority; or showed other signs of imminent decline. A major component of plans is the definition and prioritization of essential habitats.

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RESERVE THIS SPACE FOR THE FOLDOUT PAGES (11 x 17). OF TABLE **A.4 Species Prioritization** (included as another attachment)

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Table A.5. Raptor Species of Concern Exhibiting Sociality or Occasional Clumped Distribution						
Common Name	**Scientific Name**	**Evidence of Cooperative Breeding (trios or larger groups)[a]**	**Nest Assemblages/ Small Inter-nest Distances[b]**	**Communal Roosts (by Period)[b]**		
Falconiformes				**Breeding**	**Winter**	**Migration**
Osprey	*Pandion haliaetus*	x				
Swallow-tailed kite	*Elanoides forficatus*		x	x	x	
Mississippi kite	*Ictinia mississippiensis*		x	x		x
Bald eagle	*Haliaeetus leucocephalus*				x	x
Northern harrier	*Circus cyaneus*		x		x	
Harris's hawk	*Parabuteo unicinctus*	x	x			
Cooper's hawk	*Accipiter cooperii*	x				
Swainson's hawk	*Buteo swainsoni*	x		x		x
Ferruginous hawk	*Buteo regalis*				x	
Rough-legged hawk	*Buteo lagopus*				x	
Golden eagle	*Aquila chrysaetos*		x		x	
Merlin	*Falco columbarius*	x				
Peregrine Falcon	*Falco peregrinus*	x				
Strigiformes						
Flammulated owl	*Otus flammeolus*		x			
Eastern screech owl	*Megascops asio*	x				
Burrowing owl	*Athene cunicularia*	x	x			
Long-eared owl	*Asio otus*	x	x		x	
Short-eared owl	*Asio flammeus*		x	x		

a Common names of species where cooperative breeding is known to occur commonly are in bold. Cooperative breeding has been studied in detail in only a few diurnal raptor species. Therefore, mitigation efforts may not be as effective if limited to nesting pairs. (Smith and Hiestand 1990, Marks et al. 2002, Kimball etal. 2003)

b The scientific names of species known to exhibit colonial or marked social behavior are underlined with a double line. Nest assemblages or small inter-nest distances may be due to a number of factors such as concentrations of prey or suitable nest habitat. Nonetheless, it is important to determine the distribution pattern to avoid undue impact to high-value areas. (Marks etal. 1994, Bechard and Schmutz 1995, Meyer 1995, MacWhirter and Bildstein 1996, Parker 1999, England etal. 1997, Buehler 2000, Bechard and Swem 2002, Kochert etal. 2002, Wiggins etal. 2006)

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Appendix B

Nesting Periods and Recommended Seasonal and Spatial Buffers for Raptors

Spatial buffers herein are not intended to protect raptors from activities or structures, known to be direct fatality risks to raptors, located outside of the recommended nest buffer but perhaps within a foraging area. For example, siting wind turbines just outside of a 0.5 mile nest buffer, but within an area where the raptor hunts for prey, is an inappropriate application of the Guidelines.

Several raptor species use communal roosts during breeding, wintering, or migration periods (see Table A.5 for those that are raptor species of concern). Unless otherwise specified, spatial buffers for roost areas should be one-half that of the recommended spatial buffer for nests.

In addition, spatial buffers for colonial nesting species, such as the burrowing owl, should be applied in a fashion to provide protection for the complex as a whole, and to minimize fragmentation to the extent possible.

Buffers should be applied in conjunction with completion of a site-specific analysis (see **Appendix H**).

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Table B.1. Nesting periods for raptors breeding in the Western U.S.

Species		Brooding, # Days Post-Hatch	Fledging, # Days Post Hatch	Post-fledge Dependency to Nest, # Days[a]
Falconiformes				
Osprey	*Pandion haliaetus*	30-35	48-59	45-50
Swallow-tailed kite	*Elanoides forficatus*	21	35-42	14-84
White-tailed kite	*Elanus leucurus*		28-35	30-60
Mississippi kite	*Ictinia mississippiensis*	4-12	34	15-20
Bald eagle	*Haliaeetus leucocephalus*	21-28	70-80	14-20
Northern harrier	*Circus cyaneus*	21-28	42	7
Sharp-shinned hawk	*Accipiter striatus*	15	24-27	12-16
Cooper's hawk	*Accipiter cooperii*	14	27-34	10
Northern goshawk	*Accipiter gentilis*	20-22	34-41	20-22
Common black-hawk	*Buteogallus anthracinus*	22-29	41-52	18-28
Harris's hawk	*Parabuteo unicinctus*	20-30	43-49	unknown
Red-shouldered hawk	*Buteo lineatus*	20-40	32-45	unknown
Broad-winged hawk	*Buteo platypterus*	20-24	35-42	14-21
Gray hawk	*Buteo nitidus*	20-30	30-42	unknown
Swainson's hawk	*Buteo swainsoni*	20	36-40	14
White-tailed hawk	*Buteo albicaudatus*	unknown	47-52	unknown
Zone-tailed hawk	*Buteo albonatus*	28-39	42-56	7-21
Red-tailed hawk	*Buteo jamaicensis*	35	45-46	14-18
Ferruginous hawk	*Buteo regalis*	21	38-48	7-10
Rough-legged hawk	*Buteo lagopus*	17-22	34-45	21-35
Golden eagle	*Aquila chrysaetos*	30-40	66-75	14-20
Crested Caracara	*Caracara cheriway*	0-30	49-56	indeterminate
American kestrel	*Falco sparverius*	8-10	27-30	12
Merlin	*Falco columbarius*	7	30-35	7-19
Northern aplomado falcon	*Falco femoralis*	7	28-35	minimal
Gyrfalcon	*Falco rusticolus*	6-19	49-56	7-10
Peregrine falcon	*Falco peregrinus*	14-21	35-49	21
Prairie falcon	*Falco mexicanus*	28	35-42	7-14
Strigiformes				
Common barn owl	*Tyto alba*	20-22	56-62	7-14
Flammulated owl	*Otus flammeolus*	12	22-25	7-14
Western screech owl	*Megascops kennicottii*	10-14	30-32	7-14
Eastern screech owl	*Megascops asio*	6-13	26-28	7-14
Whiskered screech-owl	*Megascops trichopsis*	7	24-30	7-14
Great horned owl	*Bubo virginianus*	21-28	40-50	7-14
Snowy owl	*Bubo scandiacus*	14-25	14-25	
Northern hawk owl	*Surnia ulula*	10-14	21-35	21-35
Northern pygmy owl	*Glaucidium gnoma*	10-14	28-30	7-14
Ferruginous pygmy owl	*Glaucidium brasilianum*	8-14	21-29	7-14
Elf owl	*Micrathene whitneyi*	6-7	28-33	unknown
Burrowing owl	*Athene cunicularia*	20-22	40-45	21-28
Spotted owl	*Strix occidentalis*	14-21	34-36	10-12
Northern spotted owl	*Strix occidentalis caurina*	14-21	34-36	10-12
Mexican spotted owl	*Strix occidentalis lucida*	14-21	34-36	10-12
Barred owl	*Strix varia*	14	28-35	
Great gray owl	*Strix nebulosa*	14-21	21-28	7-14
Long-eared owl	*Asio otus*	20-26	30-40	7-14
Short-eared owl	*Asio flammeus*	12-18	24-27	7-14
Boreal owl	*Aegolius funereus*	20-24	28-36	12-14
Northern saw-whet owl	*Aegolius acadicus*	20-22	27-34	7-14

a Length of post-fledge dependency period to parents is longer than reported in this table. Reported dependency periods reflect the amount of time the young are still dependent on the nest site; i.e. they return to the nest for feeding.

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RESERVE THIS SPACE FOR THE FOLDOUT PAGE (11 x 17). OF **Table B. 2. USFWS recommended seasonal buffers for breeding raptors** (included as another attachment)

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Table B. 3. Recommended spatial buffers[a] for nests of breeding raptors (to be used in conjunction with a site-specific analysis; see Appendix H)

Species		Spatial Buffer in Non-urban Areas	
		(miles)	(meters)
Falconiformes			
Osprey	*Pandion haliaetus*	0.25	400
Hook-billed kite	*Chondrohierax uncinatus*	0.25	400
Swallow-tailed kite	*Elanoides forficatus*	0.25	400
White-tailed kite	*Elanus leucurus*	0.25	400
Mississippi kite	*Ictinia mississippiensis*	0.25	400
Bald eagle[b]	*Haliaeetus leucocephalus*	0.5-1.0	800-1600
Northern harrier	*Circus cyaneus*	0.25	400
Sharp-shinned hawk	*Accipiter striatus*	0.25	400
Cooper's hawk	*Accipiter cooperii*	0.25	400
Northern goshawk	*Accipiter gentilis*	0.5	800
Common black-hawk	*Buteogallus anthracinus*	0.5	800
Harris's hawk	*Parabuteo unicinctus*	0.5	800
Red-shouldered hawk	*Buteo lineatus*	0.25	400
Broad-winged hawk	*Buteo platypterus*	0.25	400
Gray hawk	*Buteo nitidus*	0.25	400
Swainson's hawk	*Buteo swainsoni*	0.25	400
White-tailed hawk	*Buteo albicaudatus*	0.5	800
Zone-tailed hawk	*Buteo albonatus*	0.5	800
Red-tailed hawk	*Buteo jamaicensis*	0.33	530
Ferruginous hawk	*Buteo regalis*	1	1600
Rough-legged hawk	*Buteo lagopus*	0.25	400
Golden eagle	*Aquila chrysaetos*	0.5	800
Crested Caracara	*Caracara cheriway*	0.25	400
American kestrel	*Falco sparverius*	0.125	200
Merlin	*Falco columbarius*	0.25	400
Northern aplomado falcon	*Falco femoralis*	0.25	400
Gyrfalcon	*Falco rusticolus*	0.25	400
Peregrine falcon	*Falco peregrinus*	1	1600
Prairie falcon	*Falco mexicanus*	0.5	800

a Buffers sizes are based in part on: whether the species is a Raptor Species of Concern; knowledge of a species' tolerance of disturbance (see Table A.3. and Table E.1.); and whether it nests predominanatly in open versus forested habitat.

b The National Bald Eagle Management Guidelines (NBEMG)(p. 9), make specific note that in open areas where there are little or no forested or topographical buffers, such as in many western states, the distance alone must serve as the buffer, and that buffer distances may need to be larger than those in the NBEMG. The greater recommended buffer for the arid interior west is based in part on: the generally greater line-of-sight conditions; predominant use of cottonwoods as nest and roost trees; and the decline of cottonwoods in the arid West (Miller etal. 1995, , Lite and Stromberg 2005, Birken and Cooper 2006). For large industrial developments introduced into previously undeveloped areas, use the following: 1) A year-round avoidance of 1/2-mile if topographic and/or vegetative buffers exist to 1 mile if nest is in line-of-sight (LOS) of activity is recommended for all known bald eagle nests, and 2) A year-round avoidance of 1/4-mile if topographic and/or vegetation buffers exist to 1-mile if roost in LOS of activity is recommended for all known bald eagle winter roost sites. For heavily timbered areas, use the NBEMG. Any modification of recommendations should made be in coordination with the USFWS.

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Table B. 3. Recommended spatial buffers[a] for nests of breeding raptors (to be used in conjunction with a site-specific analysis; see Appendix H)

Species		Spatial Buffer in Non-urban Areas	
		(miles)	(meters)
Strigiformes			
Common barn owl	*Tyto alba*	0.125	200
Flammulated owl	*Otus flammeolus*	0.25	400
Western screech owl	*Megascops kennicottii*	0.125	200
Eastern screech owl	*Megascops asio*	0.125	200
Whiskered screech-owl	*Megascops trichopsis*	0.25	400
Great horned owl	*Bubo virginianus*	0.125	200
Snowy owl	*Bubo scandiacus*	0.125	200
Northern hawk owl	*Surnia ulula*	0.125	200
Northern pygmy owl	*Glaucidium gnoma*	0.25	400
Ferruginous pygmy owl	*Glaucidium brasilianum*	0.125	200
Elf owl	*Micrathene whitneyi*	0.25	400
Burrowing owl	*Athene cunicularia*	0.25	400
California spotted owl	*Strix occidentalis*	0.5	800
Northern spotted owl	*Strix occidentalis caurina*	0.5	800
Mexican spotted owl	*Strix occidentalis lucida*	0.5	800
Barred owl	*Strix varia*	0.25	400
Great gray owl	*Strix nebulosa*	0.25	400
Long-eared owl	*Asio otus*	0.125	200
Short-eared owl	*Asio flammeus*	0.25	400
Boreal owl	*Aegolius funereus*	0.125	200
Northern saw-whet owl	*Aegolius acadicus*	0.125	200

a Buffers sizes are based in part on: whether the species is a Raptor Species of Concern; knowledge of a species' tolerance of disturbance (see Table A.3. and Table E.1.); and whether it nests predominanatly in open versus forested habitat.

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Table B.4. Recommended proportion of the species-specific spatial buffers to be applied for temporary activities during raptor nesting.

NESTING PHENOLOGY (Risk Level)				
Magnitude of Activity	**Courtship and Nesting (High)**	**Incubation, and Brooding (High)**	**Post-Brooding Nestling Period (Moderate)**	**Post Fledging Dependency (Moderate)**
In-Vehicle, Occasional Activity: All-terrain vehicle driving off-road, or on dirt roads, and not part of a routinely used transportation corridor.				
Single incursion, < 1 hr.[b]	NONE	NONE	NONE	NONE
Multiple incursions, each < 1 hr.[c]	HALF	HALF	NONE	NONE
> 1 hr.	FULL	FULL	HALF	HALF
Out-of-Vehicle, Recreational[a] Activity: including, but not limited to hiking, dispersed camping, rock climbing, birdwatching, fishing, hunting, biological surveys.				
Single incursion, < 1 hr.[b]	HALF	HALF	NONE	NONE
Multiple incursions, each < 1 hr.[c]	FULL	FULL	HALF	HALF
> 1 hr.	FULL	FULL	FULL	FULL
Developed Recreation: including, but not limited to ski resorts, snowmobile and off-road vehicle courses, developed campground sites, and group tour operations.				
	FULL	FULL	FULL	FULL
Industrial, Municipal, and Transportation Disturbance: including, but not limited to urbanization; mining; oil and gas development; logging; power line construction; road construction & maintenance; use of explosives; agricultural operations; fixed wing and helicopter overflights.				
Single incursion, < 1 hr.[b]	FULL	FULL	HALF	HALF
Multiple incursions, each < 1 hr.[c]	FULL	FULL	FULL	HALF
> 1 hr.	FULL	FULL	FULL	FULL

a Recreational activities = those providing outdoor recreation, entertainment, or adventure.
b No more than 1 repetition in a 24 hour period for a duration of less than 1 hour.
c More than one repetition per 24 hours, spaced no less than 2 hours apart, occurs during daylight hours. Use full buffer zone for any activities occurring during nighttime hours

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Recommendations regarding unoccupied nests are guidelines only, based upon the best available biological information. They are important when: nest substrates or nest site opportunities are limited for a raptor species of concern which is known to reuse nests; if a territory of such a species has few alternate nest sites; or if significant cumulative impacts have limited nesting opportunities for local area populations. Unoccupied nests of species which are not raptor species of concern but are, based on local information, species for which analysis suggests conservation is advisable should be conserved for 2 years.

Table B.5. Recommended conservation periods for unoccupied nests of Raptor Species of Concern[a]

Falconiformes		**Years**
Bald eagle	*Haliaeetus leucocephalus*	5
Northern harrier	*Circus cyaneus*	habitat conservation[b]
Northern goshawk	*Accipiter gentilis*	3
Common black-hawk	*Buteogallus anthracinus*	3
Swainson's hawk	*Buteo swainsoni*	3
Ferruginous hawk	*Buteo regalis*	5
Golden eagle	*Aquila chrysaetos*	10
Peregrine falcon	*Falco peregrinus*	indefinite
Prairie falcon	*Falco mexicanus*	indefinite
Strigiformes		
Flammulated owl	*Otus flammeolus*	5[c]
Burrowing owl	*Athene cunicularia*	5[c]
Short-eared owl	*Asio flammeus*	3
Mexican spotted owl	*Strix occidentalis lucida*	indefinite

a Based, in part, upon information in: Megown et al. 2007, priority of species according to tables in Appendix A, and species-specific nest-substrate limitations.

b Northern harriers do not return to individual nests, but may nest in aggregates in suitable habitat.
c Both burrowing and flammulated owls may nest in aggregated patterns, therefore habitat conservation is also recommended

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Appendix C

State or Tribal Recommendations

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RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS FOR COLORADO RAPTORS

Tolerance limits to disturbance vary among as well as within raptor species. As a general rule, Ferruginous Hawks and Golden Eagles respond to human activities at greater distances than do Ospreys and America Kestrels. Some individuals within a species also habituate and tolerate human activity at a proximity that would cause the majority of the group to abandon their nests. Other individuals become sensitized to repeated encroachment and react at greater distances. The tolerance of a particular pair may change when a mate is replaced with a less tolerant individual and this may cause the pair to react to activities that were previously ignored. Responses will also vary depending upon the reproductive stage. Although the level of stress is the same, the pair may be more secretive during egg laying and incubation and more demonstrative when the chicks hatch.

The term "disturbance" is ambiguous and experts disagree on what actually constitutes a disturbance. Reactions may be as subtle as elevated pulse rate or as obvious as vigorous defense or abandonment. Impacts of disturbance may not be immediately evident. A pair of raptors may respond to human intrusion by defending the nest, but well after the disturbance has passed, the male may remain in the vicinity for protection rather than forage to feed the nestlings. Golden eagles rarely defend their nests, but merely fly a half mile or more away and perch and watch. Chilling and over heating of eggs or chicks and starvation of nestlings can result from human activities that appeared not to have caused an immediate response.

A 'holistic' approach is recommended when protecting raptor habitats. While it is important for land managers to focus on protecting nest sites, equal attention should focus on defining important foraging areas that support the pair's nesting effort. Hunting habitats of many raptor species are extensive and may necessitate interagency cooperation to assure the continued nest occupancy. Unfortunately, basic knowledge of habitat use is lacking and may require documentation through telemetry investigations or intensive observation. Telemetry is expensive and may be disruptive so a more practical approach is to assume that current open space is important and should be protected.

Although there are exceptions, the buffer areas and seasonal restrictions suggested here reflect an informed opinion that if implemented, should assure that the majority of individuals within a species will continue to occupy the area. Additional factors, such as intervening terrain, vegetation screens, and the cumulative impacts of activities should be considered.

These guidelines were originally developed by CDOW raptor biologist Gerald R. Craig (retired) in December 2002. To provide additional clarity in guidance, incorporate new information, and update the conservation status of some species, the guidelines were revised in January 2008. Further revisions of this document may become necessary as additional information becomes available.

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS

BALD EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area; see 'Definitions' below) within ¼ mile radius of active nests (see 'Definitions' below). Seasonal restriction to human encroachment (see 'Definitions' below) within ½ mile radius of active nests from October 15 through July 31. This closure is more extensive than the National Bald Eagle Management Guidelines (USFWS 2007) due to the generally open habitat used by Colorado's nesting bald eagles.

Winter Night Roost:

No human encroachment from November 15 through March 15 within ¼ mile radius of an active winter night roost (see 'Definitions' below) if there is no direct line of sight between the roost and the encroachment activities. No human encroachment from November 15 through March 15 within ½ mile radius of an active winter night roost if there is a direct line of sight between the roost and the encroachment activities. If periodic visits (such as oil well maintenance work) are required within the buffer zone after development, activity should be restricted to the period between 1000 and 1400 hours from November 15 to March 15.

Hunting Perch:

Diurnal hunting perches (see 'Definitions' below) associated with important foraging areas should also be protected from human encroachment. Preferred perches may be at varying distances from human encroachment and buffer areas will vary. Consult the Colorado Division of Wildlife for recommendations for specific hunting perches.

GOLDEN EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from December 15 through July 15.

OSPREY

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through August 31. Some osprey populations have habituated and are tolerant to human activity in the immediate vicinity of their nests.

FERRUGINOUS HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from February 1 through July 15. This species is especially prone to nest abandonment during incubation if disturbed.

RED-TAILED HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within 1/3 mile radius of active nests. Seasonal restriction to human encroachment within 1/3 mile radius of active nests from February 15 through July 15. Some members of this species have adapted to urbanization and may

tolerate human habitation to within 200 yards of their nest. Development that encroaches on rural sites is likely to cause abandonment.

SWAINSON'S HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through July 15. Some members of this species have adapted to urbanization and may tolerate human habitation to within 100 yards of their nest.

PEREGRINE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to ½ mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a ½ mile buffer around the cliff complex.

PRAIRIE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 15 through July 15.

NORTHERN GOSHAWK

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 1 through September 15.

BURROWING OWL

Nest Site:

No human encroachment within 150 feet of the nest site from March 15 through October 31. Although Burrowing Owls may not be actively nesting during this entire period, they may be present at burrows up to a month before egg laying and several months after young have fledged. Therefore it is recommended that efforts to eradicate prairie dogs or destroy abandoned towns not occur between March 15 and October 31 when owls may be present. Because nesting Burrowing Owls may not be easily visible, it is recommended that targeted surveys be implemented to determine if burrows are occupied. More detailed recommendations are available in a document entitled "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" which is available from the Colorado Division of Wildlife

Recommended Buffer Zones and Seasonal Restrictions Around Raptor Use Sites

Species and Use	Buffer	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Bald Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
ACTIVE WINTER NIGHT ROOST without a direct line of sight- No Human Encroachment	¼ Mile												
ACTIVE WINTER NIGHT ROOST with a direct line of sight - No Human Encroachment	½ Mile												
HUNTING PERCH - No Human Encroachment	Contact CDOW												
Golden Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
Osprey													
ACTIVE NEST - No Surface Occupancy	¼ Mile												
ACTIVE NEST - No Human Encroachment	¼ Mile												
Ferruginous Hawk													
ACTIVE NEST - No Surface Occupancy	½ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
Red-tailed Hawk													
ACTIVE NEST - No Surface Occupancy	1/3 Mile												
ACTIVE NEST - No Human Encroachment	1/3 Mile												
Swainson's Hawk													
ACTIVE NEST - No Surface Occupancy	¼ Mile												
ACTIVE NEST - No Human Encroachment	¼ Mile												
Peregrine Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
Prairie Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
Northern Goshawk													
ACTIVE NEST - No Surface Occupancy	½ Mile												
ACTIVE NEST - No Human Encroachment	½ Mile												
Burrowing Owl													
ACTIVE NEST - No Human Encroachment	150 feet												

= time period for which seasonal restrictions are in place.

DEFINITIONS

Active nest – Any nest that is frequented or occupied by a raptor during the breeding season, or which has been active in any of the five previous breeding seasons. Many raptors use alternate nests in various years. Thus, a nest may be active even if it is not occupied in a given year.

Active winter night roost – Areas where Bald Eagles gather and perch overnight, and sometimes during the day in the event of inclement weather. Communal roost sites are usually in large trees (live or dead) that are relatively sheltered from wind and are generally in close proximity to foraging areas. These roosts may also serve a social purpose for pair bond formation and communication among eagles. Many roost sites are used year after year.

Human encroachment – Any activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc.

Hunting perch – Any structure on which a raptor perches for the purpose of hunting for prey. Hunting perches provide a view of suitable foraging habitat. Trees are often used as hunting perches, but other structures may also be used (utility poles, buildings, etc.).

Surface occupancy – Any physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc.

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Revised 02/2008

Wyoming

WGFD RECOMMENDED DIURNAL RAPTOR SURVEY DATES

SPECIES	MARCH 1 15 31	APRIL 1 15 30	MAY 1 15 31	JUNE 1 15 30	JULY 1 15 31	AUGUST 1 15 30
American Kestrel	XXXXXXXXXX			XXXXXXXXXX		
Bald Eagle	XXXXXXXXXXXXXX----------			----------XXXXXXXXXX		
Cooper's Hawk	XXXXXXXXX				XXXXXXXXXXXXX	
Ferruginous Hawk	XXXXXXXX----------			----------XXXXXXXX		
Golden Eagle	XXXXXXXXXXXXX

Appendix D

Disturbance Background

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There have been sufficient studies of intact raptor populations to suggest certain common factors that act to regulate density. Without human intervention, population regulation in many raptor species comes through competition for breeding space, assisted by the presence of surplus adults which breed only when an existing nesting territory becomes vacant. In habitat where nest sites are widely available, breeding density fluctuates generally in synchrony with availability of preferred prey (Pitelka et al. 1975, Woffinden and Murphy 1977, Newton 1979, Smith and Murphy 1979, Smith et al. 1981, Korpimaki 1984, 1986, Hamerstrom 1986, Hornfeldt et al. 1986, Ridpath and Booker 1986, Wiklund and Stigh 1986, Bates and Moretti 1994). The presence of alternate prey species may allow continued breeding success during periods when the availability of preferred prey species is low (Johnstone 1980, Thompson et al. 1982). In other areas, breeding density levels may be influenced by the number of available nest sites rather than by available food supply (Edwards 1969, Boeker and Ray 1971, Smith and Murphy 1978). Hence, in relatively undisturbed raptor habitat, breeding density is naturally limited primarily by food supply or nest sites, whichever is most limited (Newton 1979, 1991).

Loss and fragmentation of raptor habitat often accompany industrial, transportation, municipal, recreational and other developments. Losses or alterations of habitat can result in a loss or change in the raptor prey base or a loss of historical nesting territories (Schmutz 1984, Postovit and Postovit 1987, Williams and Colson 1989). Golden eagle breeding territories were less successful in areas lacking a mosaic of native vegetation (Thompson et al. 1982) since the habitat was unable to support abundant jackrabbit populations, their preferred prey. Plumpton and Anderson (1998) found that wintering ferruginous hawks near the suburbs of Denver, Colorado appear to modify their behavior in fragmented, largely human-altered habitats, provided some foraging habitats with adequate populations of suitable prey species, i.e., black-tailed prairie dogs, are present. They posited that, as an ecological specialist, the ferruginous hawk may experience local extirpations without adequate prey habitats. Long-term raptor population responses to habitat loss and human disturbances are not well documented for many raptor species. However, there are indications that alterations of the natural environment can strongly influence nesting raptor populations. For instance, local declines in the number of nesting ferruginous hawks in Canada and Idaho resulted from the increased cultivation of native grasslands (Schmutz 1984, Bechard et al. 1986). Golden eagle breeding territories were less successful in areas lacking a mosaic of native vegetation (Thompson et al. 1982) since the habitat was unable to support abundant jackrabbit populations, their preferred prey. Red-shouldered hawk populations in Iowa decreased in response to the clearing of woodlots and bottomland hardwood forests (Brown 1964). Populations of Harris's hawks are threatened most by habitat alteration (Bednarz 1995). Accelerated commercial and urban development was attributed to golden eagle nesting declines along the Colorado Front Range (Boeker 1974). In studies of golden eagle populations in the southwest (New Mexico and Texas) and the Front Range of the Rocky Mountains (New Mexico, Colorado and Wyoming), Boeker and Ray (1971) reported that human disturbance accounted for at least 85 per cent of all known nest losses. Similarly, Utah's Wasatch Front experienced the loss of many historically occupied raptor nests, likely in partial response to increased urbanization (Murphy 1975). Over a ten-year period, eagle owls progressively abandoned territories near power lines documented to be high risk for electrocution (Sergio et al. 2004). Scott (1985) suggested that nest abandonment may be

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affected by regional patterns and increases in human disturbance more than by habitat destruction at a specific nest site. He found that abandoned golden eagle territories in southern California had more dwellings within 1 mile (1.6 km) and higher human populations within 3 miles (4.8 km) than territories that continued to be occupied

Another factor affecting golden eagle habitat has been the increasing number, frequency, and intensity of fires. In the Intermountain West, fires have caused large-scale losses of shrubs and jackrabbit habitat in areas used by golden eagles. Greater than 98,000 acres of shrub lands were consumed by wildfires between 1981 and 1987 in the Snake River Birds of Prey National Conservation Area, and adversely affected nesting populations. Nesting success at burned territories in Snake River Canyon declined after major fires. Kochert et al (1999) documented that burned territories abandoned by the original nesting pair were taken over by neighboring pairs increasing the size of their territories. This resulted in a decreased number of nesting pairs in the initial area. Burned territories abandoned by the original nesting pair were taken over by neighboring pairs, increasing the size of their territories (Kochert et al. 1999).

Not all habitat alterations are detrimental to all raptor populations. Bechard et al. (1986) suggested that conversion to irrigated hay lands which support many nest trees and rodent prey may have contributed to local increases in Swainson's hawk nesting density. Habitat alterations may also result in species composition changes. Conversion of grasslands to cultivated fields may have resulted in reduced ferruginous hawk populations with increases in red-tailed hawk populations (Harlow and Bloom 1987).

Besides habitat loss and modification, human activities and development have frequently resulted in disturbances at wintering locations and aborted or reduced nesting attempts. Studies of human disturbances at roosting areas have mostly concerned bald eagle responses, although there is some information regarding other species that roost communally. Human disturbances may constitute a threat to wintering eagle populations by causing displacement to areas of lower human activity (Shea 1973, Servheen 1975, Stalmaster 1976, Stalmaster and Newman 1978, Brown and Stevens 1997). Human disturbances may also interfere with foraging behavior of eagles (Mathiesen 1968, Stalmaster 1976). Although there is evidence the rough-legged hawk may tolerate disturbance in roosting areas associated with roads and houses (Olson 1997), frequent disturbance can cause roosts to be abandoned (Weller 1964). Although swallow-tailed kites may tolerate some human activity near nests, roosting birds do not tolerate disturbance and are vulnerable to harassment and vandalism (Meyer 1995). Disturbance at white-tailed kite communal roosts has caused local abandonment (Dunk 1995).

Human disturbances near nest sites have resulted in the abandonment of the nest; high nestling mortality due to overheating, chilling or desiccation when young are left unattended; premature fledging; and ejection of eggs or young from the nest (Bent 1938, Woffinden 1942, Boeker and Ray 1971, Snow 1974, Fyfe and Olendorff 1976, Call 1979, Swenson 1979, Craighead and Mindell 1981, Suter and Joness 1981, Postovit and Postovit 1987, Palmer 1988, Tella et al. 1996, Anderson and Squires 1997). Raptors which successfully nest during a disturbance may abandon the nesting territory the year following the disturbance (Fyfe and Olendorff 1976, Platt 1977, Ratcliffe 1980, White and Thurow 1985). Responses of nesting

raptors to human disturbances are generally determined by the type, duration, magnitude, noise level, and timing of activity relative to nesting phenology (Suter and Joness 1981, Götmark 1992, Richardson and Miller 1997).

Overall, raptors display a high degree of fidelity to nest sites and nesting territories (Newton 1979). Certain physiographic features such as elevation, slope, aspect, habitat diversity, prey availability, nest height, and nest substrate have been measured in attempts to characterize site selection by nesting raptors (Murphy et al. 1969, Apfelbaum and Seelbach 1983, MacLaren 1986, Kirmse 1994, Balbontin 2005). The majority of raptor species are firmly fixed on a special type of nest site according to a narrow genetic disposition (Kirmse 1994).

Flushing responses of adult raptors during the breeding season may be related to the duration and frequency of disturbance events, and may vary between species (Fraser et al. 1985, White and Thurow 1985, Holmes 1994). Some level of habituation to continuous or repetitive disturbances may occur (Knight and Temple 1986). Even so, repeated flushing responses by adult raptors due to disturbance may increase energy expenditure during foraging and decrease energy ingestion. Accelerated depletion of energy reserves may result in premature mortality of raptors during harsh conditions (Stalmaster 1983, Knight and Skagen 1987). Andersen et al. (1990) documented a shift in home range center, an increase in raptor home ranges, and more frequent movements outside home ranges during periods of military activity. The increased energy expenditure, if occurring during reproduction, could result in decreased productivity. Fernandez and Azkona (1993) documented reduced parental care, specifically, shortened incubation time, less protection of chicks, and less food delivered, by marsh harriers in response to increased disturbances by crayfish fishermen. This suggests minor human disturbances may influence long-term effects on lifetime reproductive success of birds by reducing the condition of nestlings (Fernandez and Azkona 1993).

Sensitivity of adults and young to disturbance may vary during the nesting cycle (Nelson 1979, Holmes 1994). Generally, courtship, nest construction, incubation, and early brooding are considered higher risk periods during which adults are easily prone to temporarily desert or to permanently abandon nests in response to disturbance, leaving the eggs and/or young susceptible to the effects of inclement weather, solar radiation, and predation. The days immediately before and during egg laying and early incubation are the most critical stages of the nesting cycle with respect to abandonment. Disturbance of even limited duration during this time can result in immediate and permanent departure by adults from the breeding territory. During post-brooding and post-fledging dependency periods, feather development of the young is sufficiently advanced to provide some protection from the elements. Nevertheless, even temporary flushing from nests by adults due to disturbance during these periods can still result in mortality of the young which continue to be dependent on parental care and are at risk of predation.

The type of disturbance can determine to some degree the response of raptors. Declines of local and regional raptor populations can result from aborted or reduced nesting attempts, particularly when the disturbance is prolonged or permanent such as industrial and transportation developments or urban expansion (Boeker and Ray 1971, Craighead and Mindell 1981, Bednarz 1984, Gerard et al.1984). Dispersed recreational activities can deter

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nesting success. Out-of-vehicle recreational activities are generally considered more disturbing to raptors than in-vehicle recreational activities (French 1972, Garber 1972, Kahl 1972, Skagen 1980, Fraser et al. 1985, Holmes et al. 1993, Holmes 1994), and a greater number of individuals in a group can result in flight initiation at a greater distance (Geist et al. 2005). Pressure from the birding community is a disturbance factor for some of the more rarely sighted species. For example, zone-tailed hawks may suffer significant nest disturbance and mortality from birders at more popular birding locations (Johnson et al. 2000). Owl species, which are often called with repeated use of recordings or imitation calls, or are subjected to the use of strong lights for viewing, may be affected by birding activities in some locations. Henry et al. (1999) suggested such activities may have a negative effect on the elf owl, and Gelbach and Gelbach (2000) suggested the whiskered screech-owl may experience reduced productivity in some heavily-used Arizona canyons. Steidl et al. (1993) found when observers were camped 400 m from nests of golden eagles, adults spent less time near their nests, fed their young less frequently, and fed themselves and their young up to 67% less food than when observers were camped 800 m from nests. Stopped vehicles, particularly when occupants exit the vehicle, have been reported to provoke negative responses from nesting or perching raptors more often than moving vehicles (Steenhof 1976, Beck 1980, Scott 1985, White and Thurow 1985). Reactions of raptors to fixed-wing aircraft and helicopters are reportedly mixed and may be related to the amount of helicopter hovering time spent above a nest, height above the nest, or the frequency of aircraft flights within a nest's vicinity (Hancock 1966, Carrier and Melquist 1976, White and Sherrod 1973, Call 1979). Associated high noise levels and increased human activity may preclude use of otherwise acceptable raptor habitats. Areas with limited human access tend to exhibit higher nesting densities and higher fledging success for raptors (Fitzner 1980, Harmata 1991).

Raptor tolerance levels to disturbance can be species-specific. Evidence suggests that some falcons, ospreys, and owls are generally more tolerant of human-induced disturbance and human environments. Harris's hawks (Bednarz et al. 1988), and white-tailed hawks (Farquahr 1992) have a low tolerance of human activity near the nest. Golden eagles, northern harriers, Cooper's hawks, northern goshawks, and sharp-shinned hawks appear much less tolerant of disturbances. In the state of Washington, most prairie falcon nests are located over one half mile from human habitation (Hays and Dobler 2004). Buteos (ferruginous hawk, red-tailed hawk, Swainson's hawk) exhibit a wide range of acceptance levels (Thomsen 1971, Martin 1973, Herron et al. 1985, Hayward 1994, Bloom and McCrary 1996); however, some have speculated that the ferruginous hawk should be considered the most sensitive raptor to human disturbance (Woffinden and Murphy 1977, Olendorff 1993). Bechard et al. (1990) found that ferruginous hawks nested twice as far away from human habitation than red-tailed or Swainson's hawks. Keough (2006) found that oil and gas development may have a negative influence on reproductive success if active wells were place too close to nest sites, and suggested that a buffer of greater than one-half mile (0.8 km) may serve to minimize disturbance to breeding ferruginous hawk pairs. Species-specific tolerance to disturbance can lead to changes in the raptor community in areas subject to an altered disturbance regime (Andersen et al. 1990). For example, results of a study of raptor community response to increased weekend road traffic (Bautista et al. 2004), suggested the increased traffic was a factor in reducing the activity range of Spanish Imperial eagles. Additional disturbances within already altered environments may be less disruptive than

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disturbances associated with isolated breeding pairs of raptors in unaltered habitats. Raptor species may be less tolerant of disturbances when populations of prey species are at low levels (Snow 1974, White and Thurow 1985, Call and Tigner 1991, Holmes 1994).

Some individual breeding pairs appear relatively unperturbed by human disturbance and human-induced impacts and continue to breed successfully amid development (Mathisen 1968, Bird et al. 1996). Some gyrfalcon pairs have exhibited a degree of habituation to the presence of humans on foot at a distance of approximately 0.19 mile (300 m)(Poole and Bromley 1988). In addition, some land use actions are potentially beneficial for some raptor species, such as: selective logging, utility lines, dams and reservoirs, farming, grazing, fire, mechanical/chemical, and public observation (Olendorff et al. 1989). For example, peregrine falcons and prairie falcons have been observed nesting on transmission towers, bridges, and buildings in many cities and raptors, including bald eagles and golden eagles, have nested within a few hundred meters of airports, blasting, construction, quarry, and mine sites (Pruett-Jones et al. 1980, Haugh 1982, White et al. 1988, Holthuijzen et al. 1990, Russell and Lewis 1993, Steenhof et al. 1993, Bird et al. 1996, Carey 1998). In Utah, peregrine and prairie falcons have nested in abandoned raven nests on 340 kV transmission towers and a peregrine falcon pair nested on a building in downtown Salt Lake City (Bunnell et al. 1997).

It is not fully understood what motivates individual breeding pairs occasionally to select nesting sites within or near human-altered habitats. However, caution should be applied when interpreting the nest selection behavior of individual birds. If a site is regularly selected, but other factors lead to regular nest failure, the site is not contributing to the local area population and may serve as an attractive (ecological) sink (Delibes et al. 2001, Schlaepfer et al. 2002). Nesting within or near human-altered environments may be a manifestation of the decreased availability of high-quality natural nest sites due to increasing development; indicative of high densities of breeding birds; indicative of abundant and available prey; or simply a display of higher tolerance for disturbance by certain breeding pairs.

Extensive coordination with USFWS, state or tribal wildlife resources management agency**,** and/or resource management wildlife biologists is highly encouraged when attempting relocation of young and nests of raptors. Techniques involving relocation of raptor young and nests have been successfully accomplished for some species and are intended to maintain a breeding pair's use of their home range despite disturbance or loss of the traditional nest site (Postovit et al. 1982). Nonmigratory species such as golden eagles, which maintain from one to fourteen nests per territory (Kochert et al. 2002), may be more accepting of this strategy than migratory raptors which may shift territories in response to prey availability (Postovit and Postovit 1987). Case studies in Wyoming (Postovit et al. 1982, Parrish et al. 1994) showed high success rates for relocation of golden eagle and ferruginous hawk nests and nestlings. Relocations of great horned owls, short-eared owls, prairie falcons, and red-tailed hawks also have met with success.

Noise

It is beyond the scope of this document to provide an in-depth discussion on hearing in birds and the potential impacts of noise (but, see additional resources in **Appendix H**).

Nonetheless, there are distinctions which should be made when evaluating the potential impacts of noise upon raptors. Most commonly, sound in the field is measured as sound pressure expressed in decibels (dB). Sounds also differ in frequency (or pitch), which is measured in cycles per second (or Hertz [Hz]), and sounds differ in duration. All these qualities of noise should be considered when evaluating impacts to raptors.

Birds have fairly uniform hearing capabilities (Dooling 1980), and all hear within the range from 100 Hz to approximately 8-10 kHz. Most have the most acute sensitivities around 0-10 dB. However, owls are more sensitive in their best range than other birds by 15-20 dB (Bowles 1995). Sounds in the same frequency at which a raptor detects or makes calls may interfere with the ability to detect or communicate by masking the relevant sound. Masking may also interfere with the ability to detect prey by raptors such as owls or northern harriers, which use sound to hunt.

Factors in raptors that may lead to greater sensitivity noise include: lack of previous exposure to sound level associated with an activity; nocturnal activities; reliance on auditory cues for critical life functions, such as prey detection, mate detection, and predator avoidance; and sensitivity to a particular frequency range. Additional criteria for susceptibility include: dwelling in or on cliffs; habitat in open environment, with little tree cover; and lack of previous exposure to activity and associated sound level (Efroymson et al. 2000, Efroymson and Suter 2000).

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Table D.1. Tolerance of Selected Raptors in Areas Being Altered by Human Activities

Species		Ability to Co-exist/Tolerance of Disturbance (high to low)
Osprey	*Pandion haliaetus*	**High**
Red-tailed hawk	*Buteo jamaicensis*	
Great horned owl	*Bubo virginianus*	
Ferruginous pygmy owl	*Glaucidium brasilianum*	
Mississippi kite	*Ictinia mississippiensis*	**Mod-High**
Bald eagle	*Haliaeetus leucocephalus*	
Northern harrier	*Circus cyaneus*	
Cooper's hawk	*Accipiter cooperii*	
Swainson's hawk	*Buteo swainsoni*	
Gray hawk	*Buteo nitidus*	
Crested Caracara	*Caracara cheriway*	
American kestrel	*Falco sparverius*	
Merlin	*Falco columbarius*	
Northern aplomado falcon	*Falco femoralis*	
Common barn owl	*Tyto alba*	
Snowy owl	*Bubo scandiacus*	
Northern saw-whet owl	*Aegolius acadicus*	
Swallow-tailed kite	*Elanoides forficatus*	**Mod**
Sharp-shinned hawk	*Accipiter striatus*	
Broad-winged hawk	*Buteo platypterus*	
Rough-legged hawk	*Buteo lagopus*	
Gyrfalcon	*Falco rusticolus*	
Peregrine falcon	*Falco peregrinus*	
Prairie falcon	*Falco mexicanus*	

Species		Ability to Co-exist/Tolerance of Disturbance (high to low)
Flammulated owl	*Otus flammeolus*	**Mod**
Long-eared owl	*Asio otus*	
Boreal owl	*Aegolius funereus*	
Great gray owl	*Strix nebulosa*	
Northern hawk owl	*Surnia ulula*	
Northern pygmy owl	*Glaucidium gnoma*	
Whiskered screech-owl	*Megascops trichopsis*	
Eastern screech owl	*Megascops asio*	
Western screech owl	*Megascops kennicottii*	
Elf owl	*Micrathene whitneyi*	
White-tailed kite	*Elanus leucurus*	**Low-Mod**
Common black-hawk	*Buteogallus anthracinus*	
Zone-tailed hawk	*Buteo albonatus*	
Ferruginous hawk	*Buteo regalis*	
Barred owl	*Strix varia*	
Short-eared owl	*Asio flammeus*	
Northern goshawk	*Accipiter gentilis*	**Low**
Harris's hawk	*Parabuteo unicinctus*	
White-tailed hawk	*Buteo albicaudatus*	
Zone-tailed hawk	*Buteo albonatus*	
Golden eagle	*Aquila chrysaetos*	
Burrowing owl	*Athene cunicularia*	
Spotted owl spp.	*Strix occidentalis spp.*	

Table is adapted in part from Table 3, in Demarchi and Bentley (2005), who define the "ability to co-exist" as the degree to which raptors successfully engage a significant portion of their annual life cycle within or in close proximity to areas which have been altered by human activity. Additional species-specific information was derived from individual accounts in the online Birds of North America (Poole 2005) and Raptors of Western North America (Wheeler 2007).

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Appendix E

Service Manual 720 FW 2: Service Responsibilities to Protect Migratory Birds

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2.1 What is the purpose of this chapter? This chapter, developed in accordance with Executive Order (E.O.) 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), provides information to all Service employees about the management and conservation of migratory birds.

2.2 What are the objectives of this policy? Because migratory birds are one of our primary trust resources, all Service employees should:

A. Implement their mission-related activities and responsibilities in a way that furthers the conservation of migratory birds and minimizes and avoids the potential adverse effects of migratory bird take, with the goal of eliminating take.

B.. Emphasize an interdisciplinary, collaborative approach to migratory bird conservation in cooperation with other Service programs, State and Federal agencies, international entities, and non-governmental partners.

C. Use the best available scientific information to incorporate ecosystem integrity, reduction of invasive species, and long-term adaptive management into migratory bird conservation.

2.3 What is the scope of this chapter? E.O. 13186 directs all Federal agencies whose actions have a measurable impact on migratory bird populations to develop a Memorandum of Understanding (MOU) with the Service, in addition to calling on Federal agencies to take steps to promote migratory bird conservation. The scope of this chapter is what the Service can do internally to promote migratory bird conservation.

2.4 What are the authorities for this chapter?

A. Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712).

B. Bald and Golden Eagle Protection Act (16 U.S.C. 668).

C. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (I.L.M. 11:963-976).

D. Migratory Bird Treaties with Great Britain (for Canada) (39 Stat.1702; TS 628, as amended), Mexico (50 Stat. 1311; TS912, as amended), Soviet Union (Russia) (T.I.A.S. 9073), and Japan (25 UST 3329; T.I.A.S 7990, as amended).

E. Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Pub.L. 93-205).

F. Fish and Wildlife Coordination Act (16 U.S.C. 661-667).

G. Migratory Bird Conservation Act (16 U.S.C. 715-715d, 715e, 715f-715r).

H. E.O. 13186 (66 FR 3853), Responsibilities of Federal Agencies to Protect Migratory Birds.

I. National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347).

J. Fish and Wildlife Conservation Act (16 U.S.C. 2901-2911).

K. Endangered Species Act of 1973 (16 U.S.C. 1531-1544).

L. Magnuson-Stevens Fishery and Conservation Act, as amended (Pub. L. 94-265).

M. North American Wetlands Conservation Act, as amended (16 U.S.C. 4401).

N. Neotropical Miogratory Bird Conservation Act, as amended (16 U.S.C. 6101-6109, 1583).

2.5 What does the term 'Species of Concern' mean? The term "species of concern" means:

A. Those species listed in the periodic report, *Birds of Conservation Concern*, published by our Service Division of Migratory Bird Management,

B. Priority migratory bird species documented in comprehensive bird conservation plans (North American Waterbird Conservation Plan, United States Shorebird Conservation Plan, Partners in Flight Bird Conservation Plans),

C. Species or populations of waterfowl that the North American Waterfowl Management Plan identifies as a high, or moderately high, continental priority,

D. Listed threatened and endangered bird species in 50 CFR 17.11; or

E. MBTA-listed game birds below desired population sizes. (See our Migratory Birds Website.)

2.6 How does the Service implement its overall responsibilities for ensuring the requirements in E.O. 13186 are met? We implement this policy when we start new actions or renew contracts, permits, delegations, or other third party agreements as well as when we start new, or revise existing Service land management plans. The Division of Migratory Bird Management and the Regional and California/Nevada Operations Office (CNO) Migratory Bird program staff coordinate the following Service responsibilities, as appropriate (see sections 2.7 through 2.14 for specific program responsibilities):

A. Support the conservation intent of the migratory bird conventions by:

(1) Integrating migratory bird conservation measures into our activities, and

(2) Avoiding or minimizing adverse impacts on migratory bird resources.

B. Restore and enhance the habitat of migratory birds.

C. Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds.

D. Within established authorities and in conjunction with the adoption, amendment, and revision of our management plans and guidance, ensure that our plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts. Examples include: Partners in Flight Bird Conservation Plans, the U.S. Shorebird Conservation Plan, the North American Waterfowl Management Plan, and the North American Waterbird Conservation Plan. The North American Bird Conservation Initiative fosters integrated bird conservation, which is based on sound science, effective management, and efficient use of resources among the initiatives and bird conservation organizations.

E. Ensure that environmental analyses of Federal actions required by the National Environmental Policy Act or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern (see section 2.5).

F. Control, within the scope of our statutory authorities, the import, export, and establishment in the wild of live non-native animals and plants that may be harmful to migratory bird resources.

G. Promote interagency inventory, monitoring, management studies, research, and information exchange related to the conservation of migratory birds and their habitats. This may include:

(1) Using national inventory and monitoring programs with standardized protocols to assess the status and trends of bird populations and habitats,

(2) Implementing management studies and research using national protocols and programs, such as the Breeding Biology Research and Monitoring Database (BBIRD), and

(3) Sharing inventory, monitoring, research, and study data for breeding, migrating, and wintering populations and habitats, such as Monitoring Avian Productivity and Survivorship (MAPS).

H. Promote education and outreach opportunities related to migratory birds, such as International Migratory Bird Day, the Junior Duck Stamp Program, Urban Conservation Treaties, Hunter Education, and the Shorebird Sister Schools Program.

I. Develop and provide training on migratory bird conservation to appropriate Service and other Federal agency employees.

J. Provide technical assistance on migratory bird species and their habitats to other Federal agencies.

K. In conjunction with other Federal agencies, work to develop reasonable and effective conservation measures for key management actions that affect migratory birds and their natural habitats with emphasis on species of concern.

L. Work to identify special migratory bird habitats (migration corridors, stop-over habitats, ecological conditions important in nesting habitats, etc.) to aid in collaborative planning.

M. In consultation with the Department of State, as appropriate, promote migratory bird conservation in international activities and with other countries and international partners.

N. Participate in the Council for the Conservation of Migratory Birds.

O. Strengthen partnerships with non-governmental entities to further migratory bird conservation.

2.7 How does the Service's Migratory Bird program implement E.O. 13186?

A. The **Division of Migratory Bird Management** staff:

(1) Along with the Division of Bird Habitat Conservation and Regional and CNO Migratory Bird program staff, coordinates the development of guidance and provides technical assistance, as appropriate, to other Service programs that must implement the responsibilities sections 2.8 through 2.14 below describe.

(2) Enters permitted migratory bird take activities into the Service Permit Issuance and Tracking System (SPITS), including species and number of individuals taken, in a timely manner.

(3) Coordinates training and information exchange both within the Service and with other Federal agencies on the methods and means of avoiding or minimizing take with the goal of striving to eliminate take of migratory birds and conserving and restoring migratory bird habitat.

(4) In coordination with other Federal and State agencies and non-governmental organizations:

(a) Improves the design of existing migratory bird surveys and increases efforts to monitor species whose status is poorly known, especially species of concern; and

(b) Develops status assessments for migratory bird species of concern that identify their limiting factors and promotes strategies for addressing them.

(5) Facilitates migratory bird conservation through the increased use of biologically-based, geospatial planning tools, such as Geographic Information Systems and statistical modeling, that identify focal areas for bird habitat protection, restoration, and management.

(6) Administers the migratory bird permit program consistent with the intent of this policy.

(7) Increases dialogue between Regional and CNO Migratory Bird program staff, refuge biologists, and refuge managers during the evaluation process for species of concern, development of standards (e.g., banding, monitoring) for biological work on migratory birds, and writing of strategic Regional/CNO plans.

(8) Raises public awareness about the possible presence of birds in a nest and the risk of violating the Migratory Bird Treaty Act (MBTA), the Endangered Species Act, and the Bald and Golden Eagle Protection Act. Informs the public of factors that will help minimize the likelihood that take would occur should nests (with birds or eggs) be destroyed (also see Migratory Bird Permit Memorandum on Nest Destruction, April 15, 2003).

(9) Coordinates with Joint Ventures and other partners to develop goals and objectives for migratory birds for all Bird Conservation Regions in the U.S. Provides expertise to the National Wildlife Refuge System (NWRS) staff to integrate these goals and objectives into Comprehensive Conservation Plans (CCP) and other land management plans and to plan the future of the NWRS.

B. The **Division of Bird Habitat Conservation** staff:

(1) Provides funds for partnerships that conserve habitats benefiting migratory birds through competitive matching grants (North American Wetlands Conservation Act and Neotropical Migratory Bird Conservation Act).

(2) Encourages Joint Ventures to address migratory bird conservation priorities, consistent with national and international bird plans, in their biological planning work, conservation design, project implementation, and monitoring evaluation and research activities.

(3) Produces and markets the Federal Migratory Bird Hunting and Conservation Stamp to increase NWRS acquisitions to conserve migratory birds and implements the Junior Duck Stamp Program to increase conservation awareness.

2.8 How does the Service's Wildlife and Sport Fish Restoration program implement E.O. 13186? Our Wildlife and Sport Fish Restoration program staff:

A. Encourages partners to incorporate best management practices into their migratory bird conservation projects.

B. Encourages State agencies responsible for implementing fish and wildlife conservation and restoration grants administered through our Federal Assistance program to design their projects to provide benefits to migratory birds, particularly species of concern, as appropriate. These programs include, but are not limited to:

(1) Wildlife Restoration,

(2) National Coastal Wetlands Conservation Grants,

(3) Multistate Conservation Grants,

(4) State Wildlife Grants, and

(5) Landowner Incentive Programs.

2.9 How does the Service's National Wildlife Refuge System (NWRS) implement E.O. 13186? Our NWRS staff:

A. Coordinates and implements plans and actions (such as CCPs and habitat management plans), in support of applicable comprehensive migratory bird planning efforts, such as:

(1) The Partners in Flight Bird Conservation Plans,

(2) The U.S. Shorebird Conservation Plan,

(3) The North American Waterfowl Management Plan, and

(4) The North American Waterbird Conservation Plan.

B. Increases dialogue among refuge biologists, refuge planners, and the Regional/CNO Migratory Bird program staff during the CCP process and development of biological work plans for migratory birds and refuge strategic regional plans.

C. Integrates Bird Conservation Region (BCR) goals and objectives into the goals and objectives of CCPs and other management plans for individual NWRS units, as appropriate.

D. When developing CCPs and other management plans for NWRS units, identifies and evaluates opportunities to further provide habitats and ecological conditions within the BCR needed to achieve the migratory bird conservation goals and objectives for that Region/CNO.

E. Coordinates with the Division of Migratory Bird Management and Service Ecological Services (E.S.) field offices to evaluate proposals for siting towers or power lines on refuges. When issuing special use permits for the installation of such facilities on refuge lands, permit stipulations should encourage the permittee to implement best management practices, such as compliance with voluntary communication tower and power line guidelines and Service wind power guidelines.

F. As part of integrated pest management on refuges, ensures that there is limited use of pesticides harmful to birds. Where refuges must use pesticides that are harmful to birds, monitors the site during and after application for potential bird kills. Where employees discover problems, modifies control strategies to prevent future impacts.

G. Assesses the impact of invasive species management on migratory birds, and makes recommendations on how to best achieve invasive species management and migratory bird conservation goals. Employees should give priority to species of concern and long-term habitat benefits. Coordinates with the Division of Migratory Bird Management and the Regional/CNO Integrated Pest Management Coordinator when developing integrated pest management plans and programs for NWRS units where implementation could significantly affect migratory birds.

H. Manages refuges to encourage the restoration of native habitat communities for species of concern, where appropriate.

I. Evaluates all management practices that may cause migratory bird mortality and incorporates management principles that strive to minimize or avoid take, with emphasis on species of concern. For example, conducts restoration and management practices such as flooding, mowing, timber harvest, and burning (e.g., their timing, location, and intensity) in ways that minimize or avoid loss of nests and young, while still meeting management objectives.

J. Evaluates current migratory bird management actions to determine their effectiveness towards achieving management goals.

K. Develops measures to provide escape routes or refugia when clearing vegetation (e.g., mowing from the inside out, mosaic patterns during prescribed burns).

L. When employees do not know with a reasonable degree of certainty what the impacts of their management actions are on migratory birds, works cooperatively with Regional/CNO Migratory Bird Program staff, other agencies, research institutions, or other entities to evaluate the effectiveness of the management practices to accomplish the desired objectives for migratory birds.

2.10 How does the Service's Endangered Species program implement E.O. 13186? Our Endangered Species staff:

A. Incorporates habitat objectives of the bird conservation plans (see 2.6D), as appropriate, into Endangered Species Act (ESA) Section 10 permits associated with Habitat Conservation Plans, Safe Harbor Agreements, and Candidate Conservation Agreements with Assurances.

B. Enters permitted migratory bird take activities into SPITS, including species and number of individuals taken, in a timely manner.

C. When conducting consultations with other Federal agencies on actions that may affect proposed or candidate species, incorporates migratory bird conservation into recommendations as appropriate.

D. Offers technical assistance within the Service and to the public about recovery needs of listed, proposed, or candidate migratory bird species.

E. Considers opportunities for addressing migratory bird conservation when developing and implementing recovery plans, Candidate Conservation Agreements, and grants funded under the ESA.

F. Implements land acquisitions for the purpose of conservation of listed species, including migratory birds.

G. Works with the Migratory Bird program to identify migratory bird species that may warrant listing under the ESA and to address monitoring and conservation of recently-delisted migratory bird species.

2.11 How does the Service's Fisheries and Habitat Conservation program implement E.O. 13186?

A. Division of Fish and Wildlife Management Assistance and Habitat Restoration. Our Division of Fish and Wildlife Management Assistance and Habitat Restoration staff:

(1) Conducts site visits to flag cavity trees or active nest sites before we clear vegetation on projects we implement or fund. Encourages other entities to do the same on projects with a Federal nexus.

(2) Avoids clearing vegetation during the nesting season, particularly for species of concern.

(3) Incorporates escape routes or refugia into plans involving habitat manipulations (e.g., mowing vegetation from the inside out, mosaic patterns during prescribed burns).

(4) Reports to Regional/CNO Migratory Bird program staff incidents of take, such as those that may occur when birds are lost or wounded by fish sampling gear. Monitoring take provides useful data for the development of non-lethal techniques.

(5) Requests that contractors, heavy equipment operators, and private land owners implementing Service-funded projects avoid disturbing active nest sites during project construction.

(6) Evaluates the timing of restoration or management activities to avoid or minimize impacts to migratory birds when feasible. Places priority on avoiding impacts to species of concern during the nesting season.

(7) Recommends the use of nondestructive, nondisruptive sampling whenever feasible on site assessments.

(8) Encourages partners to incorporate best management practices into their migratory bird habitat projects.

(9) Offers technical assistance within the Service and to the public about recovery needs of listed, proposed, or candidate migratory bird species.

(10) Considers opportunities for addressing migratory bird conservation when developing and implementing fishery management plans through fish commissions or councils, such as the Atlantic States Marine Fisheries Commission.

(11) Coordinates efforts with the Natural Resource Conservation Service to ensure Farm Bill provisions are "bird-friendly" and address migratory bird conservation, where appropriate.

(12) Develops outreach material identifying and promoting regional native food plants for migratory bird species of concern.

B. Division of Habitat and Resource Conservation. Our Division of Habitat and Resource Conservation staff:

(1) Participates in early project planning to advance bird conservation, with emphasis on species of concern. Specifically, they:

(a) Identify bird-related goals, conservation measures, and comprehensive plans applicable to the project area,

(b) Advise on project impacts to migratory birds,

(c) Identify means and measures to avoid or minimize potential for take of migratory birds, eggs, and active nests, including, but not limited to:

(i) Project modification or denial;

(ii) Identification of time of year restrictions on clearing vegetation;

(iii) Recommendations about avoiding cavity trees, colonial bird nests, and other active nests; and

(iv) Recommendations about avoiding nests of species of concern.

(2) Ensures that environmental analyses required by the National Environmental Policy Act or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, particularly species of concern. This consideration is relevant to both Service actions and the review of other Federal agency actions. Use best available demographic, population, or habitat association data in the assessment of impacts on migratory birds.

(3) Coordinates with the respective Department of Defense Armed Forces in the development, review, and implementation of Integrated Resource Management Plans (INRMP) to ensure they address migratory bird conservation when applicable. Staff actively participates on INRMP teams to ensure they are addressing migratory bird conservation during INRMP development and for the 1-year and 5-year INRMP reviews.

(4) Coordinates Federal project assessments with the Regional/CNO Migratory Bird program when proposed activities may have a negative effect on migratory birds, particularly species of concern.

(5) Increases review and consultation efforts for activities that affect migratory bird populations and habitats, including communication towers, wind turbines, and other utility structures.

(6) Promotes compliance with communication tower, power line, and wind power guidelines as they are developed or revised.

(7) When completing project reviews, recommends to project applicants that they incorporate sufficient funding in their budgets for investigating and assessing issues pertinent to migratory birds, particularly species of concern.

C. Division of Environmental Quality. Our Division of Environmental Quality staff:

(1) When conducting environmental contaminants studies, limits adverse effects of collection on migratory birds by not taking live birds whenever possible and using non-lethal sampling whenever feasible (e.g., drawing blood or feather collection).

(2) Improves the use and dissemination of the results of environmental contaminants investigations that relate to migratory bird management and status. Continues to use and improve the database for the Contaminant Assessment program on National Wildlife Refuges to provide information of concern to migratory bird managers.

(3) Uses surrogate, captive bred, or more abundant avian species for testing sensitivity to environmental contaminants, especially when working in partnership with researchers at the U.S. Geological Survey (USGS), the Environmental Protection Agency (EPA), and in academia.

(4) Minimizes the loss of migratory birds from contaminants. Where terminally ill birds are euthanized during spill response or following other exposures to oil, hazardous materials, pesticides, or elevated levels of natural elements, uses specimens to obtain appropriate ecotoxicological information to assist in management planning.

(5) Assesses, minimizes, and where possible, eliminates potential adverse impacts to migratory birds from contaminants found on sites being considered for restoration activities.

(6) Where feasible, uses existing plans for migratory bird management (see section 2.6D) when developing restoration options for compensation for injuries to migratory birds.

(7) Coordinates intra- and inter-Service programs to assure remediation and other management actions taken to eliminate or reduce environmental contaminants focus on eliminating or significantly minimizing the take of migratory birds. Where possible, management actions should assist in the recovery and conservation of migratory birds.

(8) Requests appropriate funding levels for investigations and assessment of impacts of hazardous wastes, oil, and other environmental contaminants on migratory birds during general planning and budget initiatives, and encourages partners, both inside and outside the Service, to do the same.

D. Division of National Fish Hatchery System. Our Division of National Fish Hatchery System staff:

(1) Coordinates closely with other Service programs to ensure that:

(a) The Memorandum on Environmentally Beneficial Practices on Federal Landscaped Grounds (Presidential Memorandum, Environmental Practices on Federal Grounds, April 26, 1994) is followed and implemented, and

(b) It implements procedures to track the amount of pesticides known to harm birds when applied, and to return unused portions for recycling or disposal.

(2) Whenever possible, prevents the use of pesticides known to harm birds at fish hatcheries. Where they must use pesticides harmful to birds, notifies Service Ecological Services field offices and local Service Law Enforcement offices 72 hours prior to the application. The notification must include detailed data on the location (acre(s), latitude and longitude, section/range/township) and contact information for the sites during and after application. Works with the Ecological Services field office and Law Enforcement to conduct more follow-up evaluations after applications of potentially dangerous pesticides, and where problems are discovered, modifies control strategies to prevent future impacts.

(3) Coordinates with Division of Migratory Bird Management staff to evaluate the potential siting of towers or power lines on hatcheries or rights-of-way and complies with communication tower, power line, and Service interim wind power guidelines.

(4) Develops alternatives to eliminate mortality of migratory birds and reduce, if possible, the effects they have on fish at hatcheries.

(5) Manages hatchery grounds to encourage the restoration of native habitat communities for species of concern, where appropriate.

(6) Provides nest boxes for migratory birds at hatcheries, with emphasis on species of concern.

(7) Develops alternatives that eliminate the mortality of migratory birds and reduce the conflicts between migratory birds and the effects they have on fish at hatcheries.

(8) Manages public use of fish hatcheries (including both non-wildlife and wildlife-dependent recreational use) and related facilities to minimize impacts on migratory bird populations and their habitats.

(9) Evaluates all management practices at fish hatcheries that may cause migratory bird mortality and incorporates management principles that strive to minimize or avoid take, with emphasis on species of concern. For example, conducts restoration and management practices in ways that minimize or avoid loss of nests and young, while still meeting site management objectives.

2.12 How does the Service's Law Enforcement program implement E.O. 13186? Our Law Enforcement staff:

A. In coordination with the Migratory Bird program staff, works with industries proactively through education and outreach to minimize the take of migratory birds.

B. Investigates violations of the MBTA and other Federal laws that affect migratory bird populations (e.g., commercial exploitation, market hunting, and take caused by poisonings, oil spills, and other environmental contaminants).

C. Prevents, within the scope of our statutory authorities, the import of live non-native animals and plants that may be harmful to migratory bird resources.

D. Works with Federal, State, and tribal counterparts to enforce migratory game bird hunting regulations and preserve hunting opportunities for Americans.

E. Continues to develop and provide training on migratory bird identification and enforcement techniques to appropriate Federal, State, and tribal agencies.

2.13 How does the Service's International Affairs program implement E.O. 13186? Our International Affairs staff:

A. Through the migratory bird treaties (i.e., with Canada, Mexico, Japan, and Russia), works with government leaders and other colleagues in those countries to develop innovative new approaches to migratory bird conservation that help to achieve our conservation goals and those identified specifically within the U.S. and North American bird conservation plans. Develops conservation approaches in a way that integrates them into the priorities of our partner countries.

B. Enters permitted migratory bird take activities into SPITS, including species and number of individuals taken, in a timely manner.

C. Division of International Conservation:

(1) Project officers for small-grants programs work with grantees to avoid or minimize any negative impacts to migratory birds that may occur when implementing a grant.

(2) For scientific research grants on migratory birds, project officers work with grantees to make sure they are fully trained in the research methods to prevent negative impacts to birds (e.g., mist netting or other banding techniques).

(3) The Western Hemisphere Program and the Russian Program (i.e., for migrants shared between the Russian Far East and Alaska) integrate into their programs, as appropriate, migratory bird conservation efforts that positively affect species of concern. The Western Hemisphere Program and the Russian Program are adding an additional criterion to their proposal review sheets.

(4) Staff seeks opportunities to work with the World Bank, Asian Development Bank, the State Department's Agency for International Development, and other international programs that affect U.S. migratory bird species traveling outside the United States. Its objective is to promote conservation of migratory birds and avoid take of those birds.

2.14 How does the Service's Business Management and Operations program implement E.O. 13186? Our Business Management and Operations staff coordinates closely with other Service programs to ensure that:

A. Employees closely adhere to the Memorandum on Environmentally Beneficial Practices on Federal Landscaped Grounds, and

B. We incorporate best management practices into facility design, maintenance and repair, hazardous materials management, and mitigation to reduce or eliminate take of migratory birds. This includes consulting with the Regional/CNO Migratory Bird program before beginning any engineering project that may adversely affect migratory birds.

Acting DIRECTOR

Date: December 21, 2006

Appendix F

USFWS Nest Destruction Policy

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Appendix G

Federal Statutes, Executive Orders, and Regulations Applicable to Migratory Birds Conservation, with References for Tribal and State Codes

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Migratory Bird Treaty Act (MBTA); 16 U.S.C. 703-712

Under authority of the MBTA, it is unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Take is defined (50 CFR 10.12) as to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect. Proscription against killing birds, contained in the MBTA and the Eagle Act, applies to both intentional and unintentional harmful conduct and is not limited to physical conduct normally exhibited by hunters and poachers [U.S. v. Moon Lake Electric Association, Inc. (98-CR-228-B; 10th Circuit 1998)].

When taking of raptors, their parts, nests, or eggs is determined by the applicant to be the only alternative, application for Federal, state, and tribal permits must be made through the appropriate authorities. Migratory Bird Permits must be obtained through the USFWS Migratory Bird Permit Office for take of raptor nests (50 CFR 13, 21). The list of migratory birds protected by the MBTA includes raptors and is found in 50 CFR 10.13.

On July 18, 2000, the United States Court of Appeals for the District of Columbia Circuit held in Humane Society v. Glickman, 217 F. 3d 882 (D.C. Cir. 2000), that the MBTA applies to Federal agencies. The United States had previously taken the position that the MBTA only applied to individuals, and not to the Federal Government [Sierra Club v. Martin, 113 F 3d 15 (11th Cir. 1997); Newton Cty Wildlife Assn v. U.S. Forest Service, 113 F 3d 110 (8th Cir. 1997)]. Since the Federal Government decided not to appeal Humane Society v. Glickman, and because all Federal agencies are subject to the jurisdiction of the District of Columbia Circuit, the USFWS will implement the MBTA consistent with this decision.

Federal agencies are consequently required to obtain permits for activities covered by migratory bird permit regulations (50 CFR Part 21). Director's Order 131 (December 20, 2000) clarified that permits from the USFWS are required for any action resulting in intentional take of migratory birds. Permits are not issued for the unintentional take of migratory birds, including raptors. Unintentional take is prohibited by the MBTA.

The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction (Migratory Bird Permit Memorandum, April 15, 2003). The MBTA specifically protects migratory bird nests from possession, sale, purchase, barter, transport, import, export, and take. The other prohibitions of the MBTA—capture, pursue, hunt, and kill—are inapplicable to nests. The full text of the nest policy memorandum can be found in **Appendix E**.

Executive Order (EO) 13186

Executive Order 13186 (66 FR 3853, January 17, 2001) reinstated the responsibilities of Federal Agencies to comply with the Migratory Bird Treaty Act of 1918. The Executive Order (E.O.) establishes a process for Federal Agencies to conserve migratory birds by avoiding or minimizing unintentional take and taking actions to benefit species to the extent practical. The E.O., while not eliminating the possibility of violations of the MBTA, is designed to assist Federal Agencies in their efforts to comply with the MBTA.

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The E.O. identifies 15 elements or responsibilities that should be implemented to the extent permitted by law, subject to the availability of appropriations, within Administration budgetary limits, and in harmony with Federal agency missions. In addition to avoiding or minimizing adverse impacts to migratory bird populations, agencies are expected to take reasonable steps that include restoring and enhancing habitat; preventing or abating pollution affecting birds; and incorporating migratory bird conservation as well as designing migratory bird habitat and population conservation principles, measures, and practices into Federal agency planning processes whenever possible. Environmental analyses of Federal actions required by NEPA or other environmental review processes must evaluate the effects of actions and Federal agency plans on migratory birds, with emphasis on species of concern.

Bald and Golden Eagle Protection Act (Eagle Act); 16 U.S.C. 668

Specific protection for bald and golden eagles is authorized by the Eagle Act. It is illegal to take, possess, sell, purchase, barter, or transport any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. "Take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb (50 CFR 22.3). On June 5, 2007, in the Federal Register, 72:107, p.31131, the U.S. Fish and Wildlife Service clarified its regulations implementing the Bald and Golden Eagle Protection Act. The modifications to implementing regulations for the Bald and Golden Eagle Protection Act established a regulatory definition of "disturb," a term specifically prohibited as "take" by the Eagle Act. The final definition defines "disturb" as "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."

Recent case law [U.S. v. Moon Lake Electric Association, Inc. (98-CR-228-B; 10th Circuit 1998)] concluded that proscription against killing birds, contained in the MBTA and the Eagle Act, applies to both intentional and unintentional harmful conduct and is not limited to physical conduct normally exhibited by hunters and poachers.

The Eagle Act was amended in 1978 to authorize the Secretary of the Interior to publish regulations that may permit the taking of golden eagle nests that interfere with resource development or recovery operations which are operations including but not limited to mining, timbering, extracting oil, natural gas and geothermal energy, construction of roads, dams, reservoirs, power plants, power transmission lines, and pipelines, as well as facilities and access routes essential to these operations, and reclamation following any of these operations. Thus, the USFWS provides for the issuance of permits to "take" inactive golden eagle nests that interfere with resource development or recovery operations if the taking is compatible with the preservation of the area nesting population (50 CFR 22.3). The area nesting population is determined as the number of pairs of golden eagles known to have attempted nesting during the preceding 12 months within a 10-mile radius of a golden eagle nest (50 CFR 22.3). The USFWS will issue a take permit when there is a reasonable expectation that no significant long-term loss of eagle habitat will result from the proposed action.

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The Eagle Act applies to Federal Agencies as well as individuals. A Solicitor's Opinion dated June 30, 1982, initially concluded that the Eagle Act did not apply to the United States because the United States was not listed among the persons in 16 U.S.C. 668(c) to whom the Act applies. However, following recent court (Humane Society v. Glickman: see above description in the Migratory Bird Treaty Act section) and policy decisions, this Opinion was subsequently revoked by a January 19, 2001 Department of Solicitor Opinion. Eagle permits are also required under 50 CFR Part 22 for Federal Agency actions.

It is the policy of the Department of the Interior that all projects by Departmental bureaus comply with the Eagle Act and to urge other Federal agencies to follow this policy as well. Activities of the Federal government should comply with the intent of the Eagle Act and should refrain from actions that would result in the taking of bald or golden eagles.

Note: *On June 5, 2007,Federal Register 72:107, page 31141, the USFWS proposed a rule which would establish a new permit to take bald and golden eagles ("where such permits are consistent with the preservation of the eagles, and the take is associated with, and not the purpose of, the activity and can not be practicably avoided") (http://www.fws.gov/policy/library/07-2697.pdf), Additionally, the regulation would provide Eagle Act authorization comparable to the authorization granted under the Endangered Species Act (ESA) to ESA section 10 permittees who continue to operate in full compliance with the terms and conditions of their permits. We also proposed to establish a streamlined process for issuing Eagle Act permits to entities that take bald eagles in compliance with the terms and conditions of previously issued ESA incidental take statements issued under ESA section 7. Finally, these proposed regulations would authorize intentional take of eagle nests in rare cases where their location poses a risk to human safety or to the eagles themselves.*

There is currently no permit for new actions incurring what might have been previously considered 'incidental take' under ESA (or take under Eagle Act). If agencies can not modify a project proposal to avoid take, using the steps below, the USFWS advises postponing the project until either a permit under Eagle Act becomes available, or the agency can work with the local ES Office to explore other measures to reduce the potential for take.

Endangered Species Act (ESA); 16 U.S.C. 1513-1543

The ESA provides protection to threatened and endangered raptors and their critical habitats. As of this writing, the ESA protects the raptor species Mexican spotted owl (threatened) in the Mountain-Prairie Region. Current lists of endangered and threatened species can be found for all states and regions at http://www.fws.gov/endangered.

Section 9 of the ESA, as amended, prohibits any taking of listed species of fish or wildlife without special exemption. "Take" under the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harass is further defined by the USFWS to include an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is further defined by the USFWS to include an act which actually kills or

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injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3).

Birds of Conservation Concern

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." *Birds of Conservation Concern 2002* (*BCC 2002*) is the most recent effort to carry out this mandate. The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities and draw attention to species in need of conservation action.

The National Environmental Policy Act of 1970 (NEPA); 42 U.S.C. 4321

NEPA was enacted to help public officials make decisions that are based on an understanding of environmental consequences and take actions that protect, restore, and enhance the environment [40 CFR 1500.1 (c)]. NEPA requires all Federal agencies or project proponents using Federal monies to prepare environmental documentation to analyze the environmental impacts of major Federal actions affecting the quality of the human environment. The level of NEPA documentation; Categorical Exclusion, Environmental Assessment (EA), or Environmental Impact Statement (EIS); is determined by the degree of environmental impact. Generally, an EIS level analysis is required for projects with significant environmental impacts.
Mitigation measures can be incorporated into project plans to reduce impacts to the degree that they are insignificant. If that is accomplished, an EA and Finding of No Significant Impact (FONSI) would be appropriate. Mitigation as defined under NEPA (40 CFR 1508.20) includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance
- Compensating for the impacts by replacing or providing substitute resources or environments.

Tribal Wildlife Resources Codes

The Navajo Tribal Code (17 NNC § 507) makes it "unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship" any species listed on the Navajo Endangered Species List (in Groups 2 & 3).

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State Wildlife Resources Codes

Federal agencies are not bound to follow state laws. However, federal agencies planning or permitting activities should be sensitive to state concerns. Individual states may have permitting requirements separate and in addition to federal permit requirements. Each State has their own code for protection of wildlife resources. General references for the state wildlife laws in the states covered by this document are:

Alaska: Alaska Statutes Title 16 and Alaska Administrative Code Title 5
http://www.dnr.state.ak.us/pic/stats_regs.htm

Arizona: Arizona Revised Statutes, Title 17
http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=17

California: Fish and Game Code, Sections 1 to 16541
http://www.legislature.ca.gov/research_and_publications/laws_and_constitution/laws_and_constitution.html

Colorado: The Wildlife, Parks, and Outdoor Recreation Code of Colorado, Title 33; Colorado State Code. Link to online code of Colorado: http://www.sos.state.co.us/CCR/Welcome.do

Idaho: Idaho Statutes, Title 36, Fish and Game
http://www3.state.id.us/idstat/TOC/36FTOC.html

Kansas: Kansas Statutes Annotated, 1986, Chapters 21, 32, 58 and 79
http://www.kslegislature.org/legsrv-statutes/index.do

Montana: The Fish and Wildlife Code of Montana, Title 87; Montana State Code.
http://data.opi.mt.gov/bills/mca_toc/index.htm

Nebraska: Revised Statutes of Nebraska 1943, reissue of 1990, Chapters 37 and 81.
http://uniweb.legislature.ne.gov/QS/laws.php?mode=show_sta

Nevada: Nevada Revised Statutes Annotated, 2007, Title 45
http://www.leg.state.nv.us/NRS/Index.cfm

New Mexico: New Mexico Statutes Annotated, Chapter 17
http://www.conwaygreene.com/nmsu/lpext.dll?f=templates&fn=main-h.htm&2.0

North Dakota: North Dakota Century Code, Title 20.1
http://www.legis.nd.gov/cencode/T201.html

Oklahoma: Oklahoma Statutes Annotated, Title 29
http://www.lsb.state.ok.us/osStatuesTitle.html

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Oregon: Oregon Revised Statutes Annotated, Chapters 496, 498 and 501
http://www.leg.state.or.us/ors/home.html

South Dakota: South Dakota Codified Laws, Title 41, Game, Fish, Parks and Forestry and Title 34A, Environmental Protection
http://legis.state.sd.us/statutes/StatutesTitleList.aspx

Texas: Texas Parks and Wildlife Code, Title 1.
http://tlo2.tlc.state.tx.us/statutes/pw.toc.htm

Utah: The Wildlife Resources Code of Utah; Title 23, Utah State Code
http://le.utah.gov/~code/TITLE23/TITLE23.htm

Washington: Revised Code of Washington, Annotated, Titles 75 and 77
http://apps.leg.wa.gov/rcw/

Wyoming: The Game and Fish Code of Wyoming, Title 23; Wyoming State Code.
http://legisweb.state.wy.us/titles/statutes.htm

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Appendix H

Forms

Site-specific Analysis Form ─ Adapted from the site-specific analysis form developed by the Utah BLM in coordination with the USFWS, Utah Division of Wildlife Resources, and industry, and included in the Utah BLM Best Management Practices for implementing the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (Romin and Muck 2002).

Site Data Form for Annual Inventory or Monitoring ─ Adapted from fields in a raptor database developed by HawkWatch International, Inc. for the Utah Division of Wildlife Resources.

Electrocution Risk Assessment Form ─ Developed and provided to the USFWS by PacifiCorp.

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DATA COLLECTION

The Raptor Guidelines were developed to provide an advisory framework for consistent and effective raptor management on a regional basis. These are "guidelines" or suggested practices, which, if incorporated into plans and implemented, would promote project compatibility with the biological requirements of raptors and associated regulatory statutes. The Raptor Guidelines allow for modifications to the spatial and seasonal restrictions listed in Table 2 of the document, as long as protection of the raptors is provided.

Below, we outline a data collection process designed to enable modifications to be applied and documented in a consistent manner. This is the process which should be followed during an on site evaluation of an activity to determine whether or not to allow modifications of those spatial and seasonal restrictions identified in the Raptor Guidelines.

During the acquisition of baseline data for a proposed project (recommend three years prior to commencement of activities up to and including immediately prior), a qualified biologist should conduct an inventory of the lands that would be impacted and determine if raptors are utilizing the area, what species are involved, and what nest sites occur within the given buffer for that species and could be impacted by a proposed activity. A determination should also be made as to whether the nests, roosts, or other previously specified features are present near proposed development. Additional information for evaluating the possibility of negative effects of development includes, but is not limited to: 1) presence of birds in the vicinity of a nest, 2) nest building or maintenance, 3) eggs or young.

Data acquisition relative to raptors and management actions should continue during and post-project implementation. This will provide useful information regarding the efficacy of mitigation, or the accuracy of predicted impacts if mitigation was not implemented. Within the context of an adaptive management approach, agencies may want to include additional measurable metrics in order to evaluate management decisions.

Use of the Site Specific Analysis:

Alternatives should be identified, considered, analyzed, and documented whenever a federal action is proposed within the spatial and seasonal protective buffer zones of a raptor nest. Selection of a viable alternative that avoids an impact to nesting raptors should be selected over attempting to mitigate impacts to nesting productivity. Any action with a potential adverse effect should be avoided or effectively mitigated. The land management agency or project proponent should informally coordinate, prior to commencement of activities, with the appropriate USFWS Ecological Services Office and state or tribal wildlife agency whenever a site specific analysis shows that an action may have an adverse effect on nesting raptors. The purpose of the coordination will be to determine if the adverse effect can be mitigated, and if so, to determine appropriate mitigation strategies.

If a modification to the Raptor Guidelines is proposed, a qualified biologist should monitor the nest at the times of disturbance, document the findings, and forward a report to the appropriate state wildlife agency for inclusion in their state's raptor or wildlife data base.

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SITE SPECIFIC ANALYSIS

For determining the application of or modifications to the spatial and seasonal buffers include the Raptor Guidelines and associated NEPA or other environmental analysis decision documents.

The following process has been developed to minimize subjectivity and standardize the analysis and impact assessment of actions proposed to be located within spatial and seasonal of occupied raptor nest sites. The Raptor Guidelines provide latitude to devise processes for evaluating site specific impacts of land actions on nesting raptors, and to recommend modifications to the restrictions, if site specific conditions allow. The Raptor Guidelines are subject to revision as more information becomes available or guidelines are otherwise found to be ineffectual.

The Site Specific Analysis should be used to identify factors influencing whether a particular action will have an adverse effect on current and or future productivity of a particular raptor nest site. If territory information is available, include that as well. Data collected should be forwarded to the appropriate wildlife agency for inclusion in their raptor or wildlife data base

Coordination should take place with the respective agency T&E and/or Wildlife Program leads, USFWS Ecological Services Office, and state or tribal wildlife agency, any time an action is proposed to occur that deviates from a designated spatial or seasonal restriction of a raptor species. Examples are given below of specific factors that can be reviewed to on site to determine if modification of the Raptor Guidelines may be implemented.

Definitions:

Action: Management-related decisions, standards, or requirements which may modify a proposal.

Activity: The physical step(s) utilized to engage in the proposal.

Site Specific Analysis: An assessment of potential adverse effects to raptor reproduction at a specific nest location in which an action has been proposed within the protective buffer zone as defined by the Raptor Guidelines.

Nest Buffer: Spatial and seasonal buffer zones have been identified for each raptor species inhabiting Region 6. The buffers relate to protecting nest sites from disturbance during the nesting season and within a specified distance around the nest site (these variables change based on the raptor species involved). Protection of the buffer zone can be critical to the continued productivity of a nest site. Activities proposed within these buffer zones are considered potentially impacting.

Mitigation: Mitigation is considered to be any agency-required action, included as stipulation in an environmental analysis or NEPA document, applied to avoid, minimize, reduce or compensate for adverse effects of an activity on nest site productivity or suitability for nesting.

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Potentially Impacting Activities: For purposes of analysis, potentially impacting activities are considered to include any human activity or the use of operation of mechanical equipment which may disturb raptors at a nest site.

Adverse Effect: An adverse effect to nesting productivity is considered to include any activity resulting in disruption of the nesting cycle which could lead to abandonment of a nest, a reduction in the number of young produced at a nest site, or that compromises the integrity of the site reducing the suitability of the site for future nesting.

Occupied Nest: An occupied nest is a nest site which has been repaired or tended in the current year (by a pair of raptors, or is used by the member of a pair which returns early and begins displaying). During courtship and breeding all nests in a territory are considered occupied until the nesting pair selects one of the nest sites, at which time the others are deemed unoccupied. Unoccupied Nests are defined as those nests not selected by raptors for use in the current nesting season.

Line of Sight: Unobstructed visibility of an activity or intrusion from a nest site or important perch or roost directly associated with the nest site.

> A modification to the spatial restriction listed in the Raptor Guidelines for the raptor species involved, may be considered if all elements of the proposed activity occur in an area totally obstructed from view of a raptor at the nest site, or a frequently used perch or roost site, by vegetation or topographic features. Intrusions that are effectively located out of line of sight of the nest site, may be located within the recommended buffer, but no closer than half the recommended buffer distance to the nest.

Preconditioning to Existing Activities: Raptor species, and individuals within a species, vary considerably in response to activities within a nest site buffer zone.

> A modification from the Raptor Guidelines for spatial restrictions may be considered if a nesting pair of raptors has previously fledged young at the nest site after exposure to similar activities as those being proposed within the buffer. Activities that are similar in activity levels to existing tolerated activities may be located at a distance equal to the distance of the existing activity, but not closer than half the recommended buffer distance to the nest.

Timing of Courtship, Nesting, Rearing of Young, and Fledging: The Raptor Guidelines, as they relate to seasonal buffers, identify the approximate timing of the nesting period.

> A modification from the Raptor Guidelines seasonal restrictions may be considered if site specific analysis indicates that the season of nesting at the nest site being reviewed is determined to be timed differently than that described in the "Guidelines". The intent is that the seasonal restriction would apply to the courtship, mating, nesting, and fledging period that occurs at the site.

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SITE SPECIFIC ANALYSIS FORM

Conduct a site visit to the area of the proposed action and complete the raptor nest site data sheet according to agency or state data standards. (**Bold** items require completion, other information is optional)

Section A: Area of Interest Documentation

State_____	**Office_____**	**Management Unit**
Project ID# _____		**Project Type**

Section B: Site Location (Description). If new nest, also fill out Site Data form

Discovery Year	Species Confirmed Unconfirmed		General Location
Legal T____ , R ____ , Sec. _____ , 1/4, _____ 1/4,		USGS Quad Name	USGS Quad (Ohio Code)
UTM_X	UTM_Y	Nest Roost Perch	Substrate
Nest Condition	White Wash	Fresh Vegetation	Prey Remains
Photos Taken	Y( ) N( )		
Description and filename of photos:			

Section C.: Project-related Information

Distance From New Disturbance to Nest:			
Nest	**Perch** **Roost**		
Extent of Disturbance:	Permanent	Temporary	Distance/Acreage
Length of Time	Timing Variations	Disturbance Frequency	

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Line of Site Evaluation (from nest, perch or roost)(Attach any sketches, photos, or 3-D GIS analyses)	
Other Disturbance Factors: No	Yes (if yes, explain what and include distances from nest to disturbances)
Approximate Age of Nest: New	**Historical**: (number of years)_____
Habitat Values Impacted:	
Estimated Noise Levels of Project (db):	**Frequency** (Hz)
Intermittent (note pattern)	Continuous (note time of day or if 24-hour)
Ambient Noise (db)	frequency (Hz)
Available Alternative(s)(e.g., seasonal, siting, technology):	
Associated Activities:	

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Cumulative Effects of Proposal and Other Actions Not Associated With the Proposal:
Potential for site Rehabilitation: High_____ Low_____ Other Notes (including soil types and presence/pervasiveness of invasive or noxious weeds & type)
Summary of Proposed Modifications: Possible modifications to the spatial and seasonal buffers within the Raptor Guidelines include the following: Rationale
Summary of Proposed Mitigation Measures: Possible mitigation measures related to the proposal include the following Rationale for mitigation measures:

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Summary of Alternatives Considered: Possible alternatives to the proposal include the following Rationale for alternatives:	
Recommendation Based on Above Findings:	
Signature:	**Date:**

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SITE DATA FORM FOR ANNUAL INVENTORY AND MONITORING

Location, Description and Occupancy/Production Evidence

Discovery Year	Species Confirmed Unconfirmed		General Location
Legal T____ , R ____ , Sec. _____ , 1/4, _____ 1/4,		USGS Quad Name	USGS Quad (Ohio Code)
UTM_X	UTM_Y	GPS_Type	At_Nest Y N
Dominant Vegetation		Nest Roost Perch	Substrate
Nest Type	Tree Spp	Nest Condition	Substrate Height
Nest Height	Nest Exposure	Nest Elevation	Nest Slope
Nest Diameter	Nest Thickness	White Wash	Fresh Vegetation
Prey Remains	Prey Spp	Egg Shell	Overhang
Shading	Access	Observation Method	Date

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Human Activity	Prey Base	Habitat Change	Observer

Photos Taken	Y( )	N( )

Description and filename of photos:

Additional comments

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Electrocution Risk Assessment Form

Use of this form should be used in conjunction with training by an appropriate expert or experts and a regularly implemented plan to assess the risk of power infrastructure.

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Record ID No. _____

Date_____

Observer(s)_____

Sheet_____**of**_____

IF A MORTALITY WAS DOCUMENTED, CHECK HERE _____

IF POLE HAS SOME RAPTOR PROTECTION BUT IS NOT RAPTOR-SAFE, CHECK HERE_____

District _____**Circuit**_____

HABITAT TYPE (Circle. If more than one apply, indicate percent of each.)

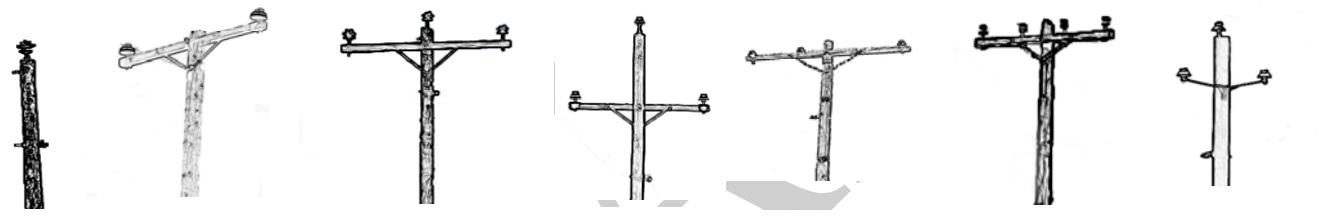
Sagebrush/Shrub/Grass Dry meadow Cropland/Pasture Barren Riparian Residential/developed Pinyon/Juniper

Spruce/Fir/Aspen Wet meadow Mudflat Open water Other:_____

Is the area: remote rural suburban

MAP STRING & FACILITY POINT: _____**COPCO #:**_____**Missing Plate?** Yes

POLE CONFIGURATION (Circle one. If pole does not match any shown, draw it on other side of sheet.)



Single phas no crossarm | Single phase with crossarm | Three-phase | Three-phase crossarm lowered | Three-phase w two lines on one neutral dowr | Three-phase with lines on each side, neutral up | Three-phase streamline

Is structure raptor-safe? Yes No

Circle all that apply: Tangent Angle Corner Deadend Double deadend Feeder to underground

No. distribution conductors _____

No. transmission conductors_____ YS Post-mount H-frame Other _____

Equipment:

transformers_____capacitor bank_____

cutouts_____jumpers_____

arresters_____# regulators_____

other_____

Crossarm size: 8-ft 10-ft other

Crossarm material: wood metal fiberglass n/a

Crossarm brace material: wood metal fiberglass n/a

Equipment arm material: wood metal fiberglass n/a

Location of ground wire: Below arm At or above arm None

Location of neutral: Up Down None

Is down guy insulated: Yes No n/a

Is hardware bonded: No Yes (Distrib and/or Transm?)

Photo number_____

Raptor Protection:

bushing caps_____# arrester caps_____

hose: all none partial :_____

insulator covers_____

perch guards_____type_____

nest platform_____perch_____

firefly_____BFD/SVD_____

other_____

Circle if present: Pellets Whitewash

Prey remains Molted feathers Prey populations

Are there live raptors, mortalities, nests, or pole damage?

No Yes*

(*if yes, continue on other side)

POLE CONDITION (Circle all that apply)

Broken insulator Broken crossarm Leaking transformer Broken/burned/leaning pole Other: _____

MORTALITIES/INJURIES

Status: dead injured **Number individuals** _____ **Distance to nearest pole (ft.)**_____

Species (circle one): Red-tailed Hawk Ferruginous Hawk Swainson's Hawk Golden Eagle Bald Eagle Osprey Peregrine Falcon Prairie Falcon Merlin American Kestrel Great Horned Owl Barn Owl Common Raven American Crow Black-billed Magpie Great Blue Heron Unknown Other_____

Cause of death/injury: Unknown Electrocution Shot Roadkill Other: _____

Evidence of electrocution: Burnt feathers Burnt talons Burnt bill Exit wound Other:_____

Status of carcass/remains: Buried Left on-site Collected **Final deposition:**_____

Wrist to wrist (in.)_____**Head to foot (in.)**_____

Wingspan (in.)_____**Wing chord (in.)**_____

Band number (if applicable) _____ **Directions**_____

_____

LIVE SPECIES OBSERVED

Species (<u>indicate number of individuals</u>): Red-tailed Hawk_____ Ferruginous Hawk_____ Rough-legged Hawk _____ Swainson's Hawk_____ Golden Eagle_____ Bald Eagle_____ Peregrine Falcon___ Prairie Falcon_____ Merlin_____ American Kestrel_____ Osprey_____ Northern Harrier_____Barn Owl_____ Great Horned Owl_____Common Raven_____ Unknown_____Other_____

Behavior (check all that apply, <u>indicate species</u>): Flying/Hunting_____ Perched on wire_____ Perched on Power Pole_____ Perched on Tree/Cliff/Ground_____ Other:_____

Nest?_____ **Species**_____ **Active / inactive ?**

Location_____

NOTES_____

_____

_____

_____

Record ID No._____

USFWS Notification_____**Date**_____

Manager Notification_____**Date**_____

Pole Diagram:

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Appendix I

Additional Resources

This appendix is only an overview, and not intended to be exhaustive. We welcome recommendations for additional resources.

Portions adapted from information developed by Terry Rich <terry_rich@fws.gov>

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RESOURCES FOR GENERAL INFORMATION ON THE BIOLOGY AND ECOLOGY OF BIRDS, INCLUDING RAPTORS

Avian Visual Cognition
This is an online (cyberbook) publication Edited and Published by Dr. Robert G. Cook, Department of Psychology, Tufts University, in cooperation with Comparative Cognition Press (September, 2001).
http://www.pigeon.psy.tufts.edu/avc/toc.htm

Birdnet
Issue briefs, grants, permits, guidelines, and fact sheets. Meetings, journals, ornithological societies, and listservs. Recent Ornithological Literature On-line.
<http://www.nmnh.si.edu/BIRDNET/>.

Birds of North America
In two centuries of American ornithology, only three comprehensive references have been completed on North American birds. The most recent of these, A.C. Bent's Life Histories of North American Birds, was begun in 1912, and is now out of date. This modern reference series is here. The Birds of North America, supported by The American Ornithologists' Union, the Cornell Lab of Ornithology and the Academy of Natural Sciences of Philadelphia, provides a detailed scientific account of each of the more than 700 species nesting in the 50 United States and Canada. <http://birds.cornell.edu/birdsofna/>. Full BNA accounts are available online for a fee.

Cornell Lab of Ornithology
Field guides, reference books, field checklists, tapes and CDs of bird songs, optical equipment, links to other bird resources on their web site. Citizen Science projects data and reports, e.g., Project Tanager, Project Feederwatch, and Great Backyard Bird Count.
<http://birds.cornell.edu/>.

National Audubon Society - <http://www.audubon.org/>.

National Biological Information Infrastructure
NBII is a collaborative program to provide access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources. <http://birdcon.nbii.gov/>.

NatureServe
NatureServe is a non-profit conservation organization that provides the scientific information and tools needed to help guide effective conservation action. NatureServe and its network of natural heritage programs are the leading source for information about rare and endangered

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species and threatened ecosystems. Information includes an online encyclopedia of plants, animals, and ecosystems of the U.S. and Canada; digital range maps for birds of the Western Hemisphere; Ecological Systems of the United States, Latin American and the Caribbean; and a database on wildlife of Latin America, among many other things. <**http://www.natureserve.org/**>.

Raptor Information System
Searchable database for raptor-related references.
<http://ris.wr.usgs.gov/>

BIRD MONITORING RESOURCES

Avian Science Center, University of Montana, All-bird Monitoring Plan
The University of Montana led one of the first efforts in the nation to develop and implement an All-bird Monitoring Plan. Resources at this site include draft coordinated bird monitoring plans, information on landbird and riparian wetland monitoring, products from the Avian Fire Research Program, and additional downloadable publications.
http://www.avianscience.org/research_coordinated.htm

Avian Point Count Database
Standardized methodologies for conducting point counts have been developed and guidelines have been published. These have become popular for documenting relative abundance because they are much less labor-intensive than Breeding Bird Censuses or Winter-Bird Population Counts, but yield much of the same information. Point counts can be used to document the effects of site-specific habitat management efforts. Recently, an online Bird Point Count Database has been implemented to allow easy entry, storage, and retrieval of data.
<http://www.mp2-pwrc.usgs.gov/point/>.

Breeding Bird Atlases
Atlases are not monitoring programs but rather inventories of birds that occur in a given area. Atlases provide standardized data useful for many analyses. A handbook <http://www.americanbirding.org/norac/atlastitle.htm> has been prepared by the North American Ornithological Atlas Committee. Field work has been completed, and Atlases published, for a number of States and several counties.

Breeding Bird Survey
Begun by Chan Robbins in 1966, this is the most valuable long-term terrestrial vertebrate monitoring program in North America. Birds are counted along a 24.5-mile route during the breeding season. The main use of the data are for population trends at various geographic scales, but species distributions, relative abundances, and a variety of other sorts of information can be obtained from this database. About 2900 of the 3700 routes are read annually.
<http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>.

The Canadian Wildlife Service has summarized the results of all Canadian BBCs. These data were very useful for the PIF North American Landbird Conservation Plan. <http://www.cws-scf.ec.gc.ca/publications/tech/tech342/index_e.cfm>.

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Breeding Bird Research and Monitoring Database
BBIRD is a research initiative of the Montana Cooperative Wildlife Research Unit (Tom Martin, Director). Plot-based intensive nest searching using standardized field methodologies for studies of nesting success and habitat requirements of breeding birds. BBIRD participants contribute their data to the national BBIRD database to allow examination of large-scale patterns and trends. The national database includes data through 2002 on nearly 60,000 nests and associated vegetation, representing more than 210 species of birds. BBIRD monitors nesting success and habitat of nongame birds by finding and monitoring nests at replicate plots across North America. <http://pica.wru.umt.edu/BBIRD/info.htm>.

Coordinated Bird Monitoring, National Site - Background
Under the guidance of the US NABCI Committee, there is a relatively new effort underway to establish Coordinated Bird Monitoring for North America. The goal is to establish a shared set of objectives for monitoring and then to have all partners coordinate their monitoring activities to meet those objectives. Monitoring currently is very fragmented, not coordinated, and inefficient. Major over-arching objectives are, for example, to ensure adequate long-term population trend monitoring for the highest priority species. <http://amap.wr.usgs.gov/>.

Coordinated Bird Monitoring Project
Resources available from this site include: Individual state reports; state coordinated bird monitoring plans from Colorado, Idaho, Montana, Nevada, and Utah; and **Guidelines for designing short-tem monitoring projects**
<http://greatbasin.nbii.gov/CBM/>

Cornell Lab of Ornithology - <http://birds.cornell.edu/>

Great Basin Information Project: Bird Monitoring Project
This is a useful and inclusive portal to additional resources, including the Idaho and Great Basin Coordinated Bird Observatories.
<http://greatbasin.nbii.gov/Birds.html>

Hawk Migration Migration Counts
The Hawk Migration Association of North America coordinates standardized counts throughout spring and/or fall migration season at selected lookouts using standardized methodologies. Long-term data are available for perhaps a couple of dozen major sites scattered across North America, with additional data available from hundreds of other sites. The Autumn Hawk Watch, a subset of hawk migration data, is available at BirdSource
<http://report.birdsource.org/HawkWatchResults/>. <http://www.hmana.org>.

Intermountain West Coordinated Bird Monitoring Project
The Intermountain West Coordinated Bird Monitoring (IWCBM) program is a cooperative effort by numerous organizations to improve the efficiency and utility of bird monitoring in the intermountain west. It four modules: aquatic bird surveys, terrestrial bird surveys, bird-habitat models, and data management. The object data management module is to create a data management system to assist program managers in data entry, storage, retrieval and analysis, and

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in sharing data with others to the extent desired
<http://greatbasin.nbii.gov/IWCBM/>

National Biological Information Infrastructure
Links to various monitoring programs can be found at
<http://birdcon.nbii.gov/monitoring_links.html>. One link is to the Migratory Bird Data Center, with further links. <http://birddata.fws.gov/>.

Northeast Coordinated Bird Monitoring
Although not currently within the area covered by this document, this is a very good resource regarding coordinated bird monitoring and has a highly useful section of bird monitoring publications. For example, the section under "tools and resources" dealing with survey design, implementation, and analysis contains publications on general monitoring strategies, detectability, presence-absence and occupancy, field protocols, and trend analysis.
http://www.nebirdmonitor.org/

Patuxent Wildlife Research Center
Bird Banding Laboratory, Breeding Bird Census, Museum collections, bird identification resources, Duck Data, population analysis software, Avian Point Counts, Contaminant Exposure and Effects -Terrestrial Vertebrates database. <http://www.pwrc.usgs.gov/>.

PRBO Conservation Science.
PRBO, founded as Point Reyes Bird Observatory, is dedicated to conserving birds, other wildlife and ecosystems through innovative scientific research and outreach. Their site provides links to a number of science tools and information related to conservation planning. They have divisions devoted to wetlands, marine, and terrestrial ecology, as well as informatics and climate change. They also have a complete Guide to Adaptive Conservation Strategies.
http://www.prbo.org/cms/index.php

Rocky Mountain Bird Observatory
The Rocky Mountain Bird Observatory works to conserve birds of the Rocky Mountains, Great Plains, and Intermountain West and the habitats on which they depend through research, monitoring, education, and outreach. Information available at this site includes annual monitoring reports and survey protocols.
http://www.rmbo.org/default.html

RAPTOR METHODOLOGIES AND TECHNIQUES

Inventory Methods for Raptors: Standards for Components of British Columbia's Biodiversity No. 11
If no other state, regional, or agency methods are required or available, these provide good guidance for raptor inventory methods.
<http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/raptors/version2/rapt_ml_v2.pdf>

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Raptor Management and Research Techniques. Hancock House, Surrey, British Columbia, Canada. Thoroughly updated version of the popular but long out of print Raptor Management Techniques Manual. Available at http://www.hancockhouse.com/products/rapres.htm

SPECIES AND HABITAT ASSESSMENT, CONSERVATION, & MANAGEMENT

Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia.
This document was developed to provide additional background information in support of *Develop with Care*. It is also the companion document to the Best Management Practices for Amphibians and Reptiles in Urban and Rural Land Development in British Columbia. The document provides general material on raptors, including life history and habitat requirements, for 25 species whose ranges overlap with urban and rural development, and provides best management practices guidelines for activities undertaken in those ranges.
<http://www.env.gov.bc.ca/wld/documents/bmp/raptor_bmp_final.pdf>

British Columbia Integrated Land Management Bureau's Resources Information Standards Committee: Standards
Extensive resources regarding inventory methods and data forms for all types of avian (and other) resources, including raptors. They have separate documents for diurnal raptors and owl survey methods.
<http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/index.htm>

Commission for Environmental Cooperation, Biodiversity Publications
This site includes Conservation Action Plans for ferruginous hawk and burrowing owl.

<http://www.cec.org/pubs_docs/scope/index.cfm?varlan=english&ID=12>

Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah
Conservation agreement signed by the National Forests, Bureau of Land Management, Utah division of Wildlife Resources, and the USFWS, intended to sustain a viable population of goshawks.
<http://www.fs.fed.us/r4/goshawk/strategy-wo-lp-as.pdf>

Effects of Management Practices on Grassland Birds
This source provides links to useful syntheses of information on grassland birds, the effects of management practices upon them, and recommendations for improved management. Includes accounts for: northern harrier, Swainson's hawk, ferruginous hawk, golden eagle, prairie falcon, merlin, short-eared owl, and burrowing owl.

Johnson, Douglas H., Lawrence D. Igl, and Jill A. Dechant Shaffer (Series Coordinators). 2004. Effects of management practices on grassland birds. Northern Prairie Wildlife Research Center, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/index.htm> (Version 12AUG2004).

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Intermountain West Joint Venture Coordinated Bird Conservation Plan and State Plans
The plan(s), covering all or portions of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming, identify priority habitats and specific habitat areas (Bird Habitat Conservation Areas, or BHCA's) for conservation. Plans also provide habitat goals and objectives for key habitats.
<http://www.iwjv.org/plans.htm>

Integrating Bird Conservation into Range Management
This publication, available via the website for the Rocky Mountain Bird Observatory, received funding from the USDA Western Region Sustainable Agriculture Research and Education (SARE) program. The manual was designed to assist resource professionals with integrating birds and their habitat needs into range management and monitoring, and to train landowners and land managers to do the same.

http://www.rmbo.org/pubs/downloads/sare/RMBO_SARE_manual_Jun_06.doc

Management Recommendations for Washington's Priority Species, Volume IV: Birds
The volume includes species accounts with information on each bird's geographic distribution and the rationale for its inclusion on the Priority Habitats and Species (PHS) List. The habitat requirements and limiting factors for each species are discussed, and management recommendations addressing the issues in these sections are based on the best available science. Each species document includes a bibliography of the literature used for its development, and each has a key points section that summarizes the habitat requirements and management recommendations for the species. Raptor species include: bald eagle, burrowing owl, ferruginous hawk, flammulated owl, golden eagle, northern goshawk, peregrine falcon, and prairie falcon.
<http://wdfw.wa.gov/hab/phs/vol4/birdrecs.htm>
<http://wdfw.wa.gov/hab/phs/vol4/phs_vol4_birds.pdf>

National Gap Analysis Program
Gap Analysis is a scientific means for assessing to what extent native animal and plant species are being protected. It can be done at a state, local, regional, or national level. The goal of Gap Analysis is to keep common species common by identifying those species and plant communities that are not adequately represented in existing conservation lands. Common species are those not threatened with extinction. By identifying their habitats, Gap Analysis gives land managers, planners, scientists, and policy makers the information they need to make better-informed decisions when identifying priority areas for conservation. <http://gapanalysis.nbii.gov>

Navajo Natural Heritage Program (NNHP)

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The Navajo Natural Heritage Program (NNHP) is the Navajo Nation's rare, threatened and endangered species office. NNHP's purpose is to collect, manage and disseminate biological and ecological information for land-use planning to promote the conservation of biological diversity on the Navajo Nation. The NNHP maintains a comprehensive database of information on rare and protected plant and animal species and biological communities on the Navajo Nation, including raptors. Species-specific files for raptors include information regarding status, distribution, habitat, phenology, suggested survey method, and suggested avoidance.
<http://nnhp.navajofishandwildlife.org/>

Partners in Flight
<http://www.partnersinflight.org/>
A cooperative effort of federal, state and local government agencies, philanthropic foundations, professional organization, conservation groups, industry, the academic community, and private individuals. Multiple resources, including the following:

Links to bird conservation plans, which contain habitat and species-specific conservation recommendations, as well as lists of priority species:
<http://www.partnersinflight.org/conservation_plans/default.htm>

The Five Elements Process: Designing Optimal Landscapes to Meet Bird Conservation Objectives
<http://www.partnersinflight.org/pubs/ts/01-FiveElements.pdf>

Partners in Flight Species Assessment Databases
Provide scores on 7 vulnerability factors and other information for landbirds and other birds.
<http://www.rmbo.org>.

Species Assessments Compiled by: Wyoming Natural Diversity Database, Laramie, Wyoming, for the Wyoming Bureau of Land Management
Species assessments for state sensitive species (therefore BLM sensitive species), including bald eagle, ferruginous hawk, northern goshawk, and burrowing owl.
<http://www.blm.gov/wy/st/en/programs/Wildlife/species-assessments.html>

State Wildlife Action Plans
State wildlife action plans outline the steps that are needed to conserve wildlife and habitat before they become more rare and more costly to protect. Taken as a whole, they present a national action agenda for preventing wildlife from becoming endangered. They also provide conservation goals for habitats and priority species.
<http://www.wildlifeactionplans.org/index.html>

USDA Forest Service, Rocky Mountain Region, Species Conservation Program: Species Conservation Assessments
This highly informative site includes Species Conservation Assessments for ferruginous hawk, northern harrier, northern goshawk, burrowing owl, and short-eared owl.
<http://www.fs.fed.us/r2/projects/scp/assessments/>

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GENERAL BIRD RESEARCH PROGRAMS, PUBLICATIONS, AND DATA

Avian Science Center, University of Montana
The mission of the Avian Science Center is to promote ecological awareness and informed decision making through the collection, synthesis, and dissemination of science-based information on western birds.
http://www.avianscience.org/research_coordinated.htm

Department of Defense
DOD has a large amount of land, much of which is in good ecological condition because it's been off limits to many uses, and it has a well funded research program. This site lists research projects by state. <www.dodpif.org/projects/index.htm>.

Forest Service Research Stations
The USFS has over 1,000 experts in research programs that address many bird conservation issues directly. There are research stations in numerous locations, each focusing on issues in its region - International Institute of Tropical Forestry, Northeastern, North Central, Pacific Northwest, Pacific Southwest, Rocky Mountain, and Southern. <http://www.fs.fed.us/research/>.

Institute for Bird Populations
IBP is currently focusing on six major research programs in order to accomplish its primary goals. Each of these projects trains and utilizes substantial numbers of "interns", biologists and other volunteers. The best known is MAPS (see above).
<http://www.birdpop.org/programs.htm>.

Ornithological Journals
See links to major societies at BirdNet <http://www.nmnh.si.edu/BIRDNET/>. Most are available by subscription, but increasing availability of articles on line, e.g., <http://library.fws.gov/ejournals.htm>, and <http://www.nmnh.si.edu/BIRDNET/onlinelit.html>.

National Park Service
As part of the National Park Service's effort to "improve park management through greater reliance on scientific knowledge," a primary role of the Inventory and Monitoring (I&M) Program is to collect, organize, and make available natural resource data and to contribute to the Service's institutional knowledge by facilitating the transformation of data into information through analysis, synthesis, and modeling. This web source provides a wealth of data as well as protocols for inventory and monitoring.

Inventory and Monitoring: <http://science.nature.nps.gov/im/index.cfm>

USGS Cooperative Research Units
Coop Units conduct research on renewable natural resource questions, participate in the education of graduate students destined to join the natural resource profession, provide technical assistance and consultation to parties who have interests in natural resource issues, and provide various forms of continuing education for natural resource professionals.
<https://coopunits.org/>.

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USGS Biology Programs - <http://biology.usgs.gov/pub_aff/usgsbio.html>.

- Invasive Species
- Wildlife and Terrestrial Resources
- Terrestrial, Freshwater, and Marine Ecosystems
- Contaminant Biology
- Status and Trends of Biological Resources

Selected Noise References

Acoustical Society of America. A leading international scientific society in acoustics, dedicated to sharing and increasing the knowledge of acoustics and its practical applications. Areas of research and expertise cover such areas as acoustical oceanography, musical acoustics, noise, underwater acoustics, and animal bioacoustics.
http://asa.aip.org/

Cornell Lab of Ornithology Bioacoustics Research Program
The Bioacoustics Research Program (BRP) is a unit within the Cornell Lab of Ornithology. BRP develops digital recording equipment, computer software, and algorithms that are used by scientists around the world to study animal communication and to monitor the health of wildlife populations. BRP is also pioneering new techniques for censusing and tracking wildlife with arrays of microphones placed in natural environments around the globe.
http://www.birds.cornell.edu/brp/

Operational Noise Manual: An Orientation for Department of Defense Facilities. This manual provides brief overviews of relevant noise regulations, policy and the following subjects: Characteristics of Sound; Effects of Noise; Military Noise Sources; Noise Monitoring; Reduction of Noise Conflicts and more. It also provides easily understood discussion of steps for evaluating noise under differing conditions.
http://chppm-www.apgea.army.mil/dehe/morenoise/DoDOperationalNoiseManaulFinalREV.pdf

Useful literature:
Bowles, A.E. 1995 Response of wildlife to noise. Pp109-156. *In* (R.L. Knight and K.J. Gutzwiller, eds.) Wildlife and Recreationists, Island Press, Washington, D.C.

Comparative hearing. Birds and reptiles / Robert J. *Dooling*, Richard R. Fay, Arthur N. Popper, editors. New York : Springer, c2000. 380 pp.

HABITAT EVALUATION, MANAGEMENT, AND RESTORATION RESOURCES

USGS RESOURCES

Habitat Evaluation Procedures (HEP)
The philosophy behind the Habitat Evaluation Procedures (HEP) is that an area can have various habitats, and that these habitats can have different suitabilities for species that may occur in that area. The suitabilities can be quantified (via Habitat Suitability Indices [HSIs]) and the different

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habitats have measurable areal extents. HEP allows wildlife managers to quantitatively compare two or more alternative management practices of an area with regards to those practices affecting species in that area. For example, we can judge the effects of logging, mining, and cattle grazing, versus no use. Furthermore, HEP provides the ability to quantify the effects of mitigation (not so great a negative impact) or compensation (improve another like area to make up for lost habitat in the impacted area). An important tool for land use managers, as they can quantify the effects of alternative management plans over time, and provide for mitigation and compensation that can allow fair use of the land and maintain healthy habitats for affected species.
<http://www.fort.usgs.gov/Products/Software/HEP/>

Habitat Suitability Index Models Series
This series provides habitat information for evaluating impacts on fish and wildlife habitat resulting from water or land use changes. The impetus for this series was the Habitat Evaluation Procedures (U.S. Fish and Wildlife Service 1980a), a planning and evaluation technique that focuses on the habitat requirements of fish and wildlife species. The habitat information in this series has been formatted according to Standards for the Development of Habitat Suitability Index Models (U.S. Fish and Wildlife Service 1981).
<http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiintro.htm>

HEP500 - Habitat Evaluation Procedures & HEP300 - Using HEP and HSI Software.
Courses taught by Adrian Farmer. Who can be contacted through FORT at Fort Collins, CO

USDA Forest Service General Technical References

Jornada Experimental Range Monitoring and Assessment Resources
The Jornada Experimental Range (JER) is an international leader in the development of rangeland assessment and monitoring protocols. During the past five years, JER has developed a quantitative monitoring protocol (*Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems)* that is being tested and applied in over 10 states and at least four countries outside the U.S. JER also co-authored the qualitative assessment protocol, "Interpreting Indicators of Rangeland Health," which is being applied globally. Both protocols are approved for use in the US by the BLM and NRCS.
<http://usda-ars.nmsu.edu/monit_assess/monitoring.php>
Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems (Volumes I and II)
<http://usda-ars.nmsu.edu/monit_assess/PDF_files/Quick_Start.pdf>
<http://usda-ars.nmsu.edu/monit_assess/PDF_files/Quick_Start.pdf>

Gen. Tech. Rep. RMRS-GTR-136-Vols-1-3. Restoring western ranges and wildlands. Monson, S.B, R. Stevens, N.L. Shaw, comps. 2004. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 884pp.
Volume 1. <http://www.fs.fed.us/rm/pubs/rmrs_gtr136_vol1.pdf>
Volume 2 <http://www.fs.fed.us/rm/pubs/rmrs_gtr136_vol2.pdf>
Volume 3 <http://www.fs.fed.us/rm/pubs/rmrs_gtr136_vol3.pdf>

Gen. Tech. Rep. PNW-GTR-485 Source habitats for terrestrial vertebrates of focus in the interior Columbia basin: broad-scale trends and management implications by Michael J. Wisdom,

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Richard S. Holthausen, Barbara C. Wales, Christina D. Hargis, Victoria A. Saab, Danny C. Lee, Wendel J. Hann, Terrell D. Rich, Mary M. Rowland, Wally J. Murphy, and Michelle R. Eames.
Volume 1 <http://www.fs.fed.us/pnw/pubs/gtr485/gtr485v1.pdf>
Volume 2a <http://www.fs.fed.us/pnw/pubs/gtr485/gtr485v2a.pdf>
Volume 2b <http://www.fs.fed.us/pnw/pubs/gtr485/gtr485v2b.pdf>
Volume 3 <http://www.fs.fed.us/pnw/pubs/gtr485/gtr485v3.pdf>

Gen Tech. Rep. 180 RMRS Rocky Mountain Research Station Publication: Arc Habitat Suitability Index Computer Software. Habitat modeling tool developed to assist land managers in their impacts analyses for NEPA. This tool estimates the ability of an area to meet an animal species' requirements for food and cover.
<http://www.fs.fed.us/rm/pubs/rmrs_gtr180.pdf>

USDI Bureau of Land Management References

Available from the BLM Library<http://www.blm.gov/nstc/library/library.html>

Idaho BLM Technical Bulletin Series <http://www.id.blm.gov/techbuls/index.htm> includes several raptor-related and habitat management publications.

Technical References <http://www.blm.gov/nstc/library/techref.htm>, this page provides links to a number of publications, including the following:

TR-1730-2. Biological Soil Crusts: Ecology and Management
<http://www.soilcrust.org/crust.pdfU

TR-1734-6 rev. Interpreting Indicators of Rangeland Health.(a USGS/USDA FS & NRCS/BLM document) <http://www.blm.gov/nstc/library/pdf/1734-6rev05.pdf>

TR-1737-22. Riparian Restoration (a USDA Forest Service document adopted by the BLM)
<ftp://ftp.blm.gov/pub/nstc/techrefs/Final%20TR%201737-22.pdf>

RESOURCE IN-DEVELOPMENT, POTENTIAL FOR PARTNERSHIPS
At the USGS Forest and Rangeland Ecosystem Science Center:
Toward a Continental Raptor Monitoring Strategy
Development of the Continental Raptor Monitoring Strategy was initiated in July 1996 during the North American Raptor Monitoring Workshop in Boise, Idaho. The purpose of this workshop was to address the need of various Dept. of the Interior bureaus for practical ways to determine the status and trends of raptor species. The USGS Forest and Rangeland Ecosystem Science Center's (FRESC) Snake River Field Station (SRFS) and Boise State University (BSU) propose to continue developing a strategy for monitoring raptors from throughout North America to northern Mexico. This effort will be a continuation of work begun jointly by USGS staff at the Patuxent Wildlife Research Center (PWRC), SRFS, and BSU. The scope of work addressed includes: 1) evaluate the literature and exiting databases for methods and data useful for monitoring diurnal raptors and some owls that can be surveyed during daylight; 2) identify inadequacies for monitoring by species, geographic areas, and season (breeding, migration,

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winter); 3) describe existing procedures for overcoming inadequacies; 4) recommend development of new procedures needed to provide monitoring information; 5) provide a strategy for long-term monitoring of the status and trends of raptor numbers. The Strategy will be a synthesis of how to use existing and new procedures to monitor each species, by season, and by geographic area. The effort to be implemented in a final strategy can be prioritized further by species and with consideration of cost required to conduct the various procedures we recommend.
<http://fresc.usgs.gov/text/research/detail.asp?Project_ID=19>

Contact Information:

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Appendix J

BLM Key Raptor Areas

Appendix 1 in: Olendorff, R.R, and M.N. Kochert. 1992. Raptor habitat management on public lands: a strategy for the future. Fish and Wildlife 2000: National Strategy Plans, U.S. Dep. Inter. Bur. Land Manage. 46pp.

Areas may have been more accurately delineated since the publication of the original document. For the most recent information regarding the status of these areas and their raptor populations, contact and coordinate closely with the wildlife biologists at the respective BLM Field Office, with the BLM State Wildlife Lead, For the most recent information regarding the status of these areas and their raptor populations, contact and coordinate closely with the wildlife biologists at the respective BLM Field Office, the BLM State Wildlife Lead, the appropriate USFWS offices, and state wildlife resources management agencies.

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Key Raptor Areas by State, Including Acres of Public Lands

State	Key Raptor Area Name	Acres BLM
Alaska	Kuskokwim River	480,000
	Lime Hills	300,000
	Brooks Range Foothills	1,000,000
	Colville River	400,000
	Sagwon Bluffs	207,360
	Utukok Uplands	1,000,000
	Gulkana River Basin	300,000
Arizona	Kanab Creek	40,000
	Mt. Trumbull/Mt. Logan	45,000
	Paria Canyon/Vermillion Cliff	95,000
	Alamo Lake	15,232
	Burro Creek, Francis Creek	37,150
	Grand Wash Cliffs	5,760
	Hualapai Valley	36,864
	Pinnacles	1,690
	Middle Gila Planning Unit	192,000
	Silverbell Planning Unit	266,000
	Aravaipa Canyon	60,000
	Black Rock	700
	Bonita Creek	9,000
	Eagle Creek	5,000
	Gila Box	20,000
	Markham Creek	5,000
	Muleshoe	24,000
	Needles Eye	5,000
	San Manuel Riparian	160
	Peloncillo Mountains	43,000
	San Pedro River	43,000
	San Simon Valley	448,000
	Sulphur Springs Valley	69,000
	Bill Williams River	5,500
	Whipple Mountains	110,000
	Colorado River Corridor	23,100
	Mittry Lake Wildlife Area	12,000

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State	Key Raptor Area Name	Acres BLM
California	Blue Ridge	3,268
	Carrizo/Elkhorn Plain	UNK7
	Spanish Needles	UNK
	Harper Dry Lake	4,000
	Newberry/Granite Mtns.	160,000
	Superior Valley	25,000
	Cima Dome	52,000
	Piute Creek	280
	Red Mtn./El Paso Mtns	280,000
	Robbers Roost	4,000
	Fall River Mills Bald Eagle	1,130
	Hat Creek Bald Eagle	920
	Lower Klamath Basin	11,760
	Pit River Canyon	6,640
	Eagle Lake Complex	13,000
	Round Valley Bald Eagle	280
	Skedaddle/Amadee Complex	15,000
	Hayes Canyon	9,750
	High Rock Canyon	77,000
	Surprise Valley	90,000
	Wall Canyon	3,000
	Butte Creek Mgmt. Area	2,500
	Cache Creek	8,000
	Peregrine Falcon Project	UNK
Colorado	Blanca Wildlife Habitat Area	5,750
	Lower Rio Grande River	1,440
	Cathedral Spires	240
	South Platte Reservoirs	7,100
	Beaver Creek	20,750
	Browns Canyon	6,614
	Table Mountain	UNK
	Sheep Mountain	1,020
	Hiawatha-Powder Wash	176,735
	IIes-Duff-Williams Fork Mtns.	59,126
	Yampa-Williams Fork-Little Snake	13,000
	Dolores River	24,985
	Ruby-Horsethief Canyon	24,272

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State	Key Raptor Area Name	Acres BLM
Idaho	Brownlee/Oxbow Reservoirs	40,000
	Snake River Birds of Prey Area	482,640
	Jarbidge River	UNK
	Owyhee River	180,000
	Black Pine Valley	161,140
	Bowen Canyon	10,959
	Wolf Lodge Bay	332
	American Falls Res. Roost	UNK
	Deer Park Roost	UNK
	South Fork Snake River	15,352
	Lower Blackfoot River	6,468
	Thousand Springs Wetland	3,300
	Upper Salmon River Corridor	18,860
	Bennet Hills/Wendell Planning Unit	500,000
	Camas Prairie	85,000
	Snake River Canyon	225
Montana	Centennial Valley	85,000
	Lima Foothills	140,000
	Lower Beaverhead-Bighole River	5,000
	Madison River	5,100
	Sweetwater Breaks	33,000
	Kevin Rim	4,657
	Rock Mountain East Front	19,518
	Marias River	1,120
	Upper Missouri River	1,880
	Missouri River Wild and Scenic River	1,500
	Big Bend of the Milk River	4,000
	Milk River	1,400
	Rock Creek Canyon	3,960
	Rock Creek-Thoeny Area	5,840
	Timber Creek	9,560
	Howrey's Island	631
	Little Missouri River Winter Roost	20
	Lone Tree Management Area	70,393
	Tobacco Garden/Williston	900

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State	Key Raptor Area Name	Acres BLM
New Mexico	Bald Eagle ACEC	3,300
	Chaco Coal Area	80,000
	Apache Box	400
	Gila River Lower Box	2,631
	Gila River Middle Box	720
	Lake Holloman	1,055
	Big Canyon	700
	East Guadalupe Foothills	500,000
	Los Medanos Raptor Area	80,000
	Macho Wildlife Habitat Area	634,700
	Southern Gypsum Area	75,000
	Red River Public Lands	UNK
Oregon	Catlow Rim	5,310
	Pickett Rim	4,000
	Rattlesnake, Etc., Bald Eagle Roosts	60
	Silver Creek	14
	Stinking Water Mountains	1
	Siuslaw River (Coast Range)	31,000
	Triangle Lake	8,000
	Windy Peak	6,000
	Coburg Hills	7,000
	Fall Creek Lake	9,000
	McKenzie River	17,000
	Cottage Grove Lake	5,000
	Dorena Lake	6,000
	Siuslaw River (South Valley)	29,000
	South Valley	28,000
	Abert Rim/Chewaucan Marsh	30,000
	Bryan Mountain	1,700
	Gerber Reservoir	7,000
	Fish Cr. Rim/Warner Valley	12,000
	Spotted Owl Management Areas	20,387
	Hellgate Rec. Section, Rogue River	5,300
	Upper Crooked River/Beaver Creek	30,000
	Umpqua River Corridor	3,662
	Spotted Owl Habitat Sites	40,000
	Owyhee River Canyon	33,720
	Chalk Butte Raptor Area	47,490

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State	Key Raptor Area Name	Acres BLM
Nevada	Goshute Mtn. Migration Area	UNK
	Jackpot Yearlong Use Area	1,000
	Salt Lake ACEC	6,037
	South Goshute Roost Site	5
	Dry Mountain, Newark Valley	380,000
Utah	Kenarra Canyon	2,500
	Rush Lake	10
	Summit Canyon Roost Site	150
	Cisco Desert	203,750
	Colo. River Portal/Dead Horse Point	9,500
	Dolores Triangle	100,000
	Professor Valley/McGraw Bottom	4,500
	Westwater Canyon/Fish Ford	9,500
	Panguitch	18,000
	Bookcliff Raptor Nesting Area	80
	Desolation Canyon	2,000
	San Juan Resource Area	1,800,000
	San Juan River	5,400
	Castle Gate Cliffs	69,120
	Green River/Labyrinth Canyon	37,760
	Big Hollow Raptor Area	8,718
	Deep Creek Mountains	176,131
	Fountain Green	7,482
	Lost Creek	6,164
	Otter Creek Reservoir	14,080
	Piute Reservoir	3,200
	Willow Creek	9,860
	Yuba Reservoir	9,000
	Crickett	38,760
	Deadmen's Wash	5,100
	Ledger Canyon	2,060
	Pavant Butte	3,400
	Sevier Lake	13,480
	Crawford Mountains	23,768
	Rush, Cedar, and Skull Valleys	UNK
	Bonanza Ferruginous Hawk Area	22,000
	Green River Bald Eagle Area	2,000
	Dry Fork Canyon	2,500
	Green River/Brown's Park	1,600
	Pariette Wetland Devel. Area	7,077
	Pelican Lake	400

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State	Key Raptor Area Name	Acres BLM
Washington	Badger Slope	600
	Columbia River Breaks	500
	Channeled Scablands	3,000
	Grande Ronde/Snake River	1,000
	Juniper Forest	11,000
	Kettle River	400
	Pend Orielle Canyon	1,500
	Brewster Bald Eagle Roost	200
	Moses Coulee	2,000
	Northrup Canyon	160
	Saddle Mountain	6,000
	San Juan Islands	300
	Skagit River Bald Eagle Reserve	40
	Yakima Canyon	4,000
Wyoming	Gillette/Powder River Basin	236,067
	Jackson Canyon	3,660
	Red Wall	16,280
	Atlantic Rim	11,960
	Blue Gap	5,760
	Bolten Rim	8,000
	Brown Canyon Rim	6,400
	Cherokee	8,320
	Delaney Rim	8,960
	Doty Mountain	3,840
	Ferris	7,840
	Hanna	5,440
	Muddy Creek	11,520
	Pedro Mtns. Bald Eagle Roost	2,560
	Platte Divide	5,600
	Red Rim	6,400
	Seminoe	10,240
	Shamrock Hills	18,330
	Canyon Creek	3,640
	Cedar Canyon	4,300
	Green River Riparian	340
	Pine Butte/Kinney Rim	1,400
	Rock Springs Uplift	107,000
	Bald Eagle Recovery Area	230

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Appendix K

Main Food Items

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Species		Main Foods Taken
Falconiformes		
Osprey	*Pandion haliaetus*	Live fish at least 99% of prey items recorded in almost every published account; wide variety of species taken.
Hook-billed kite	*Chondrohierax uncinatus*	Snails, amphibians
Swallow-tailed kite	*Elanoides forficatus*	Insects, frogs, nestling birds, lizards, and snakes; less frequently takes bats, fruit, small fish.
White-tailed kite	*Elanus leucurus*	Small mammals.
Mississippi kite	*Ictinia mississippiensis*	Medium-sized and large insects predominate numerically, but prey includes variety of frogs, toads, lizards, small box turtles, snakes, small birds, terrestrial mammals, and bats. Will scavenge diverse roadkills
Bald eagle	*Haliaeetus leucocephalus*	Opportunistic forager; food habits highly varied across range and site-specific, based on prey species available . In most regions, seeks out aquatic habitats for foraging and prefers fish. Uses birds and mammals often as carrion, especially in winter.
Northern harrier	*Circus cyaneus*	Summer: small- and medium-sized mammals, primarily rodents, birds (chiefly passerines and small waterbirds), reptiles, and frogs. Winter: in northern part of range, almost exclusively Microtus voles; in southern part, mammals and birds.
Sharp-shinned hawk	*Accipiter striatus*	Mostly small birds, some small mammals, occasionally large insects.
Cooper's hawk	*Accipiter cooperii*	Mostly medium-sized birds; some small mammals. In the e. United States, diet mostly birds; among individuals breeding in the west, a higher proportion of mammals in diet
Northern goshawk	*Accipiter gentilis*	Opportunist; kills a wide diversity of prey, depending on region, season, vulnerability, and availability. Main foods include ground and tree squirrels, rabbits and hares, large passerines, woodpeckers, game birds, and corvids; occasionally reptiles and insects
Common black-hawk	*Buteogallus anthracinus*	Broad diet; small vertebrates or arthropods, especially fish, frogs, crustaceans, snakes, and lizards (except venomous snakes). Reportedly eats carrion ; not observed in diets of nesters in Arizona, although retrieved caches in dried condition are eaten . Crustaceans widely reported .
Harris's hawk	*Parabuteo unicinctus*	Medium-sized to relatively large mammals (hares and rabbits), birds, and lizards.
Red-shouldered hawk	*Buteo lineatus*	Small mammals and birds, reptiles, and amphibians. Crayfish also important at times in some regions.
Broad-winged hawk	*Buteo platypterus*	Generalized predator, taking wide variety of food items; amphibians, insects, mammals, and juvenile birds the most common prey across North American range. Small mammals and amphibians are the most frequent prey and greatest biomass in most studies. Insects taken opportunistically on migration and at wintering sites

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Species		Main Foods Taken
Falconiformes		
Gray hawk	*Buteo nitidus*	Diet almost entirely vertebrates, especially reptiles. Several early descriptions indicated invertebrates taken but recent studies found invertebrates rare in diet, which is dominated by whiptail lizard and spiny lizard.
Swainson's hawk	*Buteo swainsoni*	During breeding season, mainly vertebrates, including mammals, birds, and reptiles; invertebrates (especially grasshoppers and dragonflies) at other times
White-tailed hawk	*Buteo albicaudatus*	Small vertebrates (mammals, birds, reptiles, amphibians) and arthopods.
Zone-tailed hawk	*Buteo albonatus*	Largely vertebrates, e.g., birds, especially passerines; mammals, especially ground squirrels and chipmunks ; amphibians and reptiles, particularly common collared lizard and crevice spiny lizard ; rarely fish.
Red-tailed hawk	*Buteo jamaicensis*	Small to medium-sized mammals, birds, reptiles.
Ferruginous hawk	*Buteo regalis*	Species depends on few prey species (highly stenophagous). Choice of main prey varies by location; west of continental divide, jackrabbits or cottontail rabbits; east, ground squirrels and prairie dogs.
Rough-legged hawk	*Buteo lagopus*	Primarily lemmings and voles in breeding season and voles, mice and shrews in winter; supplemented with a variety of birds, especially in summer, and medium-sized mammals such as ground squirrels and rabbits
Golden eagle	*Aquila chrysaetos*	Small to medium-sized mammals: hares and rabbits also ground squirrels , prairie dogs , marmots .
Crested Caracara	*Caracara cheriway*	Insects; small and occasionally large vertebrates, including fish, reptiles, amphibians, birds, and mammals; eggs; and carrion of all types.
American kestrel	*Falco sparverius*	Terrestrial arthropods and small vertebrates.
Merlin	*Falco columbarius*	Small to medium-sized birds, generally under 50 g.
Northern aplomado falcon	*Falco femoralis*	Mostly birds and insects, but also bats, small rodents, and lizards.
Gyrfalcon	*Falco rusticolus*	Mostly birds, passerines to geese; predominately ptarmigan; some mammals, microtines to hares.
Peregrine falcon	*Falco peregrinus*	Mostly birds, estimated at about 77–99% (frequency not biomass), passerines to small geese; occasionally mammals and rarely amphibians, fish, and insects. Most frequent mammals: bats microtines squirrels, and rats. In temperate continental latitudes Columbidae may be most frequently taken and perhaps most important by biomass.
Prairie falcon	*Falco mexicanus*	Primarily ground squirrels and Horned Larks; also lizards, other species of passerines, and small rodents.

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Species		Main Foods Taken
Strigiformes		
Common barn owl	*Tyto alba*	Small mammals majority of prey. Of these, mostly rodents but also shrews, bats, and leporids. Birds, reptiles, amphibians, and arthropods usually smaller percentage of diet.
Flammulated owl	*Otus flammeolus*	Nocturnal arthropods, especially owlet moths , beetles , and crickets and grasshoppers .
Western screech owl	*Megascops kennicottii*	Wide variety of small animals, especially mammals, birds, annelid worms, insects, and crayfish. Generally more insectivorous than Eastern Screech-Owl.
Eastern screech owl	*Megascops asio*	Invertebrates, primarily insects, crayfish , and earthworms ; all classes of vertebrates, especially songbirds and rodents
Whiskered screech-owl	*Megascops trichopsis*	Arthropods (94% by number, 27% by biomass).
Great horned owl	*Bubo virginianus*	Rabbits and hares, mice, and coots and other waterfowl. Great Horned Owl's range, diet consists of 90% mammals, 10% birds, and usually only a small number of amphibians, reptiles, insects, and other invertebrates
Snowy owl	*Bubo scandiacus*	Usually mammals, from small rodents to large hares; also birds, ranging from small songbird nestlings to medium-sized geese. Fish and other small aquatic animals less often. Probably opportunistic feeders, but likely specialize when local prey are abundant.
Northern hawk owl	*Surnia ulula*	Small mammals, especially rodents in summer; shifts in winter to birds such as ptarmigan and grouse. Its specialized small-mammal diet, and hence hunting habitat, is similar to that of other circumpolar boreal forest owl species, such as Boreal, Long-eared , Short-eared, and Great Gray owls.
Northern pygmy owl	*Glaucidium gnoma*	Small birds, mammals, insects; to lesser extent amphibians and reptiles.
Ferruginous pygmy owl	*Glaucidium brasilianum*	In Texas, insects, mainly grasshoppers; reptiles, birds, small mammals, and amphibians to a lesser extent ; seasonal and annual variations occur (GAP). In Arizona, reptiles, birds, small mammals, and insects .
Elf owl	*Micrathene whitneyi*	mostly insectivorous, but occasionally eats small reptiles and mammals.
Burrowing owl	*Athene cunicularia*	Opportunistic feeders; primarily arthropods, small mammals, and birds; amphibians and reptiles also reported and may be important in Florida .

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Species		Main Foods Taken
Strigiformes		
California Spotted owl	*Strix occidentalis occidentalis*	Two most important food items (in terms of biomass consumed): dusky-footed woodrat and flying squirrel . At higher elevations of the Sierra Nevada, flying squirrel is the most important prey species; at lower elevations there, and throughout remainder of this subspecies' range, dusky footed woodrat is the predominant prey . Other important prey include pocket gophers, broad-footed moles , mice , and diurnal squirrels. Insects are highest frequency diet item but contribute minor amount of prey biomass.
Northern spotted owl	*Strix occidentalis caurina*	Northern flying squirrels predominate by biomass and frequency in the northern portion of the owl's range in British Columbia, Washington, and the Coast and Cascade Ranges of Oregon . Dusky-footed woodrats predominate in the southern portion of the range in sw. Oregon and in the northern coastal ranges in California . Other important prey include bushy-tailed woodrats , mice , red tree voles , red-backed voles , snowshoe hares , brush rabbits , and pocket gophers . Non-mammalian prey include a variety of birds, amphibians, and insects which appear less frequently in diet.
Mexican spotted owl	*Strix occidentalis lucida*	Over most of subspecies' range, Neotoma species dominate diets in terms of biomass . Peromyscus, rabbits , voles , and bats can be locally important in specific years or areas.
Barred owl	*Strix varia*	An opportunistic predator, consuming small mammals and rabbits, birds up to the size of grouse, amphibians, reptiles, and invertebrates.
Great gray owl	*Strix nebulosa*	Small mammals, especially rodents.
Long-eared owl	*Asio otus*	Small mammals; birds important in a few studies
Short-eared owl	*Asio flammeus*	Small mammals; less frequently birds.
Boreal owl	*Aegolius funereus*	Small mammals (voles, mice) up to 50 g; birds, insects, and larger mammals (> 100 g) also consumed occasionally.
Northern saw-whet owl	*Aegolius acadicus*	Small mammals.

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Table A.4. Prioritization of raptor species protected under 50 CFR Part 10, based on status, tolerance, and range of species relative to energy development

		Maximum Canada-U.S. Population (adjusted PIF Estimate)*	Proportion of Juveniles (DEA)**	Number of Juveniles in U.S. (DEA)**	Percent in U.S.and Canada (PIF)	BCC National List	Regional or BCR List	Demographic Data	Tolerance of Disturbance	Coal	Oil and Gas	Coal-Bed Methane	Wind	CONUS Relevance	Total
						No = 0, Yes = 3	No = 0, Yes = 2	Good = 1, Fair = 2, Poor = 3	High = 1, Moderate = 2, Low or Unknown = 3	No = 0, Yes = 1	No = 0, Yes = 1	No = 0, Yes = 1	No = 0, Yes = 1	Little = 0, Some = 1, Much = 2	Score
FALCONIFORMES															
Ferruginous Hawk	*Buteo regalis*	11,500	0.30	3,450	100	3	2	3	3	1	1	1	1	2	17
Northern Harrier	*Circus cyaneus*	227,500	NC	NC	35	3	2	2	3	1	1	1	1	2	16
Swainson's Hawk	*Buteo swainsoni*	230,300	NC	NC	94	3	2	3	2	1	1	1	1	2	16
Peregrine Falcon	*Falco peregrinus*	138,000	0.30	30,001	23	3	2	1	2	1	1	1	1	2	14
Prairie Falcon	*Falco mexicanus*	17,280	0.50	8,640	96	3	2	1	2	1	1	1	1	2	14
Mississippi Kite	*Ictinia mississippiensis*	95,000	NC	NC	100	0	2	3	2	1	1	1	1	2	13
American Kestrel	*Falco sparverius*	2,175,000	0.60	1,305,000	75	0	2	2	3	1	1	1	1	2	13
Northern Goshawk	*Accipiter gentilis*	120,050	0.30	36,015	25	0	2	1	3	1	1	1	1	2	12
Rough-legged Hawk	*Buteo lagopus*	132,500	NC	NC	50	0	0	3	3	1	1	1	1	2	12
Golden Eagle	*Aquila chrysaetos*	40,000			47	0	2	2	2	1	1	1	1	2	12
Bald Eagle	*Haliaeetus leucocephalus*	165,000	NC	NC	>99	3	2	2	2	0	1	0	0	2	12
Gyrfalcon	*Falco rusticolus*	13,750	0.30	8,250	50	0	0	2	3	1	1	1	1	2	11
Sharp-shinned Hawk	*Accipiter striatus*	291,500	0.50	145,570	0.53	0	0	1	3	1	1	1	1	2	10
Merlin	*Falco columbarius*	325,000	0.60	195,000	50	0	0	2	2	1	1	1	1	2	10
Cooper's Hawk	*Accipiter cooperii*	276,450	0.50	138,225	97	0	0	1	2	1	1	1	1	2	9
White-tailed Hawk	*Buteo albicaudatus*	10,000	NC	NC	<1	0	2	3	3	0	0	0	0	1	9
Zone-tailed Hawk	*Buteo albonotatus*	10,000	NC	NC	<1	0	0	3	3	1	1	0	0	1	9
Red-tailed Hawk	*Buteo jamaicensis*	979,000	0.30	293,700	89	0	0	2	1	1	1	1	1	2	9
American Swallow-tailed Kite	*Elanoides forficatus*	3,750	NC	NC	<5	0	2	3	2	0	0	0	0	1	8
Common Black-Hawk	*Buteogallus anthracinus*	10,000	NC	NC	<1	0	2	3	3	0	0	0	0	0	8
Harris's Hawk	*Parabuteo unicinctus*	19,500	0.25	4,875	10	0	2	1	3	0	0	0	0	1	7
Red-shouldered Hawk	*Buteo lineatus*	410,850	0.30	123,255	95	0	0	3	2	0	0	0	0	2	7
Broad-winged Hawk	*Buteo platypterus*	864,000	NC	NC	96	0	0	3	2	0	0	0	0	2	7
Short-tailed Hawk	*Buteo brachyurus*	50,000	NC	NC	<5	0	2	3	2	0	0	0	0	0	7
Aplomado Falcon	*Falco femoralis*	<2,000	NC	NC	<1	0	0	2	1	0	1	0	1	2	7
Osprey	*Pandion haliaetus*	105,800	NC	NC	46	0	0	3	1	0	0	0	0	2	6
Hook-billed Kite	*Chondrohierax uncinatus*	1,000	NC	NC	<1	0	0	3	3	0	0	0	0	0	6
Snail Kite	*Rostrhamus sociabilis*	10,000	NC	NC	<1	0	0	3	2	0	0	0	0	1	6
Gray Hawk	*Buteo nitidus*	10,000	NC	NC	<1	0	2	3	1	0	0	0	0	0	6
Hawaiian Hawk	*Buteo solitarius*	3000***	NC	NC	100	0	0	3	3	0	0	0	0	0	6
Crested Caracara	*Caracara cheriway*	50,000	NC	NC	<5	0	0	3	2	0	0	0	0	1	6
Eurasian Kestrel	*Falco tinnunculus*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
Roadside Hawk	*Buteo magnirostris*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
Gray Frog Hawk	*Accipiter soloensis*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
Crane Hawk	*Geranospiza caerulescens*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
Collared Forest-Falcon	*Micrastur semitorquatus*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
Eurasian Hobby	*Falco subbuteo*	0	NC	NC	0	0	0	3	3	0	0	0	0	0	6
White-tailed Eagle	*Haliaeetus albicilla*	0	NC	NC	0	0	0	3	2	0	0	0	0	0	5
Steller's Sea-Eagle	*Haliaeetus pelagicus*	0	NC	NC	0	0	0	3	2	0	0	0	0	0	5
Japanese Sparrowhawk	*Accipiter gularis*	0	NC	NC	0	0	0	3	2	0	0	0	0	0	5
Black Kite	*Milvus migrans*	0	NC	NC	0	0	0	3	1	0	0	0	0	0	4
STRIGIFORMES															
Flammulated Owl	*Otus flammeolus*	14,245	NC	NC	77	3	2	3	3	1	1	1	1	2	17
Short-eared Owl	*Asio flammeus*	348,000	NC	NC	29	3	2	3	3	1	1	1	1	2	17
Burrowing Owl	*Athene cunicularia*	310,000	NC	NC	31	3	2	2	2	1	1	1	1	2	15
Long-eared Owl	*Asio otus*	18,000	NC	NC	30	0	2	3	2	1	1	1	1	2	13
Northern Saw-whet Owl	*Aegolius acadicus*	960,000	NC	NC	96	0	2	2	3	1	1	1	1	2	13
Northern Pygmy-Owl	*Glaucidium gnoma*	42,000	NC	NC	84	0	0	3	2	1	1	1	1	2	11
Elf Owl	*Micrathene whitneyi*	22,800	NC	NC	24	0	2	3	3	1	1	0	0	1	11
Spotted Owl	*Strix occidentalis*	5,250	NC	NC	70	0	2	1	2	1	1	1	1	2	11
Common Barn Owl	*Tyto alba*	171,500	NC	NC	7	0	0	3	1	1	1	1	1	2	10
Eastern Screech-Owl	*Megascops asio*	369,600	0.60	221,760	99	0	0	3	1	1	1	1	1	2	10
Western Screech-Owl	*Megascops kennicottii*	270,100	0.60	162,060	85	0	0	3	1	1	1	1	1	2	10
Great Horned Owl	*Bubo virginianus*	1,139,500	0.30	341,850	55	0	0	2	1	1	1	1	1	2	9
Snowy Owl	*Nyctea scandiaca*	72,500	0.30	21,750	NA	0	0	3	2	1	1	1	1	0	9
Northern Hawk Owl	*Surnia ulula*	32,500	NC	NC	50	0	0	3	2	1	1	1	1	0	9
Whiskered Screech-Owl	*Megascops trichopsis*	5,000	NC	NC	<5	0	2	3	2	0	0	0	0	0	7
Barred Owl	*Strix varia*	280,000	NC	NC	100	0	0	3	2	0	0	0	0	2	7
Great Gray Owl	*Strix nebulosa*	15,750	NC	NC	50	0	0	2	3	0	0	0	0	2	7
Ferruginous Pygmy-Owl	*Glaucidium brasilianum*	100,000	NC	NC	<1	0	2	3	1	0	0	0	0	0	6
Boreal Owl	*Aegolius funereus*	300,000	NC	NC	30	0	0	2	3	0	0	0	0	1	6
Stygian Owl	*Asio stygius*	0	NC	NC	<1 (GA)	0	0	3	3	0	0	0	0	0	6
Mottled Owl	*Ciccaba virgata*	0	NC	NC	<1 (GA)	0	0	3	3	0	0	0	0	0	6
Puerto Rican Screech-Owl	*Megascops nudipes*	0	NC	NC	<1	0	0	3	2	0	0	0	0	0	5
Oriental Scops-Owl	*Otus sunia*	0	NC	NC	<1 (GA)	0	0	3	2	0	0	0	0	0	5

Change in scientific name	Change in common name	* Adjusted from the Landbird Conservation Plan Estimate
Addition to 10.13 list		** Falconry/Propagation Draft Environmental Assessment (NC=Not Covered in EA)
To be filled in later.		** From FWS Federal Register Notices

Table B. 2. USFWS recommended seasonal buffers for breeding raptors (includes courtship or nest building to post fledge dependency to nest)

Species		USFWS Region 1			USFWS Region 2				USFWS Region 6								USFWS Region 7	USFWS Region 8	
		Idaho	Oregon	Washington	Arizona	New Mexico	Oklahoma	Texas	Colorado	Kansas	Montana	Nebraska	North Dakota	South Dakota	Wyoming	Utah	Alaska	California	Nevada
Falconiformes																			
Osprey	*Pandion haliaetus*				4/8-8/25					*	4/1-8/31			4/1-8/31		4/1-8/31	5/1-9/15		
Hook-billed kite	*Chondrohierax uncinatus*				*					*	*			*		*	*		
Swallow-tailed kite	*Elanoides forficatus*				*					*	*			*		*	*		
White-tailed kite	*Elanus leucurus*				5/6-7/7					*	*			*		*	*		
Mississippi kite	*Ictinia mississippiensis*				5/16-7-25					4/15-9/1	*			*		*	*		
Bald eagle	*Haliaeetus leucocephalus*				12/1-7/27					1/15-9/1	1/1-8/31			2/1-8/31		1/1-8/31	2/15-8/31		
Northern harrier	*Circus cyaneus*				5-May					4/1-8/1	4/1-8/15			4/15-8/31		4/1-8/15	5/1-8/31		
Sharp-shinned hawk	*Accipiter striatus*				4/30-7-25					4/15-9/1	3/15-8/31			4/15-8/31		3/15-8/31	5/1-8/31		
Cooper's hawk	*Accipiter cooperii*				3/22-8/27					4/15-8/15	3/15-8/31			4/1-8/31		3/15-8/31	*		
Northern goshawk	*Accipiter gentilis*				5/1-8/18					*	3/1-8/15			3/1-8/31		3/1-8/15	3/1-8/31		
Common black-hawk	*Buteogallus anthracinus*				3/16-8/13					*	*			*		*	*		
Harris's hawk	*Parabuteo unicinctus*				1/29-6/30					*	*			*		*	*		
Red-shouldered hawk	*Buteo lineatus*				5-Jun					3/15-8/1	*			*		*	*		
Broad-winged hawk	*Buteo platypterus*				*					5/1-8/1	*			4/15-8/15		*	*		
Gray hawk	*Buteo nitidus*				4/21-7/31					*	*			*		*	*		
Swainson's hawk	*Buteo swainsoni*				4/16-8/11					4/1-9/1	5/1-8/31			C		3/1-8/31	*		
White-tailed hawk	*Buteo albicaudatus*				*					*	*			*		*	*		
Zone-tailed hawk	*Buteo albonatus*				4/1-7/27					*	*			*		*	*		
Red-tailed hawk	*Buteo jamaicensis*				2/10-8/21					2/15-8/1	3/15-8/15			3/15-8/15		3/15-8/15	5/15-8/31		
Ferruginous hawk	*Buteo regalis*				5/14-7-19					4/1-8/1	3/15-7/15			3/15-8/1		3/1-8/1	*		
Rough-legged hawk	*Buteo lagopus*				*					*	*			*		*	5/1-8/15		
Golden eagle	*Aquila chrysaetos*				3/17-7/11					2/1-8/1	1/1-8/31			2/1-8/31		1/1-8/31	2/15-9/15		
Crested Caracara	*Caracara cheriway*				4/18-9/27					*	*			*		*	*		
American kestrel	*Falco sparverius*				3/21-8/11					3/15-9/1	4/1-8/15			4/15-8/15		4/1-8/15	5/1-8/31		
Merlin	*Falco columbarius*				*					*	4/1-8/31			5/1-8/31		4/1-8/31	4/15-8/31		
Northern aplomado falcon	*Falco femoralis*				*					*	*			*		*	*		
Gyrfalcon	*Falco rusticolus*				*					*	*			*		*	3/1-9/15		
Peregrine falcon	*Falco peregrinus*				3/13-7/27					2/15-8/15	2/1-8/31			3/15-8/31		2/1-8/31	3/15-9/30		
Prairie falcon	*Falco mexicanus*				3/10-6/29					*	4/1-8/31			4/1-8/31		4/1-8/31	*		
Strigiformes					*											*			
Common barn owl	*Tyto alba*				4/10-7/24					3/1-10/1	2/1-9/15			3/15-9/31		2/1-9/15	*		
Flammulated owl	*Otus flammeolus*				5/30-7-7					*	5/1-9/30			*		4/1-9/30	*		
Western screech owl	*Megascops kennicottii*				3/13-8/10					*	3/1-8/15			*		3/1-8/15	3/15-8/31		
Eastern screech owl	*Megascops asio*				*					2/15-9/1	3/1-8/15			3/1-8/15		3/1-8/15	*		
Whiskered screech-owl	*Megascops trichopsis*				7-Jun					*	*			*		*	*		
Great horned owl	*Bubo virginianus*				1/5-8/14					1/1-8/1	12/1-9/31			12/1-9/31		12/1-9/31	2/1-9/15		
Snowy owl	*Bubo scandiacus*				*					*	*			*		*	5/15-8/31		
Northern hawk owl	*Surnia ulula*				*					*	*			*		*	2/15-7/31		
Northern pygmy owl	*Glaucidium gnoma*				5/10-6/5					*	4/1-8/1			*		4/1-8/1	4/15-8/31		
Ferruginous pygmy owl	*Glaucidium brasilianum*				4/18-7/25					*	*			*		*	*		
Elf owl	*Micrathene whitneyi*				4/5-7/7					*	*			*		*	*		
Burrowing owl	*Athene cunicularia*				3/25-8/3					4/1-9/1	4/1-8/31			4/1-8/31		3/1-8/31	*		
Spotted owl	*Strix occidentalis*				*					*	*			*		*	*		
Northern spotted owl	*Strix occidentalis caurina*				*					*	*			*		*	*		
Mexican spotted owl	*Strix occidentalis lucida*				5/16-8/5					*	3/1-8/31			*		3/1-8/31	*		
Barred owl	*Strix varia*				*					2/1-8/1	*			too few to know		*	3/15-8/15		
Great gray owl	*Strix nebulosa*				*					*	3/1-8/31			*		3/1-8/31	3/1-8/31		
Long-eared owl	*Asio otus*				3/23-6/30					2/15-7/1	2/1-8/15			2/15-8/15		2/1-8/15	*		
Short-eared owl	*Asio flammeus*				*					4/1-8/1	3/15-8/1			4/1-8/31		3/1-8/1	4/1-8/15		
Boreal owl	*Aegolius funereus*				*					*	2/1-7/31			*		2/1-7/31	2/15-7/15		
Northern saw-whet owl	*Aegolius acadicus*				3/26-4/15					*	3/1-8/31			4/1-8/31		3/1-8/31	3/1-8/15		