U.S. Fish and Wildlife Service

FINAL ENVIRONMENTAL ASSESSMENT
Proposal to Permit Take as Provided Under the Bald and Golden Eagle Protection Act

DIVISION OF MIGRATORY BIRD MANAGEMENT

FINAL ENVIRONMENTAL ASSESSMENT

Proposal to Permit Take

Provided Under the Bald and Golden Eagle Protection Act

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Summary

- The U.S. Fish and Wildlife Service has removed the bald eagle (*Haliaeetus leucocephalus*) from the list of threatened and endangered species under the Federal Endangered Species Act in all areas except the range of the Sonoran Desert bald eagle population, which remains protected as a threatened species. The Bald and Golden Eagle Protection Act (Eagle Act) remains as the primary law protecting bald eagles in other parts of its range and the golden eagle (*Aquila chrysaetos*).

- The Eagle Act authorizes the Secretary to permit take of eagles "necessary for the protection of … other interests in any particular locality." In addition, there may be instances where take of eagle nests is necessary to protect public safety and welfare.

- In this assessment we consider three alternatives for regulations establishing new take permits under the Eagle Act, and authorizing take of eagle nests where necessary to protect public safety and welfare.

- The assessment looks at potential impacts that could result from the implementation of the proposed regulation or alternatives to the proposed regulation within the context of other take already authorized or otherwise occurring.

- This assessment also summarizes the biological foundation for defining take thresholds for bald eagles and golden eagles. Under the preferred alternative, the Service will define thresholds for take by adapting a published model used in other recent raptor regulations. The thresholds will guide annual take limits on a regional basis to ensure that we are consistent with the goal of stable or increasing breeding populations.

- The majority of authorized take will be non-lethal and will simply allow activities to disturb eagles in a way that will result in a loss or reduction of one year's productivity by a nesting pair.

- On-the-ground information and conditions will guide the actual amount of take authorized, which may be less than modeled, as long as the total does not exceed the modeled thresholds.

- Except for safety emergencies, the rule will give priority in permitting to Native American use for rites and ceremonies that require eagles be taken from the wild if requests for permits will likely approach the annual threshold. The next permit priorities will be for activities necessary to ensure public health and safety, renewal of programmatic nest-take

permits, and Non-emergency activities necessary to ensure public health and safety, and (for inactive golden eagle nests only) resource development or recovery operations (§ 22.25).

- The Service's preferred alternative, number 3, will: (1) authorize disturbance take of eagles; (2) authorize removal of eagle nests where necessary to protect public health and safety; and (3) provide for permits for take resulting in mortality in some limited circumstances. It will authorize take permits for both bald eagles and golden eagles.

- Alternative 3 is also the environmentally-preferred alternative. It is expected to have the least adverse impact on the human environment, with negligible effects on the natural and physical environment and the least adverse impact along with the most beneficial impacts to the socioeconomic environment.

- The criteria for issuance of permits would initially limit their issuance to only 5% of the Maximum Sustainable Yield for bald eagles, which is consistent with the recommendations in published literature for take of raptors where population monitoring may be limited or there are concerns about the vital rates for a species

- The best available data we have for golden eagles indicate modest declines in the four BCRs that constitute 80 percent of its range in the lower 48 states. Estimates of population size in Alaska are coarse, based upon even fewer data sources than in the lower 48 states, and juvenile survival may be far lower, so management would therefore need to be conservative. In addition, McIntyre et al. (2008) suggested that conservation strategies for migratory golden eagles require a continental approach. Therefore, until we have additional data to show that populations can withstand additional take, of those authorized under the new rule, we will only consider issuance of permits for safety emergencies and programmatic and other permits that will result in a net reduction in take or a net take of zero for golden eagles. We will continue to issue historically-authorized take permits under existing permit types at the level of take carried out under those permits (average over 2000-2007).

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Chapter 1: Purpose and Need for the Action

1.1 Introduction

This Final Environmental Assessment (FEA) has been prepared to analyze the U.S. Fish and Wildlife Service's (Service) proposal to create a permit or permits under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) (Eagle Act) allowing the take of bald eagles and golden eagles and their nests when necessary to protect interests in particular localities. This FEA is an analysis of potential impacts that could result from the implementation of the proposed regulation or alternatives to the proposed regulation within the context of other take already authorized or otherwise occurring. It is to assist us in ensuring compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" under NEPA is defined by regulation at 40 CFR 1508.27, and requires short-term and long-term consideration of both the context of a proposal and its intensity, and whether the impacts are beneficial or adverse. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a FONSI would be signed for the EA approving the alternative selected and a Set of Findings may be prepared.

As with any NEPA process, if all components have undergone equal analysis, the final proposal may include all or some components of a single alternative. Or, it may include a combination of components from more than one alternative.

1.1.1 Background

In 2007, the Service removed the bald eagle from the list of threatened and endangered species under the Endangered Species Act (16 U.S.C. 1531 *et seq.*) (ESA) (72 FR 37345, July 9, 2007). However, on March 6, 2008, the federal district court for the District of Arizona enjoined removal from ESA protection of the population of "Desert bald eagles" of "the Sonoran Desert region of the American southwest" pending resolution of a 90-day petition to list a distinct population segment of bald eagles in that region. *Ctr. for Biological Diversity v. Kempthorne*, 2008 U.S. Dist. LEXIS 17517 at 42 (D. Ariz. 2008). Therefore, the bald eagle remains protected under both the Eagle Act and the ESA in the Sonoran Desert region as a threatened species pending the outcome of that case. The Bald and Golden Eagle Protection Act remains as the primary law protecting bald eagles outside the range of the Sonoran Desert population in the U.S. and golden eagles throughout their U.S. range. The Eagle Act would also become the primary law protecting bald eagles within the range of the Sonoran Desert population should the Service delist that population in the future. The

Eagle Act prohibits take of bald eagles and golden eagles and provides a statutory definition of "take," which includes activities that "disturb" eagles. Bald eagles and golden eagles are also protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712).

To provide a consistent framework in which to implement the Eagle Act after bald eagle delisting, on June 5, 2007, the Service clarified its regulations implementing the Bald and Golden Eagle Protection Act. (72 FR 31131). The modifications to implementing regulations for the Eagle Act established a regulatory definition of "disturb," a term specifically prohibited as "take" by the Eagle Act. As per the regulatory definition, disturb means

> *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, injury to an eagle; a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.*

As stated, the regulatory definition of "disturb" also applies to golden eagles.

Also on June 5, 2007, the Service issued a Notice of Availability of the National Bald Eagle Management Guidelines (Guidelines). (72 FR 31156). These guidelines provide a roadmap for landowners and project proponents seeking to avoid violating the Eagle Act while conducting activities near eagles. For example, the guidelines recommend buffers around nests to screen nesting bald eagles from noise and visual distractions caused by human activities. We intend the clarifications and the guidelines give landowners, and others, guidance in ensuring that actions they undertake are consistent with the Bald and Golden Eagle Protection Act.

When Congress enacted the Eagle Act in 1940, it intended the Act to be the primary law protecting eagles from extinction, and as such it provided a broad prohibition in its definition of "take" by defining it to include "pursue, shoot, shoot at, wound, kill, capture, trap, collect, molest or disturb." (Pub. L. No. 76-567, §4, 54 Stat. 250, 251 (1940)). Congress later added "poison" to the definition. (Pub. L. No. 92-535, §4, 86 Stat. 1064, 1065 (1972)).

However, the Eagle Act also delegates to the Secretary the ability to permit take of eagles for several reasons, including when "necessary for the protection of "other interests in any particular locality" after determining the take is "compatible with the preservation of the bald eagle or golden eagle." In addition, there may be instances where take of eagle nests is necessary to eliminate a hazard to human or eagle safety. Most populations of the bald eagle have recovered sufficiently to be removed from the ESA list, while supporting take during recovery. Therefore, we can logically assume populations can continue to sustain limited take.

1.2 Current Proposal

The Service proposed new regulations to amend the current regulations at 50 CFR 22.26 and 22.27 as follows: to (1) establish an eagle take permit under the Eagle Act; (2) authorize take of eagle nests where necessary to protect public health and safety, (3) authorize take resulting in mortality (TRM)[1] under limited circumstances; and (4) establish new programmatic permits under the Eagle Act for disturbance, airfield eagle hazards, nest removal from power lines, and TRM (72 FR 31142, June 5, 2007). The take permit provisions will primarily authorize disturbance. However, the regulations analyzed in this document will also provide for authorization of other types of take of eagles under limited circumstances.

For example, take might be authorized, in the areas meeting prescribed standards, for a utility that does all of the following:

- establishes a mortality baseline through estimates or a sampling scheme;
- employs the best available techniques and mutually-approved standard practices for minimizing eagle mortalities;
- undertakes a system-wide risk analysis and retrofits a significant portion of hazardous locations within a reasonable time frame;
- implements an effective monitoring program and reports eagle mortality to the Service,
- uses only avian-safe practices on all new infrastructure in areas determined to be high-risk for eagles; and
- demonstrates it has eliminated eagle mortality except that which is unavoidable.

To prevent collisions, utilities might also need to ensure transmission lines, distribution lines and towers located in known eagle concentration areas, foraging areas, or nesting areas, have visual markers on the wires. Because even best practices cannot ensure that eagles will not be killed by electrocution or collision with power lines, the regulation could authorize this type of unavoidable take by a utility that has met all the requirements above. This is an example only. The specific requirements listed above may not be applicable should the Service issue such a permit in the future, but the standards to be met will be comparable.

1.3 Purpose and Need for Action

The purpose of this regulatory proposal is to: (1) provide authorization for take of bald eagles and golden eagles "necessary for the protection of "other interests in any particular locality" as provided for in the Eagle Act, while ensuring it is compatible with the preservation of the eagles, as mandated by the Eagle Act;

[1] TRM in this document refers to non-purposeful take that would result in mortality, despite all efforts to avoid it. We distinguish this from intentional lethal take permitted under 50 CFR 22.22 for Native American religious purposes.

(2) develop a management system that will simplify complex, long-term-eagle-management issues by allowing programmatic approaches; (3) provide a consistent approach to permitting between Service Regional offices; and (4) make take authorization available for removal of eagle nests where necessary to protect public health and safety and to protect eagles.

For purposes of this action, "compatible with the preservation of the bald eagle and the golden eagle" means consistent with the goal of stable or increasing breeding populations. Although take thresholds are based on regional populations, the regulation requires the Service to consider additional factors, such as cultural significance, that may warrant protection of smaller and/or isolated populations within a region. In the DEA and notice re-opening of the comment period on the rule (73 FR 47574, August 14, 2008), to elucidate the statutory standard of "preservation of the bald eagle or the golden eagle," we proposed the following terminology: "maintaining increasing or stable populations." We continue to support the essential meaning of that standard, but recognized that it could be misapplied to constrain any authorization of take because any take of a bald or golden eagle by some degree results in a population decrease, even if short-term and inconsequential for the long-term preservation of the species. Thus, if interpreted so narrowly, the word "maintaining" would render us unable to authorize any take. Therefore, we are revising our interpretation of "preservation of the eagle" to read "consistent with the goal of stable or increasing breeding populations." The phrase "consistent with the goal" will allow take that is compatible with long term stability or growth of eagle populations. Adding the word "breeding" clarifies the significance of the number of breeding pairs for maintaining or growing populations, versus floaters (non-breeding adults).

Under the Eagle Act as it has been applied to golden eagles, the Service relies on enforcement discretion and voluntary cooperation between the Service and other agencies and private entities to regulate take of eagles in the absence of an available permit for non-purposeful take. The resulting case-by-case enforcement and reliance on voluntary measures to eliminate and reduce take during otherwise-legal activities has made it difficult for the Service to ensure that such take is compatible with the preservation of eagles. The Service needs to provide a uniform legal framework for allowing take of eagles during the conduct of otherwise-legal and permitted activities. Creation of a permit or permits that all Service Regions can consistently administer will fulfill that need and improve the protection of eagles. The permit or permits created must be both feasible to implement and enforceable, and provide for the conservation of both species.

1.4 Authorities

The principal Federal authority for the actions analyzed in this FEA is the Eagle Act (16 U.S.C. 668–668d). The Service is the Federal agency with primary statutory authority for the management of bald eagles and golden eagles in the

United States. Regulations implementing the Eagle Act are in Subparts C & D of Part 22 of Title 50 of the Code of Federal Regulations.

Compliance with Federal Statutes, Regulations, and Orders Relevant to the Alternatives Considered

The proposal is in compliance with the following federal statues, regulations, Executive Orders, and Department of the Interior Departmental Policy:

Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*) (Eagle Act)

The Eagle Act provides that the Secretary of the Interior may authorize certain, otherwise-prohibited activities through promulgation of regulations. The Secretary is authorized to prescribe regulations permitting the "taking, possession, and transportation of [bald or golden eagles] . . . for the scientific or exhibition purposes of public museums, scientific societies, and zoological parks, or for the religious purposes of Indian tribes, or . . . for the protection of wildlife or of agricultural or other interests in any particular locality," provided such permits are "compatible with the preservation of the bald eagle or the golden eagle" (16 U.S.C. 668a). In accordance with this authority, the Secretary has previously promulgated Eagle Act permit regulations for scientific and exhibition purposes (50 CFR 22.21), for Indian religious purposes (50 CFR 22.22), to take depredating eagles (50 CFR 22.23), to possess golden eagles for falconry (50 CFR 22.24), and for the take of golden eagle nests that interfere with resource development or recovery operations (50 CFR 22.25). This rulemaking establishes permit regulations to authorize non-purposeful eagle take "for the protection of . . . other interests in any particular locality."

The analysis in this FEA evaluates whether the proposed permits and their implementation, including limits on annual take, are compatible with the preservation of the bald eagle and the golden eagle.

National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 *et seq*.)

Agencies must complete environmental documents pursuant to NEPA before implementing Federal actions. NEPA requires careful evaluation of the need for action, and that Federal actions are considered alongside all reasonable alternatives, including the "No Action Alternative." NEPA also requires the action agency to consider the potential impacts on the human environment of each alternative. The decision maker(s) must consider the alternatives and impacts prior to implementation, and must inform the public of these deliberations.

The Service has prepared this FEA in compliance with NEPA; the President's Council for Environmental Quality (CEQ) Regulations, (40 CFR 1500–1508); and the NEPA-compliance requirements in the Department of the Interior's Departmental Manual (DM) and the Fish and Wildlife Service's Manual (FW) (516 DM 8, 550 FW 1-3, 505 FW 1-5).

Pursuant to NEPA and CEQ regulations, this FEA documents the analysis of a proposed Federal action, and all reasonable alternatives, including the “No Action” alternative. The FEA evaluates impacts anticipated from all alternatives; informs decision-makers and the public; and serves as a decision-aiding mechanism to ensure that NEPA and CEQ regulations have been incorporated into Federal agency planning and decision-making. The Service prepared this FEA using an interdisciplinary approach to address all aspects of the natural and social sciences relevant to the potential impacts of the project. The FEA analyzes the direct, indirect, and cumulative effects of the proposed action.

Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*)

It is Federal policy under the ESA that all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (§ 2(c)). Action agencies must implement section 7 consultations with the Service to ensure that "any action authorized, funded, or carried out by such an agency … is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. Each agency shall use the best scientific and commercial data available" (§ 7(a)(2)). In addition to the Sonoran Desert population of bald eagles, there may be other listed species present when permitted take of eagles will occur. When deemed necessary, each Regional Permit Office may help coordinate intra-Service section 7 consultations at the permit stage.

Migratory Bird Treaty Act, as amended (MBTA) (16 U.S.C. 703 *et seq.*)

The MBTA provides the Service with the regulatory authority to protect species of birds that migrate outside the United States. Individuals of species that do not migrate outside of the United States are also protected with the exception of several introduced, non-native species, including mute swans (*Cygnus olor*), house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), Eurasian collared-doves (*Streptopelia decaocto*), and rock pigeons (*Columba livia*). For eagle take, a separate authorization under the MBTA is not required. Many impacts authorized under the ESA that will require Eagle Act authorization will not “take” eagles under the MBTA because that statute does not contain a prohibition against disturbance (without injury) of the birds it protects. Therefore, activities that disturb an eagle will not require MBTA authorization unless the activity also results in injury or some other impact prohibited by the MBTA. Even where MBTA take will occur, a separate MBTA authorization in addition to the Eagle Act authorization is not required because 50 CFR 22.11(a) exempts those who hold Eagle Act permits from the requirement to obtain an MBTA permit.

National Historic Preservation Act of 1966, as amended (NHPA) (16 U.S.C 470 *et seq*.)

Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties. Federal agencies accomplish this by following the Section 106 regulations, "Protection of Historic Properties" (36 CFR Part 800). The Section 106 regulations set forth a process by which agencies: 1) evaluate the effects of any Federal undertaking on historic properties (properties included in, or eligible for inclusion in, the National Register of Historic Places (National Register)); 2) consult with State Historic Preservation Officers (SHPO), Tribal Historic Preservation Officers (THPOs), and other appropriate consulting parties regarding the identification and evaluation of historic properties, assessment of effects on historic properties, and the resolution of adverse effects; and 3) consult with appropriate American Indian Tribes (Tribes) and Native Hawaiian Organizations (NHOs) to determine whether they have concerns about historic properties of religious and cultural significance in areas of these Federal undertakings.

Some Tribes and tribal members may consider eagle nests sacred sites provided for in the American Indian Religious Freedom Act (42 U.S.C. 1996) (some are frequently referred to as Traditional Cultural Properties (TCPs)), and as potential historic properties of religious and cultural importance under the NHPA. Such sites are not limited to currently-recognized Indian lands, and they occur across the entire aboriginal settlement area. In addition, some tribes may consider all eagles and eagle nests as TCPs or sacred sites, and potential historic properties of religious and cultural significance which must be considered under Section 106 of NHPA. Properties of religious and cultural importance may be areas where eagles nest and have nested within living memory, their presence becoming a contributing element for determining eligibility under NHPA (King 2006, Tanji 2008)). Thus, a landform or landscape known for eagle habitation—a ridgeline, canyon, lakeshore, river valley, mesa, mountain, etc.—may be considered by Tribes as suitable for designation as a property of religious or cultural importance. A search of the database of historic properties listed on the National Register yielded eleven sites that may be associated with eagle habitat and that are likely to be considered properties of religious and cultural significance by Indian Tribes (Appendix A). We consider this list to be far from comprehensive, and include it primarily to illustrate the minimal information readily available. For other sites considered to have religious and cultural significance, the rigorous evaluation process for listing on the National Register has not been completed, or Tribes may not have initiated the process. According to the Section 106 regulations, a property is considered an historic property if it is listed on, or **eligible for** (emphasis added) listing on, the National Register. Thus, a lack of formal listing does not lessen the need to consider a property; instead, it emphasizes the need for close coordination with appropriate parties at the project planning stage.

Because an eagle or eagle nest may constitute or be considered a contributing feature or element of a property of religious or cultural importance or

sacred site (see discussion in Section 3.8, Societal Issues), issuance of the proposed permits for eagles could constitute an undertaking requiring compliance with Section 106 of the NHPA, and may also require government-to-government consultation with Tribes. Each Regional Permit Office will coordinate with the Service Regional Historic Preservation Officer to ensure necessary NHPA consultations take place with the appropriate parties. The FWS will comply with Section 106 on a case-by-case basis for permits that have the potential to affect historic properties. If it is determined to be more efficient for all parties, the Service may also consult with appropriate stakeholders to develop state or regional Programmatic Agreements that will govern and resolve the compliance with NHPA for the issuance of permits to take in specific states or regions.

American Indian Religious Freedom Act (AIRFA) (42 U.S.C. 1996)

AIRFA sets forth Federal policy to protect and preserve the inherent right of American Indians to express and exercise their traditional religions, including but not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. Given the special trust relationship between the federal government and federally-recognized Indian Tribes, the accommodation of tribal religious practices is in furtherance of the duty of the federal government to promote tribal self-determination. AIRFA will be construed in conjunction with the Service's trust responsibility to federally-recognized Tribes. The Service, in proposing this regulation, has incorporated these principles into the proposal. To address the possibility that demand exceeds our scientifically-based take thresholds, the regulation contains permit-issuance criteria to ensure that requests by Native Americans to take eagles from the wild, where the take is necessary to meet the religious purposes of the Tribe, will be given first priority over all other take except, as necessary, to alleviate safety emergencies.

Religious Freedom Restoration Act of 1993 (RFRA) (42 U.S.C. 2000bb *et seq.*)

RFRA is aimed at preventing laws that substantially burden a person's free exercise of his or her religion. Regardless of the TCP designation under the NHPA, individual eagle nests and eagle areas may be regarded as "Sacred Sites" (AIRFA, EO 13007, and RFRA). The age or longevity of a sacred location has no bearing on its sacred quality, and questions of age or longevity might not be relevant to the community or religious practitioners who ascribe sacredness to a place. In keeping with our commitments under RFRA and AIRFA, the Service will place the highest priority upon Native American religious use for rites and ceremonies that require eagles be taken from the wild when allocating permits, except, as necessary, to alleviate safety emergencies, and we will conduct all necessary consultations (see discussion of Executive Order 13175 below).

Executive Order 13007, Indian Sacred Sites (61 FR 26771, May 29, 1996)

In managing Federal lands, each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency function, (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. When deemed necessary, each Regional Permit Office will coordinate with the Regional Historic Preservation Officer and Regional Native American Liaison (NAL) to ensure implementation of the proposal is in compliance with this Order.

Executive Order 13175, Consultation and Coordination with Tribal Governments (65 FR 67249, Nov. 9, 2000)

This Executive Order emphasizes the need for regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, the responsibility to strengthen the United States government-to-government relationships with Indian tribes, and the responsibility to reduce the imposition of unfunded mandates upon Indian tribes. Each Service Regional Director, in coordination with the Service Regional NAL, conducts government-to-government consultation with the tribes in their Region, and will do so on permits under this proposal. In order to ensure consistent, appropriate consultation, the implementation guidance for this proposal, which will also be available for public comment, will contain guidelines on government-to-government consultation. To facilitate coordination of our multiple responsibilities, our Tribal consultations will advise the Tribes that we are providing them notice under all applicable federal mandates, and we will list them: AIRFA, RFRA, the Eagle Act, E.O. 13007 (if applicable), E.O. 13175, and NHPA. We will also indicate that our notice and invitation to consult is being provided in an effort to carry out our trust responsibility to Tribes, with regard to the unique traditional religious and cultural significance of eagles to Native American communities, and in furtherance of the reserved rights of Native communities with respect to eagles.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853, Jan. 17, 2001)

This Executive Order specifies the need to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions, as well as the need to restore and enhance the habitat of migratory birds. The proposal, through its standards for incorporation of avoidance and minimization measures, is consistent with the goals of this Executive Order. The local Ecological Services and Regional Offices will review any mitigation proposals to ensure they do not adversely affect populations of other migratory bird species.

Department of Interior Departmental Manual 522 DM 1 Adaptive Management Implementation Policy

This policy from the Department of the Interior states that Bureaus should incorporate the operational components identified in the report, Adaptive Management: The U.S. Department of the Interior Technical Guide. These components are: the AM definition; the conditions under which AM should be considered; and the process for implementing and evaluating AM effectiveness. The proposal will be consistent with the Order.

Tribal and State Statutes

As of the writing of this document, 17 states consider the bald eagle endangered, and another considers it threatened under State statutes (See Appendix B). The Nez Perce, Mille Lacs Band of the Ojibwe, and Navajo Nation consider the bald eagle endangered. Three States consider the golden eagle endangered, and a single State protects it as a threatened species. The Navajo Nation and the Mille Lacs Band of the Ojibwe list the golden eagle as endangered. Nothing in the proposed regulation will prohibit individual Tribes or States from considering either eagle species as threatened or endangered according to their statutes. Nor will the proposed regulation prohibit Tribes or States from developing more stringent protection for either species.

Take of eagles may not be allowed without having obtained necessary tribal and State permits and/or certificates or registration. It is beyond the scope of this document to provide specific information regarding each Tribe's or State's permit requirements. However, it is the responsibility of each applicant to contact the respective tribal and State wildlife agency to determine permitting requirements. The Service will determine, upon application, whether there is a valid justification for the permit. In addition, the permit will include this proviso: "The authorization granted by permits issued under this section is not valid unless you are in compliance with all other Federal, tribal, State, and local laws and regulations that are required to conduct the permitted activity." Permittees found to be out of compliance with such other laws and regulations are subject to revocation of their permits under the Eagle Act.

Each Service Region will coordinate and consult with their respective Tribes and States on a case-by-case basis.

1.5 Scope of Analysis

The FEA considers alternatives for permits to take bald eagles and golden eagles "for the protection of … other interests in any particular locality" and where necessary to protect public health and safety. The document also provides evidence and analysis sufficient to determine whether an EIS is required.

This assessment evaluates the effects of various alternatives for permits to take eagles under the Eagle Act. Different permits have potentially different effects on bald eagles and golden eagles, and on societal aspects of the human environment. The potentially-affected human environment includes bald eagle and golden eagle populations, safety, the economy, cultural values, and Native

American religious and cultural practices. Since neither eagle addressed in this document occurs naturally in the State of Hawai`i, Hawai`i has been eliminated from the scope of analysis. In general, the analysis is either national or Service Regional in scale.

1.5.1 Scoping and Public Participation

The proposed permit regulation was made available to the public for a 90-day comment period (72 FR 31141, June 5, 2007), and we relied upon those comments as scoping under NEPA. The Service received approximately 21,500 comments. About 21,400 of the comments were essentially identical, but we summarized their substantive input. Thirty-four individual respondents provided additional substantive input that will be helpful in crafting final regulations, and have helped during the development of the FEA. The 34 individual respondents consisted of: one Federal agency, three Tribes, six State natural resources agencies, three Flyway Committees comprised of representative from State departments of natural resources, one State department of transportation, five environmental organizations, four industry associations, three law firms/consultants on behalf of developers, two power companies, one federal reclamation project, one airport, three rail transportation companies (commenting together), and three private citizens. In addition, we received 58 comment letters on the proposed revisions to the rule and the DEA as noted in our August 14, 2008, notice re-opening of the comment period on the rule and announcing the availability of the DEA. The respondents consisted of: three Federal Agencies, three Tribes, two Confederations of Tribes, one Tribal Department of Natural Resources, three Flyways, 13 State agencies, three Tribal members, one airport, three electric utilities, 10 individuals (non-tribal), five industry associations, nine environmental organizations, one conglomeration of railroad companies, and one transportation association. We have incorporated and responded to the majority of comments addressing our proposal in the preamble to the amended proposed regulation the Service will publish. In addition, the Affected Environment (Chapter 3) and Environmental Consequences (Chapter 4) portions of the FEA reflect a number of the comments, and Appendix K includes a summary of the substantive comments provided on the DEA, with our responses.

1.5.2 Related NEPA Documents

The Service has finalized two other NEPA documents analyzing the impacts from proposed regulations to take raptors. The Service published the Final Environmental Assessment for Take of Nestling American Peregrine Falcons in the Contiguous United States and Alaska for Use in Falconry in March 2004 (http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/AmericanPeregrineFalcon/Final_EA_Peregrine.pdf). We finalized the Environmental Assessment for Take of Raptors from the Wild under the Falconry Regulations and the Raptor Propagation Regulations in June 2007 (http://www.fws.gov/migratorybirds/issues/falconry/Final%20Regulations%20EA.

pdf). For permitting disturbance under the Eagle Act, the Service will use the same modeling approach for determining take used in those NEPA documents.

1.5.3 Issues Discussed in Detail

The Service has used comments on the proposed regulation to help us develop this document. Some of the major topics on which comments focused, and which the FEA discusses, include the following:

- How populations will be delineated for management purposes.
- How the Service will be able to detect the threshold population declines.
- Whether the issuance criteria "where take cannot practicably be avoided" is appropriate.
- Whether "other interests in a particular locality" should be applied as a "catch-all" category.
- How permits will be prioritized if limited in quantity.
- The kinds of mitigation that will be required or effective.
- State coordination and relationship to State guidelines.

In addition, the FEA identifies resources that may either be affected by or may affect the alternatives. These include: (1) presently-occurring eagle mortality factors; (2) human safety concerns; and (3) cumulative effects to eagle habitat from human-generated and other environmental factors.

1.6 Decisions to be Made

- Whether to authorize take permits for both bald eagles and golden eagles.
- Whether to implement take permits for both bald eagles and golden eagles.
- Whether to authorize and implement take permits for removal of both bald and golden eagle nests when necessary to protect public health and safety.
- Whether to set thresholds for take employing a theoretical ecological model consistent with that used in other recent raptor regulations.
- Whether to authorize "disturbance" take only, or to authorize TRM under specific circumstances, and if so, under what circumstances.
- Whether the Service should authorize a permit for only one "disturbance" at a time, or authorize provisions for a programmatic approach.
- Whether, as our final preferred alternative, to adopt all of one proposal or components of more than one alternative.
- Whether, under NEPA, a Finding of No Significant Impact can be reached.

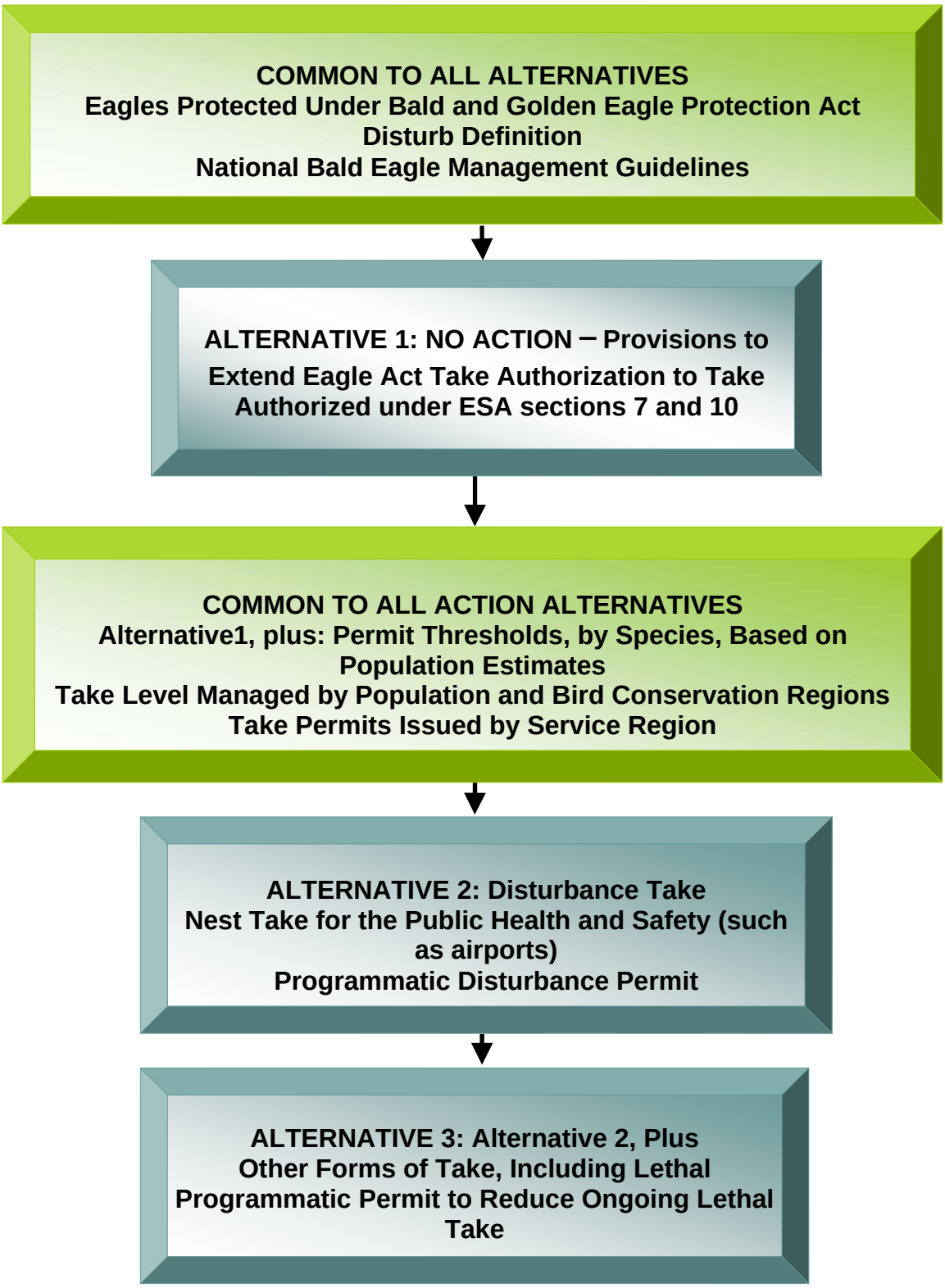

Figure 1 Outline of Alternatives

CHAPTER 2: ALTERNATIVES

2.1 Introduction

This chapter considers three alternatives that provide a reasonable range of options for a regulation permitting take of bald eagles and golden eagles that will occur while carrying out otherwise-legal activities. The alternatives provide different approaches to questions regarding the proposed take permit, such as the following:

- Whether the Service should allow a permit system with allocation based on prioritization.
- Whether the Service should only allow "disturbance" take.
- Whether the Service should allow TRM under certain circumstances, and if so, under what circumstances.
- If the Service will permit only for one "disturbance" at a time.
- Whether the Service will establish provisions for a programmatic approach.

The FEA presents the biological foundations for setting permit thresholds for bald eagles and golden eagles, and outlines a proposal for permit management according to populations, Bird Conservation Regions (BCRs), and Service Regions. The document also discusses whether and how to establish programmatic approaches to permitting, summarizes key aspects of the alternatives, and states the Service's preferred alternative.

The FEA has presented the alternatives in an order from the simplest to the most complex (Figure 1). In some cases, the alternatives are additive. For example, Alternative 3 includes all of the components common to all alternatives, Alternative 2, plus additional proposals, including TRM.

2.1.1 Comparison of Approaches to Take under the ESA and the Eagle Act

Although both the ESA and the Eagle Act prohibit take, there are some subtle, but distinct differences in how each Act defines and regulates take. One key distinction is that the ESA includes the term "harm" in its definition of take, which the Service has defined to include habitat modification and degradation, while the Eagle Act does not. Additional points to bear in mind throughout the discussions in this FEA are included in Table 1.

Table 1. Comparison of Approaches to Take under ESA and Eagle Act

Endangered Species Act Regulations, and Policies	Bald and Golden Eagle Protection Act Regulations, and Policies
Definition of "take"	
"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 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).	*"Take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb (50 CFR 22.3). "Disturb" is defined 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.*
Actions that would significantly disrupt normal behavior patterns are **not limited to breeding, feeding, or sheltering behavioral patterns.**	Limited to "**substantially interfering with breeding, feeding, or sheltering behavior."**
May include significant habitat modification or degradation; therefore, there are provisions for habitat conservation measures.	The definition itself includes only nest abandonment, but the rule also talks about important eagle use areas such as communal roosts and concentration areas. Does not provide for habitat conservation measures, but habitat manipulation that would result in disturbance may be indirectly regulated.
Not specifically tied to decrease in productivity by individuals.	Specific to decrease in productivity of individual birds.

(Comparison of Approaches, continued)	
Endangered Species Act Regulations, and Policies	**Bald and Golden Eagle Protection Act Regulations, and Policies**
Reference for evaluation	
Not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats in the case of Federal agency actions.	Population-based. Goal of stable or increasing breeding populations. (Note: no designated critical habitat).
Thresholds	
Not routinely set or quantified at a population level.	Set and quantified at a population level.
Cumulative Effects	
Evaluation of cumulative effects under section 7 consultation does not include information on other future federal actions; they are assumed to be covered during consultations on the other actions (past activities addressed in baseline and cumulative).	Would include information regarding all past, present, and future actions, regardless of entity. However, for purposes of the FEA, past activities that continue to indirectly take eagles are addressed in the baseline.
Evaluation process	
Mandatory section 7 consultation on federal actions, sometimes requiring biological evaluation and biological opinion. Section 10 HCPs for non-federal actions, requiring plan and NEPA.	Optional discussions with Regional Permits Offices and/or Field Offices, and submittal of avoidance, minimization, and sometimes compensatory measures.
Authorities	
Both are federal statutes, with ultimately federal responsibilities.	
Streamlining	
'Streamlining' and 'batching' of section 7 consultations are encouraged and there is guidance available, as well as a recognized process.	Although not specific to the Eagle Act or its regulations, 'streamlining the permitting process' is mentioned in the Migratory Bird Strategic Plan. We will develop specific guidance in the implementation guidance for this rule.

2.2 Management Common to All Alternatives

The Service will continue the current management and permitting of bald eagles and golden eagles under the Eagle Act, including the finalized definition of disturb, and the National Bald Eagle Management Guidelines (USFWS 2007a), recognizing that the Guidelines are voluntary rather than regulatory. Each Service Regional Director, in coordination with the Service Regional NAL, conducts government-to-government consultation with the tribes in their Region, and will, where appropriate, do so on a case-by-case basis when issuing individual permits under this proposal.

2.3 Alternative 1– No Action: Permit Existing and Future Take Authorized Under ESA:

As part of the rulemaking in which the Service initially proposed eagle take permit regulations (72 FR 31141, June 5, 2007), the Service proposed to extend Eagle Act authorizations to persons previously granted authorization to take bald eagles under the Endangered Species Act. The Service has finalized those provisions in a separate final rulemaking, published on May 20, 2008 (see 73 FR 29075). The new regulations include the following:

- A new section at 50 CFR 22.28 (Eagle Take) providing for expedited permits for take of bald eagles exempted through section 7 incidental take statements; and
- New provisions at 50 CFR 22.11 extending Eagle Act take to HCPs that cover ESA section 10 incidental take of bald eagles and golden eagles.

The regulations extend Eagle Act authorization to persons authorized to take eagles under the ESA, provided the take occurs in compliance with the terms of the ESA authorization. Specifically, the regulations include revisions to 50 CFR 22.11 to provide Eagle Act authorization to persons with ESA section 10 permits that cover the bald eagle or golden eagle[2] for take of eagles that occurs according to the terms and conditions of the ESA permit, as long as the permittee fully complies with the terms and conditions of the ESA permit. The new provision at 50 CFR 22.11 also applies to take covered under future ESA section 10 permits, if, at some future time, either eagle species should become listed under the ESA. The regulations also establish an expedited process to issue Eagle Act permits for take that is in compliance with previously-granted ESA section 7 incidental take statements.

Alternative 1 includes the existing "incidental" take authorizations as well as the current management of bald eagles and golden eagles under the Eagle Act,

[2] Although an HCP is keyed to the section 10 permit provisions of the ESA, which only apply to listed species, HCPs may address both listed and unlisted species, such as the golden eagle. In the event that an unlisted species addressed in the approved conservation plan subsequently is listed under the ESA, no further mitigation requirements would be imposed if the conservation plan addresses the conservation of the species and its habitat as if the species were listed.

including the finalized definition of disturb, and the National Bald Eagle Management Guidelines ("Management Common to All Alternatives"). Required by NEPA, the “No Action” alternative, along with the conditions in the Affected Environment, serve in this document as the reference for comparing the action alternatives. The “No Action” alternative would not provide non-purposeful take outside that previously authorized under the ESA, and such take would continue to be illegal.

2.4 Management Common to Both Action Alternatives: Thresholds for Permits, Management by Population Regions for Bald Eagles, by Bird Conservation Regions for Golden Eagles

Management of eagles under all the action alternatives will include the “Management Common to All Alternatives,” the authorizations currently in place as described in Alternative 1—the “no action” alternative—plus the conditions outlined in this section. This section discusses how the Service will revise its eagle permitting regulations by establishing permit thresholds, and how the Service will establish a management framework. It discusses the biological and geographical foundations for permit thresholds and permit management.

As a result of compelling comments and recommendations from the public on the Draft EA, additional sensitivity analyses we conducted (see Appendix C), and new information suggesting the population growth rate averaged over the span of record of the WEST survey for golden eagles may be negative, the Service will initially place a cap on permitted take at 5% estimated annual productivity for bald eagles (following the approach recommended in Millsap and Allen 2006) and permitted new take at 0% estimated annual productivity for golden eagles. If, in the future, data and modeling suggest golden eagle populations can support take, we would begin to authorize take at no greater than 1% of annual productivity, unless information available at that time demonstrates that higher levels of take can be supported (again, following Millsap and Allen 2006 for species with high uncertainty). However, at this time, we will only consider issuance of "safety emergency take" and the Programmatic Take permits for golden eagles, the latter because it offers the most immediate potential for reducing ongoing take and improving populations.

The Service’s approach is consistent with the recommendations made by Millsap and Allen (2006) that advised that falconry harvest rates for juvenile raptors in the United States not exceed one-half of the estimated MSY up to a maximum of 5%, (depending on species-specific estimates of capacity to sustain harvest) and harvest rates of 1% for species without adequate demographic data. These new permits represent a somewhat different approach to eagle management and have significant policy implications and uncertainties. Those uncertainties and stochasticity (natural variability in vital rates affecting population trends) for both species support a more conservative approach than we proposed in our DEA, which proposed capping threshold at ½ maximum sustainable yield (MSY). The MSY is the greatest harvest rate over an indefinite

period that does not produce a decline in the number of breeding adults in the population. The original proposed cap did not adequately take into account known variability in vital rates, nor was it consistent with the recommendations in Millsap and Allen (2006).

In recent sensitivity analyses the Service conducted (incorporating stochastic events and documented normal variability in vital rates), our models showed, at 4% take there would be no potential for growth for a golden eagle population that may be declining, and there would be negative effects to the floater portion of the bald eagle population (using population trend data from Florida) at ½ MSY and even some minor effects at 5% take. Both the original application of the model and the sensitivity analyses for golden eagles calculated and used a positive growth rate for golden eagles. Incorporation of the new data from Good et al. (2009, pers. Comm.) into calculations for population demographics, yielded a declining growth rate for golden eagles. Floaters, for which monitoring is rarely conducted, serve to buffer populations from decline in times when productivity does not offset mortality, and also serve to provide a buffer for unforeseen effects to populations. Importantly, the models did not factor in the cumulative effects that were discussed in the DEA. Furthermore, the lack of annual monitoring to ensure we are not having a negative affect on populations, particularly when the thresholds we are proposing would be in effect for five years, compels us to adopt the more conservative approach. Some commenters, including eagle experts in various parts of the U.S. believe the DEA's population numbers and survival rates for bald eagles may have been too high for some areas of the country.

Furthermore, the caps recommended in Millsap and Allen were in the context of falconry, where removal of birds from the population has no associated impacts to habitat, whereas many permits issued under both these new regulations will have long-term or permanent habitat-related impacts that may lead to lost breeding opportunities or reduced suitable nest locations that would negatively affect the population. Therefore, we believe that caps should be no less conservative than those recommended for falconry take.

The approach taken also incorporates the cultural significance of both species (Section 3.8, Cultural and Religious). Cultural significance is not limited to Native American religious purposes, but encompasses a broad cultural regard for both species. Although collected by some Native American tribes for ceremonial purposes, the overall cultural value placed on bald eagles and golden eagles is, generally quite distinct from the value of harvesting them. This fact warrants a different, significantly more conservative approach than for managing game bird populations, where allowable take approaches MSY.

Definitions and Interpretations Used in This Document and Proposal

On June 5, 2007, the Service clarified its regulations implementing the Bald and Golden Eagle Protection Act and 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.” It is this form of take to which we refer in much of the FEA.

For the purposes of this action, in the associated “disturb” permit regulations, the Service will define “mitigation” as per the Service Mitigation Policy (46 FR 7644, Jan. 23, 1981), and the President’s Council on Environmental Quality (40 CFR 1508.20 (a–e)), to sequentially include the following:

- 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 operation during the lifetime of the action;
- Compensating for the impact by replacing or providing substitute resources or environments.

The Service will adopt both new and modified definitions under 50 CFR 22.3. The Service will remove the definition of “golden eagle nest”; amend the regulatory definition of “take” as applied to bald eagle and golden eagle nests; clarify existing law by adding the term “destroy”; and add new definitions for “eagle nest” and for “important eagle use area.”

The definition of “eagle nest” is “a readily identifiable structure built, maintained, or used by bald eagles or golden eagles for breeding purposes.”

The definition of “important eagle-use area” is “an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.” Not all foraging areas and communal roost sites are important enough such that interfering with eagles at the site will cause disturbance (resulting in injury or nest abandonment.) Whether eagles rely on a particular foraging area or communal roost site to that degree will depend on a variety of circumstances, most obviously, the availability of alternate sites for feeding or sheltering.

We interpret the standard of “compatible with the preservation of the eagle” as consistent with the goal of stable or increasing breeding populations. Although take thresholds are based on regional populations, the regulation requires the Service to consider additional factors, such as cultural significance, that may warrant protection of smaller and/or isolated populations within a region.

The Service has developed or included the following definitions in response to requests and recommendations for clarification of terms as used in the proposed rule and/or FEA.

Eagle Terms (FEA only):

Adult ─ an individual eagle capable of breeding.

Breeder ─ an adult eagle that defends a breeding territory.

Cohort ─ for purposes of the models used in the FEA, eagles of the same species born in the same year.

Fledgling ─ a juvenile eagle that has taken the first flight from the nest but is not yet independent.

Floater ─ an adult or subadult eagle without a breeding territory.

Juvenile ─ an individual eagle less than one year old.

Lambda (λ) ─ the annual rate of change in population size. The population is increasing if lambda is greater than (>) 1, is constant if lambda = 1, and is decreasing if lambda is less than (<) 1.

Natal dispersal distance ─ extent of movement between the place of birth and place of first breeding.

Nestling ─ an individual eagle between the time of hatching and the time it takes the first flight from the nest.

Productivity ─ the mean number of individuals fledged per occupied nest annually.

Subadult ─ an individual eagle greater than one year old, but typically not able to breed.

Vital rates ─ factors such as productivity, survival of juveniles, and annual survival of adults that influence population change.

Use Area Terms (To be defined by regulation except where noted):

Communal roost site ─ an area where eagles repeatedly in the course of a season gather and shelter overnight, and sometimes during the day in the event of inclement weather.

Foraging area ─ an area where eagles regularly feed during one or more seasons.

Inactive nest ─ a bald eagle or golden eagle nest that is not currently being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days immediately prior to, and including, at present. An inactive nest may become active again and remains protected under the Eagle Act.

Territory ─ a defended area that contains, or historically contained, one or more nests within the home range of a mated pair of eagles.

Permit and Permit Evaluation Terms (To be defined by regulation except where noted):

Advanced Conservation Practices — scientifically-supportable measures that are approved by the Service and represent the best-available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable.

Cumulative effects — the incremental environmental impact or effect of the proposed action, together with impacts of past, present, and reasonably foreseeable future actions. Cumulative environmental effects may be individually minor, but collectively significant over time.

Indirect effects — effects for which a proposed action is a cause, and which may occur later in time and/or be physically manifested beyond the initial impacts of the action, but are still reasonably likely to occur.

Necessary to ensure public health and safety — required to maintain society's well-being in matters of health and safety

Practicable — capable of being done after taking into consideration, relative to the magnitude of the impacts to eagles, (1) the cost of a remedy compared to proponent resources; (2) existing technology; and (3) logistics in light of overall project purposes. For programmatic permits, the comparable standard is "*maximum degree technically achievable*," defined as "the standard at which any take that occurs is unavoidable despite implementation of Advanced Conservation Practices.

Programmatic permit — a permit that authorizes programmatic take. A programmatic permit can cover other take in addition to programmatic take.

Programmatic take — take that (1) is recurring, but not caused solely by indirect effects (2) occurs over the long-term and/or in a location or locations that cannot be specifically identified.

Safety emergency — a situation that necessitates immediate action to alleviate a threat of bodily harm to humans or eagles

Techniques (FEA only) — within the context of Advanced Conservation Practices, includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

A question submitted on the original proposed regulation asked whether "other interests in a particular locality" should be applied as a "catch-all" category. Our interpretation of this phrase is that it is inclusive, in order to allow flexibility. As a practical example, "other interests in a particular locality" may apply to interstate transmission and transportation corridors as well as small communities and individuals. It may also apply to holders of economic, recreational, or other social interests in a particular locality who do not necessarily reside at that locality. For example, holders of mineral leases, rights-of-way, or vacation homes may not reside in the same State as the particular locality, but they have interests there. In addition, it is often the case that American Indian tribes and individual tribal members have an interest in a particular locality because of its aboriginal cultural, spiritual, religious or traditional values, but the locality is outside currently-recognized Indian lands.

2.4.1 Steps When Determining Potential for Take

By employing the Guidelines, State-specific guidance, and other appropriate avoidance and minimization measures, landowners and project proponents should be able to avoid eagle disturbance under the Eagle Act most of the time. In most parts of the country, the Service anticipates issuing relatively few permits for take associated with activities by proponents that have used the Guidelines because the majority of such activities will not take eagles. We routinely encourage project proponents to work with the Service during the early planning phases of their projects. If, after coordination with the Service, it is determined that avoiding disturbance is not practicable, acquisition of a permit may be needed to comply with the Eagle Act. In general, we anticipate that the first point of contact for many inquiries regarding whether or not a permit is advisable will be the Service Ecological Services Offices, Division of Habitat and Resource Conservation, Branch of Conservation Planning Assistance. However, applicants who have already incorporated avoidance and minimization measures into their project planning, and believe take is still likely, may wish to first contact the Regional Permit Office. No matter which office is first contacted, they will coordinate closely with each other.

Disturbance may also result from human activity that occurs after the initial activities. In general, however, the Service will not issue permits for routine activities where take is not likely to occur. New uses or uses that are greater in scope or intensity than pre-existing conditions (such as increased hiking, driving, or residential development) may raise the likelihood of eagle disturbance, and as such, could require authorization for take under these proposed regulations. When evaluating the take that may result from an activity for which a permit is sought (such as residential development), the Service will consider the effects of the preliminary activity (construction) as well as the effects of the foreseeable ongoing future uses (such as activities associated with human habitation).

The Service will not limit its consideration of the impacts and threshold distances to the footprint of the initial activity if it is reasonably foreseeable that the activity will lead to adverse, secondary prohibited impacts to bald eagles and golden eagles. We consider the direct, indirect, and cumulative effects of each activity. For example, when evaluating the effects of expanding a campground, in addition to considering the distance of the expansion from important eagle-use areas, the Service will consider the effects of increased pedestrian and motor traffic to and from the expanded campground. In many cases, the potential for take could be greater as a result of the activities that follow the initial project. For example, the installation of a boat ramp 152 meters (500 feet) from an important bald-eagle foraging area may not disturb eagles during the construction phase, but the ensuing high levels of boat traffic through the area during peak feeding times may cause disturbance. Trail construction 122 meters (400 feet) from a nest is generally unlikely to take bald eagles, but may disturb golden eagles, which have shown such responses as reduced feeding of juveniles in the presence of observers camped 122 meters (400 feet) from a nest (Steidl et al.

1993). Moreover, if the trail will be open to off-road vehicle use during the nesting season, the Service will need to consider the impacts of the vehicular activity as part of the impacts of the trail construction. The Service will evaluate permit applications for whether they had evaluated both direct and indirect impacts of the proposal, and addressed impacts through mitigation measures.

2.4.2 Modify Existing Certification of Compliance Language

All of the Service's migratory bird and eagle-related permits contain the standard condition that the Federal authorization is not valid unless the activity complies with all other applicable laws, including State and local laws. Permits issued under this regulation will include that condition and clarify that the activity must also be in accordance with "tribal" laws (if applicable). The application will therefore ask the applicant to state whether he or she has obtained the State, local, or tribal authorizations necessary to conduct the activity. This permit condition does not override or supersede the right of States or tribes to withhold authorization for take of eagles.

2.4.3 Eagle Management Units and Permit Administration Regions

The Service used available data for each species of eagle to identify appropriate regional population scales for management purposes, with the goal of ensuring the Service's permit program does not cause declines in eagle populations at a regional or national scale.

Bald Eagle

For bald eagles, we obtained locations of all known contemporary nest sites from State fish and wildlife agencies. We also obtained U.S. Geological Service Bird Banding Laboratory band recovery data for all bald eagles banded as nestlings and recovered at five or more years of age at times of the year when they could have been breeding (during the nest building and incubation stages of the breeding cycle of the individual's natal population). We used natal populations (eagles within the median natal dispersal range of each other) in our evaluation in order to look at distribution across the landscape. Being able to see where natal populations appear sparser, rather than concentrated, allows us to determine natural boundaries between regional eagle populations and thus reduces the risk that we will issue take permits in any one regional management area in a manner that is disproportionate to the population in the area. We will consider the natal dispersal distance of bald eagles when evaluating effects to local area populations.

Based on analysis of band recovery data for a subsample of states (AK, AZ, FL, MN, VA; 50 cases), we estimated the median natal dispersal distance for bald eagles to be 43 miles. We built a GIS database that incorporated all State nest locations, and then placed a 43 mile-radius buffer around each nest, effectively "linking" nests that were within the median natal dispersal distance of one another. We regarded aggregates of linked nests as components of the

same regional population for management purposes. Gaps (or areas of sparse nest distribution) in the buffered nest database were used to delineate boundaries between regional management populations. The bald eagle management areas derived using this method include most bald eagle nests in the United States, although a few highly-isolated nesting sites in Arizona, southern California, central Utah, southeastern Colorado, northeastern New Mexico, western Oklahoma, and eastern Texas were not clearly affiliated with any of the larger management areas. For purposes of this EA, we considered Alaska's bald eagles as one population, but Service Region 7 may manage by smaller management regions. Although most nests have been located in southeastern Alaska, extensive surveys have also been conducted on Kodiak Island, the Kenai Peninsula, Alaska Peninsula, Prince William Sound and several mainland rivers. (USFWS 2008). However, vast areas of interior Alaska and the Aleutians remain unsurveyed.

The Service acknowledges that this process was somewhat subjective, and that the regional management populations delineated are not, in most cases, genetically or even demographically isolated. However, we believe the approach does serve to identify biologically-based, regional populations at a scale meaningful for eagle conservation. The Service's goal in managing bald eagles at this scale is to ensure permitted take does not negatively affect the species' status in any regional management population.

The Service will manage bald eagles roughly by eagle populations within Service Regions (see Figure 3 for lower 48 states), referenced to the continental population. Currently, the Sonoran Desert population is still protected under the ESA, but if this population is eventually delisted, we will use the demographic parameters of the Sonoran Desert population in determining take under the Eagle Act in order to more closely monitor that population (Table C.3 in Appendix C). Permits will be administered by Service Regions in coordination with each other, especially where a management area lies in more than one Service Region. For example, the Southwest Region will closely coordinate with the Southeast Region regarding permitting of bald eagles in Texas and Oklahoma (see Figure 3). This management and administrative approach will be evaluated regularly, at least once every five years.

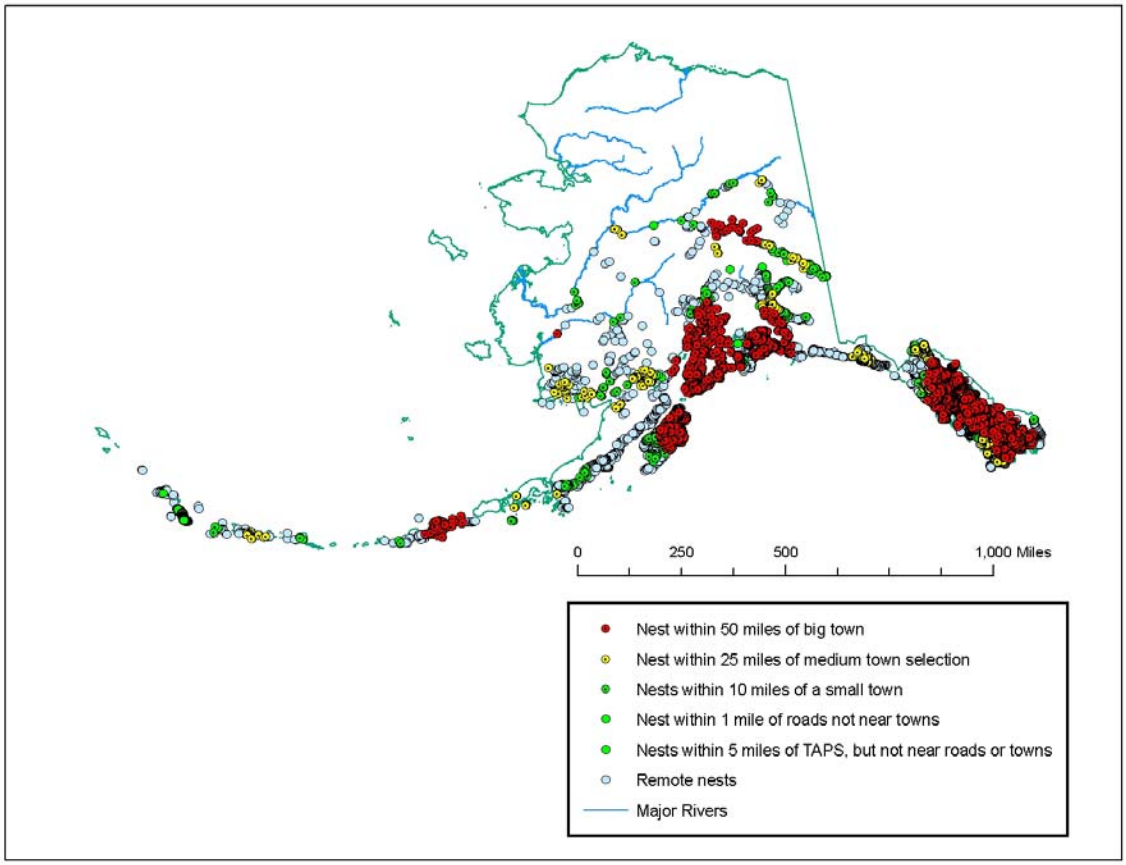

Figure 2 Locations of bald eagle nests catalogued in Alaska: Data collected from organized surveys, reports from biologists doing other work and incidental observations from biologists and the public (TAPS in the legend is the Trans-Alaska Pipeline System). Areas on the map that do not have nests reported may be because there are no nests, but more likely because no one has looked in that area for nests.

Golden Eagle

For golden eagles, available data on distribution are not as spatially precise. However, to estimate natal dispersal distances for golden eagles, an analysis of appropriate band recovery data provided by the U.S. Bird Banding Laboratory (BBL) comparable to that done for bald eagles. Our analysis of this data set showed that 90% of mature golden eagles reencountered during the breeding season were within 140 miles of their natal site. We will consider the natal dispersal distance of golden eagles when evaluating effects to local area populations.

The Service has funded transect-based aerial surveys of golden eagles in the interior west periodically since 2003 (Good et al. 2008). The goal of this survey is to provide statistically-rigorous estimates of population size and juvenile to non-juvenile age-ratios in Bird Conservation Regions (BCRs) 9, 10, 16, and 17.

In addition, the Partners in Flight landbird conservation planning process generated population size estimates for golden eagles in other U.S. BCRs, though these estimates are not as statistically rigorous, nor have the estimates been replicated. Because the BCR-scale population estimates are the only range-wide estimates available for the golden eagle, we used a BCR-scale management approach for this species. In other words, we will manage take of golden eagles according to thresholds set at the BCR level. Because Service Regions are not administered according to BCR boundaries, we will administer permits by Service Regional Permit offices. In those instances when a BCR occurs in more than one Service Region (such as Great Basin BCR 9 in Service Regions 1, 6, and 8, see Figure 4), Service Regions will coordinate closely regarding permit issuance to ensure that the threshold for that BCR is not exceeded. Because there are no breeding populations in the eastern United States that can sustain take (Section 3.4.2), the Service will not authorize take for golden eagles east of approximately 100° west longitude (Figure 4) except for take of nests for safety emergency situations. In addition, for most States west of 100° west longitude, there is little reliable recent data for breeding golden eagles. For example, Breeding Bird Surveys in Kansas and Oklahoma, which intersect the proposed management region by only a small proportion, do not report sightings of golden eagles, although it occurs in both states. It is important to note that failure to detect does not necessarily mean absence, because both States individually note small numbers of breeding pairs (NatureServe 2008). In addition, many states have not had the resources to conduct monitoring of golden eagle populations, in some cases for up to 20 or more years. The Service will therefore base thresholds upon existing data and modeling until better data become available.

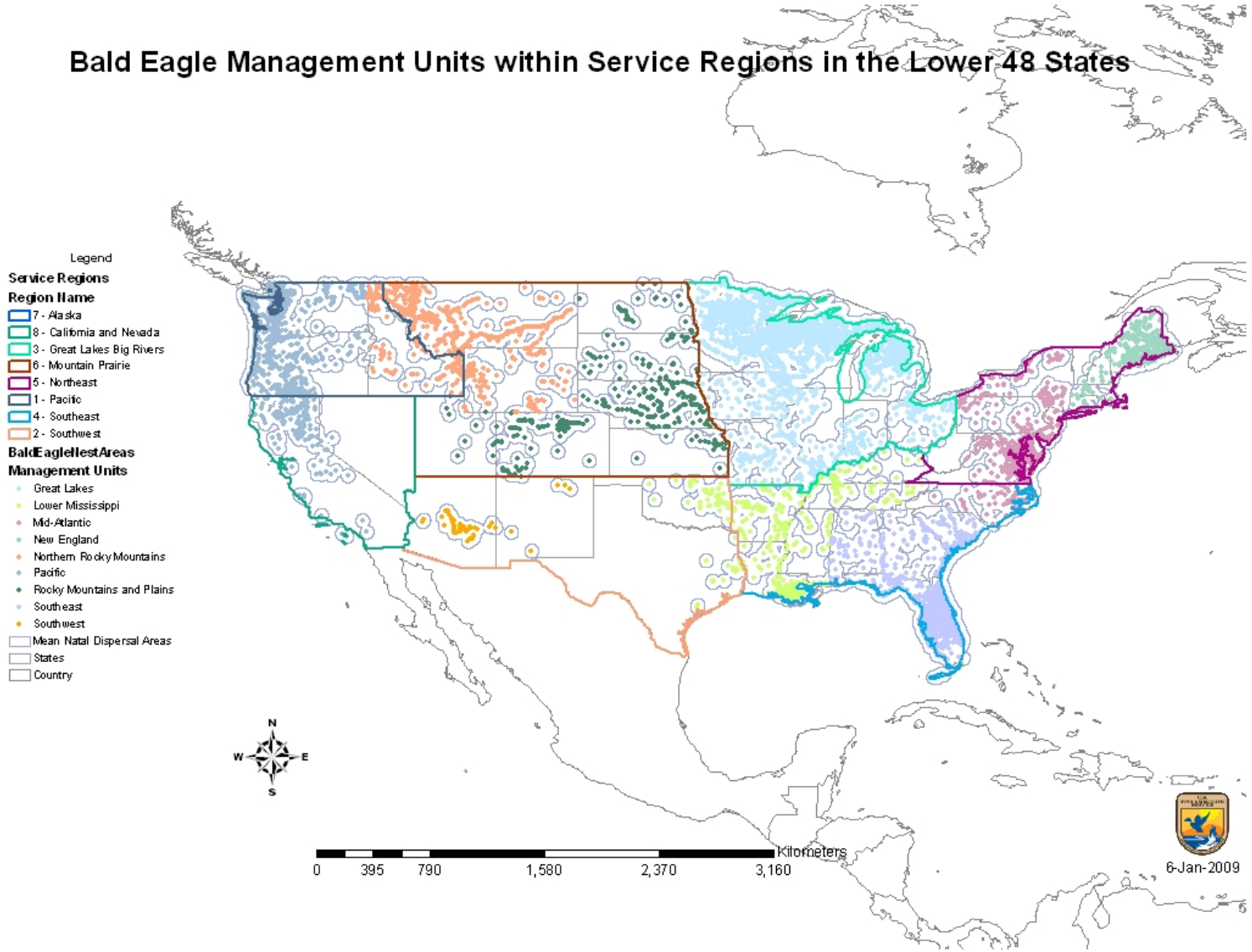

Figure 3 Bald eagle management areas

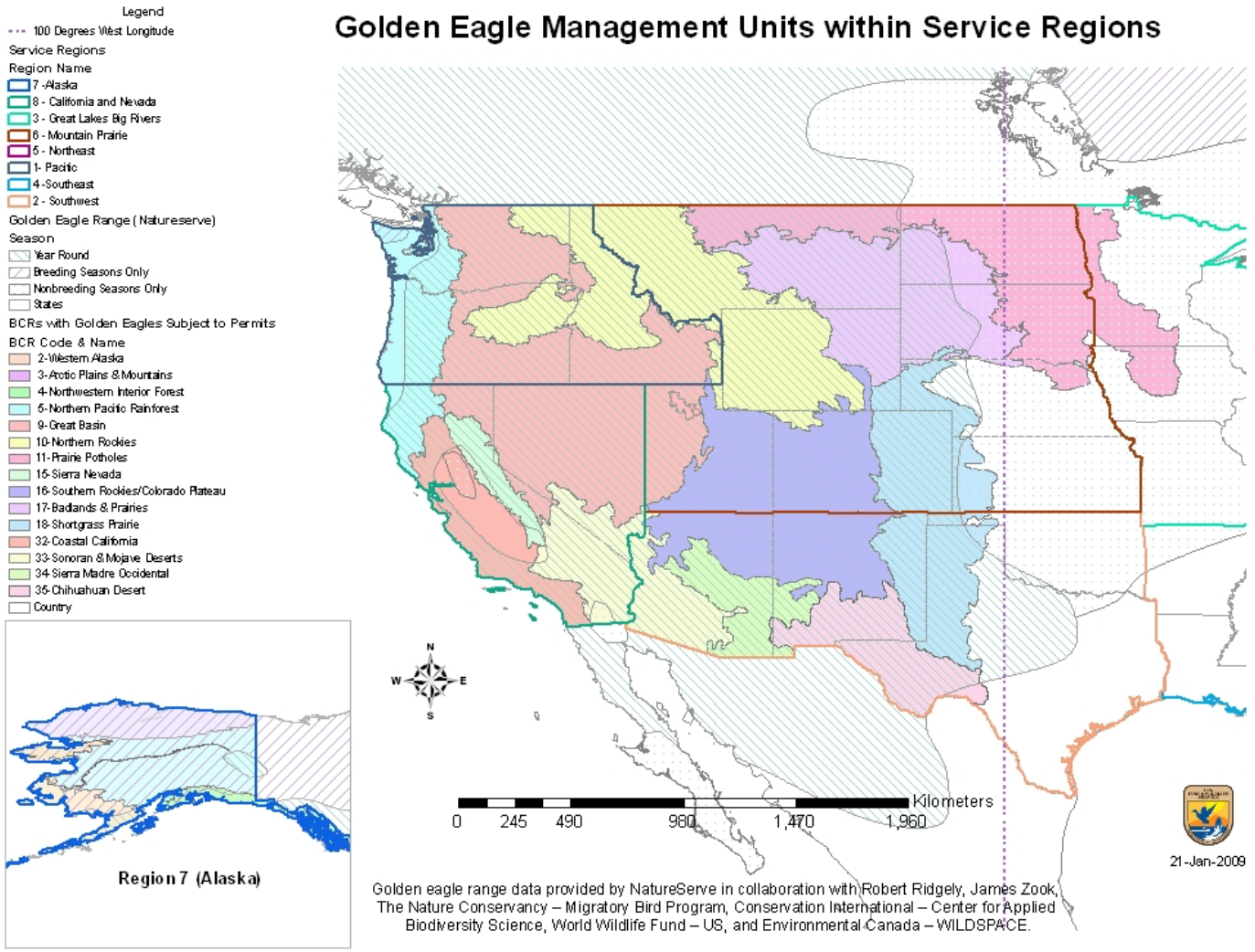

Figure 4 Golden eagle management areas

2.4.4 Permit Thresholds

The Service will base maximum levels of permitted take of bald eagles and golden eagles under both 50 CFR 22.26 and 22.27 on populations (see Appendices C and D for complete discussions of assumptions and methods). We will base take thresholds on regional populations for each species and estimates of their vital rates (see Millsap and Allen 2006), where there is information to substantiate different vital rates. Current, ongoing take from natural and unauthorized human causes contribute to the survival ratios used in the population models. The proposed thresholds will reflect acceptable take above that from natural and unauthorized take. Estimated take caused by currently-permitted activities under the Eagle Act, with the exception of certain ongoing take for Indian religious purposes, will, cumulative with the proposed permit, be subject to the proposed thresholds.

The thresholds proposed in this FEA will determine maximum annual take until new information warrants modification of the thresholds. The Service will base the limits on take upon:

- Models that use available data on population parameters such as juvenile, subadult, and adult survival.
- The number of nests and their occupancy as the information becomes available.
- Cumulative effects of other permitted take of eagles.

However, because the proposed thresholds are estimates and based in part upon models, they do not take into account such things as cumulative effects and site-specific conditions, factors which will become available during the permit-evaluation stage. The on-the-ground information and conditions will guide the actual amount of take that is authorized, as long as the total does not exceed the modeled thresholds. In fact, the actual take authorized may be less than the predicted threshold. The Service Regions, in coordination with adjacent Regions, will make the final decisions regarding the actual amount of take allowed each year.

Biological Foundation for Take Thresholds

The Service originally proposed managing take of eagles using the outer negative range of the regional Population Trend criteria established by Partners in Flight (PIF)[3] to define a stable population (Panjabi etal. 2005)

[3] In the PIF species assessment, each species is assigned global scores for six factors, assessing largely independent aspects of vulnerability at the range-wide scale: Population Size (PS), Breeding Distribution (BD), Non-breeding Distribution (ND), Threats to Breeding (TB), Threats to Non-breeding (TN), and Population Trend (PT). Each of the scores reflects the degree of a species' vulnerability (i.e., risk of significant population decline or rangewide extinction) as a result of that factor, ranging from "1" for a low vulnerability to "5" for high vulnerability. Simplified scores for population trend on a continental scale (PT-c) evaluate trends in terms of % change over 30 years, or equivalent % annual change. A score of 1 means a ≥50% increase over 30 years with an equivalent % annual change of ≥1.36% (Large population increase). A score of 2 means a 15-49% increase, or <15% equivalent annual change (Possible or moderate population increase or population stable). A score of 3 means a Highly variable or Unknown change over 30

(http://www.rmbo.org/pubs/downloads/Handbook2005.pdf). That would have allowed an annual decline of up to 0.54%. There are several reasons why the Service has decided not to use that approach. First, managing to allow for an annual decline, no matter how small, will have a long-term, negative impact on eagle populations. Second, as noted in some comments on the proposal, the current monitoring proposal for the bald eagle and the limited monitoring for the golden eagle do not have the precision or accuracy to detect declines of that magnitude. Third, for golden eagles in particular, the Service requires key demographic, biological, and ecological information, particularly juvenile mortality rates and proportions of non-breeding adults to breeding adults. The original management scenario risked accepting declining populations as the norm, which is not compatible with the preservation of eagles. Finally, the Service wants to use consistent standards for management approaches for all raptors while taking into consideration species-specific natural history differences.

For the preceding reasons, the Service will use the same model for calculating take for eagles that we used in the recently-finalized falconry regulations. This FEA incorporates by reference the methodology presented in a peer-reviewed article (Millsap and Allen 2006, Appendix E) regarding the effects of falconry on wild populations of raptors in the United States, with the following exceptions: unlike the falconry regulations, the term "take" in the proposal does not always mean removal from the wild; and we are using juvenile survival rates of 0.79 instead of 0.84 for golden eagles. Millsap and Allen (2006) noted that the dynamics of most raptor populations make monitoring the short-term impact of take on them nearly impossible. However, it provided recommended strategies designed to account for uncertainties within the plan to manage take. Millsap and Allen (2006) also included an explanation of the deterministic model used to estimate how take likely affects raptor populations. Setting conservative take allocations (as discussed further in Section 2.4, Management Common to Both Action Alternatives and in Appendix C) will allow us to buffer the effects of the uncertainty inherent in using a deterministic model for populations with vital rates that may vary widely from one year to the next, particularly for the golden eagle. Increasing take rates further toward MSY will require us to implement robust population monitoring, a costly effort that will be extremely difficult logistically and financially.

The modeling will set the level of take the Service could permit that is compatible with the preservation of the eagle. The thresholds applied by the Service Regions will consider the cumulative effects of all permitted take, including other forms of lethal take permitted under regulation, against the backdrop of other causes of mortality and nest loss. The backdrop reflects the factors contributing to mortality and survival rates, and includes both natural

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years, and an equivalent % annual change is not available (Uncertain population trend). A score of 4 means a 15-49% decrease over 30 years with a <-0.54 to -2.28% equivalent annual change (Possible or moderate population decrease). Finally, a score of 5 means a ≥50% decrease over 30 years and an annual equivalent change of ≤-2.28% (Large population decrease). Under the PIF species assessment process, the PT-c score for bald eagles is 1, and the PT-c score is 3 for golden eagles.

mortality and human-caused mortality, purposeful and non-purposeful. Examples of illegal purposeful take, which are investigated by the Service's Law Enforcement (LE) program in coordination with State, tribal and international wildlife agencies, include deliberate persecution of eagles and killing of eagles for purposes of commercial gain from wildlife trafficking.

There are inherent limits to the ability of monitoring to detect precise fluctuations in bald eagle and golden eagle numbers. Take is not always discovered or may occur later, so there may be uncertainty as to whether individual actions being permitted will in fact result in a "take" of eagles. To reduce and compensate for uncertainties, we intend to use multiple sources of the best available data, including but not limited to data from post-delisting monitoring by States, the Breeding Bird Survey, golden eagle data from the previously mentioned west-wide surveys (WEST data), and fall and winter migration counts and any other reliable data that may become available, to assess the status of eagle populations, adjust the model based upon updated parameter information, and adjust permitting criteria on a five-year basis as appropriate. As noted in the introductory paragraph to this section, thresholds proposed in this FEA will determine annual take until new information warrants a modification of thresholds. If data confirm populations at either national or regional scales are declining, depending on the source and severity of the decline, the Service will either establish lower take permit thresholds where appropriate or suspend permitting until data confirm the populations can support take. Conversely, if a population at one or the other scale is increasing, the Service may set take thresholds at a higher level. If we have inadequate data to run our modeling and no other means of assessing the status of the population where the take will occur, we may not be able to determine that the take is compatible with the preservation of the species, and if we determine that take is not compatible, we will not authorize it.

The Service will assess, at least every five years, overall population trends along with annual report data from permittees and other information to assess how likely future activities are to result in the loss of one or more eagles, a decrease in productivity of bald or golden eagles, and/or the permanent loss of a nest site, communal roost site, or important foraging area. The Service will also assess how such outcomes will likely affect population trends, taking into consideration the cumulative effects of other activities that take eagles and eagle mortalities due to other factors. In addition, the assessment will incorporate estimates of illegal purposeful take of eagles from persecution or trafficking as well as unauthorized non-purposeful take, both of which LE will continue to investigate. This periodic assessment will provide additional information for: (1) establishing permit thresholds; (2) determining the efficacy and applicability of mitigation; (3) confirming or modifying permit information and issuance criteria; (4) confirming or modifying the recommendations provided in the Guidelines.

The impact to the population from permits (the cumulative take under all permits used/allocated) will include the following: (a) disturbance associated with a temporary loss of productivity; (b) disturbance resulting in a permanent loss of a nest or abandonment of a territory (in some cases leading to a decrease in the

breeding population); (c) Native American religious take which has been for either nestlings or, when take occurs in the fall, fledglings, juveniles, or adults; and (d) other permitted take (see Appendix C for a more extensive discussion relative to methods for setting thresholds). Recommended thresholds for take that results in a temporary loss of productivity will incorporate the total permitted disturbance of eagles at communal night roosts and important foraging areas. The Service will recommend greater take be deducted from the annual allocation when there is a permanent loss of a foraging area or roost for which there is no comparable alternate use area within an average home range distance of the applicable season. On the other hand, in the case of take occurring at nests, if there were other suitable nest locations or alternate nests used by the breeding pair, or they subsequently emigrated but were replaced by another pair, the Service will recommend take be allocated based upon a loss of productivity rather than loss of a nest. We will determine the amount of take incurred per location on a case-by-case basis by Service Region.

Accounting for Take

Because we will evaluate the effect of take on the basis of survival of juveniles rather than nest productivity, we will be able to set take in terms of individual eagles (see Appendix C for detailed discussion, including take calculations for bald eagle populations other than "standard").

For the standard bald eagle population:

- take affecting one individual = subtraction of one individual from the threshold;
- take resulting from disturbance at one nest on only one occasion = subtraction of 1.3 individuals from the threshold; and
- one nest take resulting in the permanent abandonment of a territory = subtraction of 1.3 individuals from the threshold the first year and a reduction of eight individuals from the annual individual permit limit until data show the number of breeding pairs has returned to the original estimated, or until it can be demonstrated that the predicted loss has not occurred.

For the standard golden eagle population:

- take affecting one individual = subtraction of one individual from the threshold;
- take resulting from disturbance at one nest on only one occasion = subtraction of 0.78 individuals from the threshold; and
- one nest take resulting in the abandonment of a territory = subtraction of 0.78 individuals from the threshold the first year, and a reduction of four individuals from the annual individual permit limit until data show the number of breeding pairs has returned to the original estimated, or until it can be demonstrated that the predicted loss has not occurred.

Destruction or loss of the use of a nest location, with no opportunity for replacement, may result in the loss of a territory, and a permanent decrease in the breeding population. The Service would not issue permits, except for safety emergency, if a permanent, unmitigable loss of a golden eagle territory is likely.

2.4.4 Mitigation

As noted in Section 2.2, Management Common to All, the Service will define "mitigation" to sequentially include: avoidance, minimization, rectification, reduction over time, and compensation for negative impacts to bald eagles and golden eagles. Prior to the submission of a permit application, potential applicants should consult with Ecological Services Field Offices to determine whether or not the proposed activity is consistent with eagle management guidelines. The Service will evaluate permit applications to determine whether, during the process of developing an activity, use of the eagle management documents and other methods for avoiding and minimizing the potential for take will be employed. Any requests for permits will need to cite these measures in their supporting documentation.

For most individual take permits resulting in short-term disturbance, the Service will not require compensatory mitigation. The population-based permitting the Service will propose is based on the level of take that a population can withstand. Therefore, compensatory mitigation for individual permits is not necessary for the preservation of eagles. However, the Service will advocate compensatory mitigation in the cases of nest removal, disturbance or TRM that will likely incur take over several seasons, result in permanent abandonment of more than a single breeding territory, have large-scale impacts, occur at multiple locations, or otherwise contribute to cumulative negative effects.

2.4.5 Relationship between Data Gathered and Setting Annual Thresholds

In its technical guide to adaptive management (AM) (Williams et al. 2007), page 4, the Department of the Interior adopted as the operational definition of adaptive management the definition by the National Research Council:

> *Adaptive management (is a decision process that) promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.*

AM is a structured approach to decision making that emphasizes accountability of decision outcomes, and is useful when there is uncertainty regarding the most appropriate strategy for managing natural resources. As set

forth in **522 DM 1**, consideration of AM is warranted when: (1) there are consequential decisions to be made; (2) there is an opportunity to apply learning; (3) the objectives of management are clear; (4) the value of reducing uncertainty is high; (5) uncertainty can be expressed as a set of competing, testable models; and (6) an experimental design and monitoring system can be put in place with a reasonable expectation of reducing uncertainty. Rather than simply monitoring the status of the resource of interest, a key component of AM is also monitoring the impacts of the management strategies. Although statutory requirements constrain the ability of the Service to propose an active (experimental) AM strategy, we believe the proposal is in keeping with a passive AM strategy. In a passive AM strategy, uncertainty is recognized, but the focus is on the achievement of management objectives. Monitoring is focused on the resource status and other factors that are useful for improved understanding through time (Williams et al. 2007).

The proposed eagle-take regulations are based on a number of assumptions and contain areas of uncertainty. Increasing our understanding of how disturbance actually affects eagles, and how loss of individuals and nests affects populations, will improve our ability to effectively conserve eagles with minimal impacts to eagles and socio-economic resources. The Service proposes to reduce uncertainty in the management of eagle take by requiring permittees to report back to us on the use of nests, roosts, or foraging areas by eagles for up to three years after the activity is completed (see draft forms in Appendix F). Permittees for most disturbance permits will only be asked to provide minimal information to allow the Service to assess whether or not the activity likely caused disturbance. However, this information will contribute to an AM process that will enable us to evaluate and revise thresholds for permits and to adjust the Guidelines.

The Service will also use results of the final bald eagle post-delisting monitoring program to help re-evaluate the size and status of regional populations at least once every five years for a total of 20 years. These data will increase the accuracy of our estimates of regional population size and nest locations, and will also allow us to recalibrate thresholds for take of nests and individuals based on actual population trends. The bald eagle post-delisting monitoring program will focus on nest-site occupancy. However, monitoring at nests is not sufficient to detect some types of population decline (Millsap and Allen 2006). The Service will use other eagle population data, as available, such as counts and age-ratio information from standardized migration count sites, to look for indications of population changes not detectable through any existing nest surveys.

For golden eagles, the Service will initially use data from available surveys such as that by WesternEcoSystems Technology, Inc. and information from the BBS. The Service also will use additional data, as available, such as counts and age-ratio information from standardized migration count sites, and the long-term monitoring data from the Snake River Birds of Prey National Conservation Area.

For both species, we will evaluate persistent changes in migration counts or age ratios, at least once every five years, to determine if eagle-take regulations

might be a contributing factor, and if changes are warranted. The Service will adjust the permitting thresholds and allocations by using the best data available at the time of each decision. We will use the updated data to apply the population model for estimating the number of permits to allocate.

2.5 Alternative 2– Eagle Take Permits, Structured Allocation Authorized, Nest Take for Public Health and Safety, and Programmatic Disturbance

Alternative 2 discusses regulatory proposals that will authorize the following: disturbance-related take of eagles; removal of eagle nests for reasons of "public health and safety"; and programmatic disturbance under a permit designed to avoid or minimize the ongoing and future risk of disturbance to eagles

2.5.1 Disturbance Take

The Service will add a new section at 50 CFR 22.26 (Eagle Take) to authorize disturbance take of bald eagles and golden eagles for the protection of other interests in any particular locality, where such permits are compatible with the preservation of the bald eagle and golden eagle, and the take cannot practicably be avoided.

These permits will be limited to disturbance, as opposed to take that results in mortality. They will require an initial determination that the permits will be compatible with the preservation of the bald eagle and golden eagle; that the take will be associated with, and not the purpose of, an otherwise lawful activity; and that it will occur even after impacts are minimized to the extent practicable by use of avoidance and minimization measures.

Short-term Disturbance

The Service will distinguish between levels of effects to the population in two separate evaluations of disturbance. A short-term disturbance reduces productivity in a given year, and there is a decrease in recruitment into the following year equivalent to the average number fledged per occupied territory. This assumes eagles in the territory become productive again after the activity ceases, which may not be as likely for golden eagles. If it appears likely that eagles in the territory will not become productive again after the activity ceases, the Service may classify the effect as a long-term disturbance as described below.

Permanent Abandonment of Territory, Important Communal Roost Site, or Important Foraging Area

Long-term disturbance may result in the permanent abandonment of a territory, important traditional communal roost site, or important foraging area. In terms of population effects, this permanent effect is the equivalent of annually authorizing disturbance at one location in perpetuity. For this reason, long-term disturbance will have larger impacts on the eagle population, and will result in a greater take being subtracted from the annual thresholds (Appendix C). Permit

information requirements and issuance criteria will be applied in the same manner as those for short-term disturbance, and will apply if the Service's Migratory Birds Office, local Ecological Services Office or the Regional Permit Office determines that a disturbance will be associated with the permanent abandonment or loss of a nest. However, the Service would also likely require compensatory mitigation in such cases. Destruction or loss of the use of nest location, with no opportunity for replacement, may result in the loss of a territory and a permanent decrease in the breeding population. The Service would not issue permits, except for safety emergency, if a permanent (unmitigable) loss of a golden eagle territory is likely.

2.5.2 Permitted Take of Nests for the Public Health and Safety

The Service will add a new section at 50 CFR 22.27 (Eagle Nest Take) to authorize removal of bald eagle and golden eagle nests where "necessary to ensure public health and safety." This will include nests that pose an imminent hazard to human safety or to the welfare of eagles. The proposal will authorize removal and/or relocation of both active and inactive eagle nests in what we expect to be the rare case where genuine safety concerns necessitate the take. This permit will also be available to remove or relocate inactive nests in situations where the take is necessary to ensure public health and safety, but the presence of the nest does not create an immediate safety emergency. Nest take permits may be issued for projects that will provide a net benefit to eagles (including projects where the net benefit is the result of compensatory mitigation measures). We may also issue permits to take eagle nests built on human-engineered structures where the nest interferes with the intended use of the structure. This permit is limited specifically to eagle nests and will not authorize intentional, lethal take of eagles.

Except for applications associated with safety emergencies, prior to authorizing nest removal, we will review the availability of potential alternative suitable habitat (nest substrate, foraging areas, etc.) and the distance to those areas, in order to reasonably assess the likelihood of total loss of the territory. When known, we will consider such factors as the number of nests in a particular breeding pair's nesting territory and the last known date the pair used the nest under consideration for take, in order to assess the relative value of the nest to the pair. Further, to assess whether the loss of a particular nest may have negative local population impacts, we will also consider the surrounding territories and the nests within those territories to evaluate the ability of the area to support a displaced pair. For example, if all the suitable nest locations are fully-occupied, impacts leading to abandonment of a territory (either through destruction of the nest substrate or through not being re-occupied by either the original nesting pair or a new pair from the floater population) may have a significant negative impact to the area population. Available prey base or intra-species competition may be additional relevant factors. For overall permit management, we will consider local area population effects within the species-specific natal dispersal distances (43 miles for bald eagles, 140 miles for golden eagles). However, we believe it will be too burdensome to ask the proponent to

provide data on that large a scale. We have found, in implementing the resource recovery permit for take of inactive golden eagle nests (50 CFR 22.25), that data within a 10-mile radius of the nest provides us with adequate information to evaluate many of the factors noted above.

The Service anticipates that permits authorizing take of nests for the public health and safety will be relatively few and will be subject to the thresholds and allocation process proposed in the Management Common to Both Action Alternatives. Take of inactive nests that pose a hazard to human safety or to the welfare of the eagles without emergency removal may not always need to be included in the calculations for permit thresholds if the eagles will likely be lost anyway due to the conditions prompting the safety emergency, or if the Service determines the removal of the nest would not result in an unmitigable loss of a breeding territory. Because of the time constraints associated with take that will be for emergency situations, these will not be immediately subject to the allocation prioritization and all bona fide applications will be authorized. However, we will conduct an after-the-fact evaluation of emergency-take authorizations. If data indicate there may be population effects from use of emergency take, the Service will reconsider whether the allocation for the safety take should be deducted from the permit thresholds. An example will be if there were no other suitable nest locations or alternate nests for the breeding pair, and they subsequently emigrated without being replaced by another pair. If the Service determines it is necessary, we will estimate potential take from this source, based on historical numbers for the applicable Service Region to that date and the formula used in **2.4.3 Permit Thresholds**, *Accounting for Take*, and deduct the number from the available permits at the beginning of the year.

Current regulations at 50 CFR 22.25 allow the removal by permit of golden eagle nests if the nest interferes with resource development or recovery operations.

2.5.3 Allocation of Individual Permits

Although unlikely to occur in most parts of the range of either eagle species, the Service anticipates that in a handful of regions there could be more requests for permits than the number of permits available. However, we will reserve some permits in order to authorize safety and emergency permits. In some cases, e.g., sampling under a scientific collecting permit to ascertain disease, pathogen, or contaminant issues, activities intended to protect eagles may result in a short-term disturbance. If there is a compelling need for this sampling, specific to the conservation of eagles, this kind of take will be considered emergency take for prioritization purposes. In keeping with our commitments under RFRA and AIRFA, the Service's Regional Directors will each be responsible for developing and implementing a structured-allocation process in each Region if there is evidence that demand for take will exceed take thresholds for either species of eagle. This process will ensure that authorized take of birds necessary to meet the religious need of a Native American Tribe will not be denied due to other take being authorized for another purpose. Each Regional structured-allocation process will also need to ensure that permits are available in case of public

safety emergencies. The next permit priorities, in order are, renewal of programmatic nest-take permits, and Non-emergency activities necessary to ensure public health and safety. The next permit priority (for golden eagle nests only) is for resource development or recovery operations (§ 22.25). Service Regions will be responsible for any necessary NEPA compliance regarding additional decisions for implementation procedures. If the Service receives more applications for permits than it can provide under the relevant regional threshold, applicants will need to reapply at a later date.

2.5.4 Permit for Programmatic Disturbance

Under this alternative, the Service will develop a programmatic disturbance permit at 50 CFR 22.26 that will be available to entities (industries, agencies, or authorities) at the private, federal, tribal, and State level undertaking activities that may result in a cumulative loss of bald eagles and golden eagles, eagle nests, foraging areas, and roost sites with potential for local population-level effects. "Programmatic" has several meanings in the proposal. Primarily, we use the term to mean dealing with take from the same source in a consistent manner. The sources may be practices or facilities common to one or more industries or agencies, e.g., road construction conducted by Federal, State, tribal, and local transportation departments, or power lines and infrastructure installed by power companies of all sizes, or other entities such as natural gas development companies. It can also refer to resource "programs" carried out by agencies at all levels, e.g., minerals, fire, and realty programs that conduct activities that may result in non-purposeful take of eagles. The entities conducting those "programs" may want to work with the Service to develop specific measures and standard practices to avoid and minimize take of eagles, with the goal of designing a permit for those "programs." In addition, "programmatic" may refer to a permit that comprehensively addresses long-term or widespread take.

The Service will work with the entities to develop scientifically-supportable standard practices and criteria for choosing the best-available techniques in projects and plans. Project design criteria will include requirements for applicants to reduce take and provisions to notify the Service when take occurs. These standard practices and plan specifications will then become permit conditions, in addition to monitoring and reporting requirements more comprehensive than those for permits allowing take of individual eagles. The Service will require that any mitigation or standard practices be designed to avoid or minimize the ongoing, future risk of disturbance to eagles. We expect most industry-wide or agency-wide standard practices for programmatic permits will be developed with the respective entities at the Service Washington Office level, in coordination with Service Regions, and, as requested, State and tribal jurisdictional agencies. They will serve as permit type templates that can then be adopted for use by individual practitioners or companies engaged in the covered industry or program. The permits will be issued by the Regions.

In cases where current industry practices are resulting in programmatic disturbance of eagles leading to the abandonment of important eagle-use areas and when the Service has limited permits based upon population models,

compensatory mitigation may be a suitable standard practice, as long as the mitigation will provide long-term protection from disturbance for nest sites, foraging areas, or roost sites within the area defined by the programmatic permit. In addition, under certain situations (e.g., multiple transportation corridors within eagle-use areas) it may be advisable to develop geographically-based programmatic permits involving more than one industry or agency.

Several of the comments the Service received on the proposed regulation suggested that the approval process should give "substantial weight to findings of consistency with a State management plan where such plans are consistent with the Eagle Act's goal of preservation of the eagle." One commenter specifically cited the Maryland Chesapeake Bay Critical Area Program (MCBCAP). The Service considered this a potential example suitable for a programmatic disturbance permit. However, we found that the MCBCAP emphasizes habitat conservation measures (which are provided for under the ESA), but is limited in preventing disturbance of eagles (which is the focus of the Eagle Act).

This permit could also be available to entities actively engaged in habitat enhancement that will provide long-term benefits for eagles but will entail short-term negative impacts. An example of such an activity is the shrub-steppe enhancement and renewal initiatives in the Great Basin ecosystem.

Depending upon site-specific conditions and the determination of the local Ecological Services Office and/or the Service Regional Permit Office, permitted take in programmatic permits that will lead to reductions in ongoing disturbance may not need to be subtracted from the calculated take thresholds because this EA considers such disturbance take to be part of the baseline environmental conditions. Programmatic permits for future activities will be subject to take thresholds and the annual allocation process. However, if we determine that entities proposing future activities have, through advanced conservation practices on existing infrastructure or activities, ensured that there will be no net loss to the breeding population from the combined existing action and new proposal, they would not be subject to take thresholds and the annual allocation process.

2.5.5 Combination Permits

Where appropriate, the Service will issue a single permit that combines authorizations provided under the various regulations. For example, an airport that meets the obligations of its Wildlife Hazard Management Plan, or comparable document, and adopts measures developed in cooperation with the Service to minimize the potential take of eagles, could be issued a programmatic permit under these proposed regulations (50 CFR 22.26). Based upon comments received on the proposal, the Service will extend the time period of such a permit to authorize take that occurs as the result of unavoidable collisions between eagles and planes. It will be valid for up to five years. A stipulation of the permit will likely be the requirement to haze eagles in the vicinity of airports, which could constitute disturbance (for example preventing eagles from re-nesting at a hazardous location). Because this hazing is intentional and the effects on the eagles purposeful, it does not meet the issuance criteria for the §

22.26 permit, which requires the taking to be associated with, but not the purpose of, the activity. Therefore, we will issue permits to intentionally remove nests or haze under the authority of § 22.23 (Depredating permits), which will be amended to clarify their application to the protection of health and safety as well as to depredating eagles. The regulations at § 22.23 limited permit tenure to 90 days because the need for programmatic authorization was not contemplated at the time that regulation was developed. In order to have the ability to extend this type of authorization to "Advanced Conservation" programmatic permittees, we will amend the regulations at § 22.23 to allow all depredation permits to be valid for up to five years.

2.6 Alternative 3– Alternative 2 Plus Take Resulting in Mortality (TRM) Individual and Programmatic Option (Preferred Alternative and Environmentally-Preferred Alternative)

Alternative 3 will encompass all of Alternative 2 and it will add permits for TRM of bald eagles and golden eagles where the take is associated with, but not the purpose of, the activity. The primary purposes of Alternative 3 are to reduce the ongoing occurrences of unauthorized and unregulated mortality contributing to eagle losses (currently affecting survival ratios in the population modeling) and to ensure that any authorized, programmatic TRM also include measures to reduce long-term risk of take.

Alternative 3 will also authorize programmatic permits for airfields that could include TRM. Programmatic permits for new and expanded activities are subject to take thresholds and the annual allocation process if it is determined that the predicted take, even where reduced to the point where it is unavoidable, will result in a cumulative loss to the eagle population. When there are no Service-approved measures to minimize take, we will issue no permits.

We will develop metrics for determining whether take is unavoidable and for determining industry- or agency-wide standard practices for programmatic permits with the respective entities at the Service Washington Office level, in coordination with Service Regions. The permits will be issued by the Regions, and will include permit conditions to ensure all recoverable eagle carcasses, parts, and feathers are sent to the National Eagle Repository.

We intend, through a structured coordination process with States and tribes (Section 2.6.4., Measures to Minimize Uncertainty), to develop monitoring and research adequate to both resolve current uncertainties in the data and to provide enhanced ability to detect the effects of the permit program. If, after implementation for a time period commensurate with the normal population cycles of the eagle, data then indicate take thresholds can be increased in certain regions, we will increase thresholds accordingly to allow more annual take. One factor that should allow us to increase take thresholds in some regions for both species, is implementation of advanced conservation measures through programmatic permits to reduce ongoing take that is currently unauthorized. (Section 2.5.4, Permit for Programmatic Disturbance, and Section 2.6.2., Permit for Programmatic Reduction and Minimization of TRM).

2.6.1 Permit for TRM on an Individual Basis

For standard, individual permits, the same issuance criteria will apply for disturbance and TRM. The Service anticipates these permits will be few, but historically, there has been a need to permit some unavoidable TRM of bald eagles. The sources of mortality could be related to such things as transportation, forest management, electric utilities, and home construction. In addition, if a safety-related nest take occurs while the nest is active, there may be a need for an additional permit to take eggs or juveniles if it is determined they cannot be successfully relocated. However, this will be a one-time individual permit and will not apply if the mortality is ongoing for the same location, entity, or system. Therefore, whenever possible, the Service will encourage development and use of programmatic permits.

2.6.1.1 Allocation of Individual Permits for TRM

Individual permits for TRM will be subject to the same allocation process as for individual disturbance permits. The consequence of TRM of individual eagles and the consequence of nest disturbance are the same - the loss of individuals from the population. In the case of TRM, the loss is of individual eagles and the consequences are easily calculated. As long as the rate of population growth (λ) is greater than 1, the loss of any individual eagle has the same demographic consequence to the population; even if the loss is of a breeding adult, surplus floating adults should be available as replacements. In the case of nest disturbance, the loss is the contribution to the annual cohort of juveniles from the affected nest. On average, that loss will equal the average productivity of breeding pairs in the impacted population since that is the number of young that will have been produced in the absence of the authorized disturbing activity.

2.6.2 Permit for Programmatic Reduction and Minimization of TRM

Under this alternative, the Service will also develop a “Performance-Based” programmatic permit designed to reduce ongoing TRM of bald eagles and golden eagles associated with industries such as electric distribution via power lines, transportation, and wind-power development. The list of examples is not meant to be exhaustive because other industries, agencies, or authorities at the federal, tribal, and State level may also be contributing to ongoing eagle mortality. The Service Washington Office will work with the entities to develop scientifically-supportable standard practices and protection plans which, when implemented, will reduce the occurrence of mortality to that which the Service determines meets the “unavoidable” criterion. These standard practices and plans will then become permit conditions, in addition to monitoring and reporting requirements more stringent than those for permits for take of individual eagles. The take authorized through programmatic permits will require quantified estimates of mortality, and the estimate will be specified in the permit authorization. Any mitigation or standard practices must be designed to be consistent with the goal of stable or increasing breeding populations. The Service will use the monitoring and reporting to determine effectiveness of the mitigation or standard practices.

Currently, the only industry example (of which the Service is aware) of standard practices that could, with reasonable modifications, be developed into conditions for a “Performance-Based” permit is that developed by the power-line industry and the Avian Powerline Interaction Committee (of which the Service is a member). As noted in Section 1.1.2 of the Introduction, suitable components of a permit for the power-line industry will include (but will not be limited to): establishment of a mortality baseline through estimates or a sampling scheme; employment of the best-available techniques and mutually-approved standard practices for minimizing eagle mortalities; undertaking a system-wide risk analysis and retrofitting a significant portion of hazardous locations within a reasonable time frame; implementation of an effective monitoring program; reporting eagle mortality to the Service; use of only eagle-friendly practices on all new infrastructure (60" spacing, raptor-safe poles and equipment) in areas identified as high-risk for eagle mortality; and a demonstration that the permittee has eliminated all avoidable eagle mortality in those high-risk areas. To prevent collisions, utilities will also need to ensure transmission lines, distribution lines, and towers that are located in known eagle concentration areas, foraging areas, or nesting areas, have visual markers on the wires.

Other industries or agencies interested in developing standards suitable as permit conditions, and which ensure any mortality meets the “unavoidable” criterion, will be encouraged to work with the Service to develop them. Once those permit types are developed, they can serve as permit type templates that can then be adopted for use by individual practitioners or companies engaged in the covered industry or program. Practitioners of the relevant industries could work to qualify for the programmatic permit. The key components for any permit in this category will need to meet the same high level of standards set for the power-line industry as described above.

The coverage for programmatic take will be limited to those portions or programs of an industry, company, or geographic area that have fully implemented the advanced conservation practices and can demonstrate acceptable reduced mortality. Prior to completion of the risk analyses, the determination of acceptable reduced mortality will be based upon the percent reduction in mortality, supported by documentation of the implementation of standard practices or use of best available technologies. Similar to the programmatic-disturbance take permit, it may be advisable in some cases to develop geographically-based programmatic permits involving more than a single industry or agency.

The Service will encourage industry and non-governmental entities to work with us to conduct scientifically-sound risk analyses to predict with acceptable accuracy the per-unit probability of eagle mortality from specific industry practices and technologies under varying conditions and situations. We will use the per-unit mortality predictions, among other factors, to help set permit thresholds for programmatic TRM. Monitoring and reporting of actual take will be required as a part of the adaptive management process.

This permit will not be required for activities to proceed, nor, in the case of the electric-power-line-utility industry, will it replace the current voluntary process for

instituting an Avian Protection Plan, which will still remain an option, but cannot legally absolve the utility from liability. It will be a performance-based permit for those industry operators, or portions of their programs, which demonstrate their actions have reduced ongoing mortality or have contributed to population stability or improvements.

This permit will initially be for reduction of ongoing take that is currently unauthorized, and which is reflected in the survival ratios of population models. Therefore, TRM permitted in programmatic permits that will lead to reductions in mortality will not be subtracted from the calculated take thresholds. If the reductions in mortality (or other factors) contribute to population increases over a period of five years or greater, then we will re-evaluate the permit thresholds to determine whether modifications are warranted. Programmatic permits for new and expanded activities may be subject to take thresholds and the annual allocation process if it is determined that the predicted take of new activities or combined predicted take of an expansion plus existing take, even where reduced to the point where it is unavoidable, will result in a net loss to the eagle population. .

2.6.3 Avoidance and Minimization for TRM Permits

As with all other permits under this proposal, the Service will evaluate permit applications to determine whether, during the process of developing an activity, use of the eagle-management documents and other methods for avoiding and minimizing the potential for take will be employed. Any requests for permits will need to cite these measures in their supporting documentation.

Proper siting and placement of infrastructure known to be lethal or injurious to eagles are essential to avoid take. In addition to measures to avoid disturbance take as noted in the eagle-management documents, siting to avoid lethal take needs to take into greater consideration such life-history components as dispersal, migration, winter-concentration behavior, and foraging behavior during breeding and non-breeding seasons. When evaluating requests for TRM permits (especially if programmatic in scope), the Service will first assess whether the proposal includes avoidance of migration corridors, winter-concentration areas, and home ranges during breeding and non-breeding seasons. Failure to site lethal infrastructure outside these areas will reduce the options available to qualify for a permit under this proposal.

2.6.4 Measures to Minimize Uncertainty

Our original DEA identified, and commenters provided, substantive information demonstrating there could be significant negative impacts to local area eagle populations without more specific provisions to minimize uncertainty and specific measures for coordination between the Service and jurisdictional wildlife agencies regarding permit issuance and program management. As a response to comments received on the DEA and proposed rule, and to minimize uncertainty regarding eagle demographics and populations and the effects of the proposed rule, the Service will develop and implement two improvements in coordination and consultation: 1) a structured coordination process with State

and tribal wildlife jurisdictional entities, and 2) improved implementation of Service Trust responsibilities to tribes. We will develop and refine these measures during the drafting of implementation guidance for this proposal. The implementation guidance will also undergo public review and comment. In addition we agree with comments we received that additional resources, e.g., monitoring that would support management of eagles at regional or local scales, would improve and further reduce the uncertainty in the eagle permit program. We have provided a list of the goals for which we will work, as resources allow.

2.6.4.1 Structured-Coordination Process with State and Tribal Wildlife Jurisdictional Entities

The implementation guidance for this proposal will contain guidelines for the Division of Migratory Bird Management on how to better implement coordination between the Service and State and tribal wildlife jurisdictional agencies. This implementation guidance will be designed to achieve the following: consistent and effective coordination; minimization of the effects our permit actions will have on local area populations; development of additional goals necessary for effective implementation; provide a forum to share monitoring reports and data, to help develop standard practices for programmatic permits; and to cooperatively develop the required components for more localized thresholds and management, We will use the coordination structure developed by the guidance to identify specific regions, e.g., the Chesapeake Bay, that are critical to the maintenance and continued recovery of continental bald eagle populations and to the long-term sustainability of golden eagle populations, and also to develop localized conservation measures for programmatic permits. We will also use enhanced coordination to identify areas that are critical foraging, roosting, and concentration areas. We intend to actively seek the assistance of States and tribes as we develop the guidance, and we will not limit our outreach to minimal compliance with NEPA.

While there are a number of ways to implement enhanced coordination, including operating through the existing flyway structures, there may be a need to create structures at different scales, national, Service Region, and/or State or tribal. The specific structures will be developed during the implementation guidance stage, and by the Service Regions, as appropriate. However, there are elements necessary for effective coordination that will be common to all agreed-upon structures. These elements include, but may not be limited to, the following:

- Formal agreements;
- Clear delineation of roles, responsibilities, and authorities;
- Coordination facets – Coordination between entities, applying guidance criteria, implementation teams that meet regularly;
- Action level points-of-contact;
- Liaisons;
- Issue resolution teams;
- Strategic Facets – Program Manager Team (monitoring implementation of streamlining and needed improvements, assessing and monitoring

programs and workload, determining need for additional criteria, consistency, training, and developing strategic recommendations);
- Dispute resolution process;
- Implementation plan; and
- Criteria for evaluation of efficiencies.

In some areas, processes for streamlining permits may be feasible if requested. We will only consider such requests if those States or tribes have eagle-management plans or statutes protecting eagles that have legally-enforceable provisions prohibiting take at least as protective as those in the Eagle Act (including prohibitions on disturbance), and contain comparable liability provisions.

2.6.4.2 Improved Implementation of Service Trust Responsibilities to Tribes

In order to better ensure consistent, appropriate consultation, and improve our compliance with NHPA, AIRFA, and RFRA, the implementation guidance for this proposal will contain guidelines for the Division of Migratory Bird Management on how to better implement government-to-government consultation on a permit-by-permit basis and on the program as a whole. We intend to actively seek the assistance of tribes as we develop the guidance, and not limit our outreach to the requirements of NEPA. The measures in the implementation guidance will provide direction on incorporating the results of government-to-government consultation into permit conditions, as necessary. In addition, the implementation guidance will also recommend that each Region work with their respective tribal governments or representative organizations to develop a practicable and mutually-agreeable framework for regular coordination meetings relative to the eagle permit program.

2.6.4.3 Identified Goals for Improved Ability to Manage Eagle Populations and Permit Program

The comments received on the DEA, in addition to uncertainties pointed out by the Service, have lead us to identify a number of needs that, when met, will reduce the uncertainty and improve the Service's ability to manage bald eagles and golden eagles, as well as the permit program. They will also support the improved coordination procedures and structures committed to in section 2.6.4.1, as well as efforts to develop more localized management. Drawing, in part, from recommendations for golden eagle conservation in Kochert and Steenhof (2002) and Whitfield et al. (2008), and the results of analysis in this document, we have identified the following non-comprehensive, but critical needs and goals as program goals towards which we will work:

- A national golden eagle-specific conservation and management plan to include, but not be limited to:
    - Identifying and assessing the influence of constraints, e.g., nest site availability, electrocution, agricultural and urban encroachment,

persecution, unintentional disturbance through recreation, energy development (including wind), lead poisoning or other contaminants, invasive species, climate change, drought, impacts to prey base, or other factors;
    - Establishing criteria for setting favorable conservation status targets. Criteria could include such things as: whether the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and whether there is, and will probably continue to be, a sufficiently large habitat to maintain populations on a long-term basis;
    - Identifying and developing management measures to achieve favorable conservation status;
    - Developing tests for determining achievement of favorable conservation status targets; and
    - Developing standardized protocols for surveys and monitoring to ensure the ability to compare and combine results.
- A satellite telemetry study to better determine age-specific mortality, and answer questions about dispersal, migration, and winter concentration areas.
    - Eagles radio marked to provide population data could also be used to simultaneously gather information about their association with environmental factors. Those data would help fill in at least two information gaps: 1) eagle use of the environment beyond the nest site and of the landscape in general; and 2) their current use of the environment as compared to historical data.
- Improved survey and monitoring for both species.
- A habitat-predictive model for golden eagles that could identify not only suitable habitat structure (e.g. slope, aspect, geologic strata that would provide shelves, or large nest trees in some areas) but also identify areas that are prone to invasives, altered fire frequency and intensity regimes, and subject to increasing pressures from urban and energy (including wind) development.
- Population goals for each species.

2.7 Alternatives Considered but Eliminated from Detailed Study

When the Service first proposed the eagle permit regulation, we considered permitting take of bald eagles and golden eagles based upon (1) the populations in Alaska and (2) the total populations in the lower 48 states for both species. The Service is interpreting the “preservation of the eagle” to mean maintaining bald eagle and golden eagle populations with no discernible population declines, nationally or regionally. Therefore, an alternative that would allocate permits solely at the larger scale probably would not be compatible with the preservation of eagles and would be difficult to implement. In addition, the Service believes that management of either species of eagle solely at the scale of the lower 48 states would not be feasible to implement because our Permit Program is largely administered from the Service Regional Offices. It will also limit the ability of the

Service to effectively coordinate with local entities such as tribes and States. For all the preceding reasons, the Service eliminated this as an alternative.

One comment letter recommended an alternative that would propose take for bald eagles but not for golden eagles. The Service believes that the measures and analyses specific to the golden eagle in Alternative 1, the "No Action" alternative are consistent with the approach proposed by the commenter, and that the recommended alternative would not change the management of either species. The measures also ensure that thresholds are compatible with the preservation of the eagle, and allow us to suspend take of either species if populations would not support take. In addition, we believe the programmatic permits proposed are needed to improve conditions for golden eagle populations, and that failure to take those steps would not be compatible with the preservation of the golden eagle. Furthermore, we do not believe that including the proposed approach as a fourth alternative would provide any additional substantive information that would change the information informing our decision. Thus, we have not added it.

CHAPTER 3: AFFECTED ENVIRONMENT

3.1 Introduction

The affected environment includes the environmental components (resources) that will be affected by the alternatives. It is important to note these resources may also affect the alternatives if the Service were to implement them. For example, large-scale changes in habitat supporting eagles may have population impacts that may require adjustment to the level of take compatible with the preservation of eagles. Although the chapter title includes the term "affected," this chapter does not present effects. Instead, the environment described is the reference point for the comparisons of impacts in Chapter 4, Environmental Consequences. The implementing regulations for NEPA (40 C.F.R. 1502.15) state that agencies shall avoid useless bulk in statements and shall concentrate effort and attention on the important issues. The proposed permit or permits will be national in scale; therefore the Service has identified those factors with the greatest importance at that scale, and has also concentrated on those issues identified in comments on the proposed rule.

3.2 General Information Regarding Raptor Population Biology

The Service considers the availability of nest sites and food as the limiting factors for raptor populations (Wilcove et al. 1986, 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). 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 breeding territory becomes vacant. In habitat where nest sites are widely available, breeding density fluctuates generally in synchrony with availability of preferred prey (Newton 1979, Smith and Murphy 1979, Ridpath and Booker 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). Consequently, in relatively undisturbed raptor habitat, breeding density is naturally limited primarily by food supply or nest sites, whichever is most limited (Newton 1979, 1991).

Local area adult and subadult eagle populations may be comprised of: pairs occupying a breeding territory; individuals that have secured a breeding territory but not a mate; and individuals that are unable to secure a breeding 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 typically depend upon the presence of many floaters. An emphasis solely on occupied territories may delay the detection of population declines (Kenward et al. 2000), but some researchers

suggest that 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). More recent modeling efforts cited by commenters (Katzner et al. 2006) suggest that this is not so much an early warning sign, as a sign of a population in extremely dire straits, and t hat adult turnover may be a more reliable indicator of short-term changes in eagle demography. Ensuring the availability of suitable settlement areas for dispersing floaters can increase the effectiveness of conservation efforts (Penteriani et al. 2005). For additional information regarding population dynamics and how we assessed them in this proposal, see Appendix C.

3.3 Bald Eagle

3.3.1 General Conditions

Bald eagles are an endemic North American species that historically occurred throughout the contiguous United States and Alaska. It historically ranged and nested throughout North America except extreme northern Alaska and Canada and central and southern Mexico. The largest North American breeding populations are in Alaska and Canada, but there are also significant bald eagle populations in Florida, the Pacific Northwest, the Greater Yellowstone area, the Great Lakes states, Maine, and the Chesapeake Bay region. Bald eagle distribution varies seasonally. Bald eagles that nest in southern latitudes frequently move northward in late spring and early summer, often summering as far north as Canada. However, in Arizona bald eagles typically stay in their breeding areas year round. Most eagles that breed at northern latitudes migrate southward during winter or to coastal areas where waters remain unfrozen. Migrants frequently concentrate in large numbers at open water sites where food is abundant and they often roost together communally. Wintering bald eagles occur throughout the United States but are most abundant in the West and Midwest (USFWS 1983) along major river systems and large bodies of water in the mid-western states, Chesapeake Bay region, Pacific Northwestern states, and states of the intermountain west, including Wyoming, Utah, Colorado, New Mexico, and Arizona. On their winter range, bald eagles may roost singly or in small groups but larger communal roosts are important and may predominate in many areas (Platt 1976). Bald eagles have been observed to fly over 24 kilometers (15 miles) from their feeding areas to roosting sites (Swisher 1964). In some cases, concentration areas are used year-round: in summer by southern eagles and in winter by northern eagles.

Breeding bald eagles occupy territories, many of which have been used continuously for many years. One breeding territory in Ohio was occupied continuously for nearly a century (Herrick 1924). Bald eagles generally nest near coastlines, rivers, large lakes, reservoirs, and streams proximate to an adequate food supply. They often nest in mature or old-growth trees, snags (dead trees), sometimes on cliffs or rock promontories, and rarely nest on the ground. They also nest with increasing frequency on human-made structures such as power poles and communication towers. Several alternate nests are built by a single

pair in a breeding territory, and in any given year, a new nest may be built or an old nest may be reoccupied (Greater Yellowstone Bald Eagle Working Group (GYBEWG) 1996). The start of the breeding season ranges from October in Florida, to late April or early May in the northern United States.

3.3.2 Population

The first declines in bald eagle populations in the past 250 years occurred due to habitat loss as early European immigrants settled on shorelines in the Chesapeake Bay and elsewhere on the East Coast. More significant declines began in the late 19th Century due to hunting for feathers, trophies, and bounty. In addition, eagles were killed by ingesting poisons used to bait and kill livestock predators. In 1940, Congress enacted the Bald Eagle Protection Act (amended in 1962 to protect golden eagles, and now called the Bald and Golden Eagle Protection Act). In the late 1940s, organochlorine pesticide compounds such as DDT (dichloro-diphenyl-trichloroethane) began to be used in large quantities. DDT metabolites accumulated in the fatty tissues of breeding bald eagles, resulting in production of eggs with abnormally thin eggshells, which cracked or failed to fully develop, causing a severe decline in bald eagle numbers. By 1963, a survey conducted by the National Audubon Society estimated the number of breeding bald eagles in the lower 48 states to be 417 breeding pairs.

Since DDT use in the United States was banned in 1972 and the bald eagle gained the protection of the ESA,[4] bald eagle numbers have rebounded.[5] In 1999, the Service proposed to remove the bald eagle from the list of threatened and endangered species, prompting some states to stop conducting annual surveys for bald eagles. The most recent national census in 2000 counted 6,471 breeding pairs in the lower 48 states. On February 16, 2006, the Service re-opened the comment period on its 1999 proposal to delist the bald eagle (71 FR 8238, Feb. 16, 2006), conservatively estimating at least 7,066 breeding pairs in the contiguous United States. As of February 2007, the Service estimates that number to exceed 9,700 (72 FR 37346, July 9, 2007). In July of 2007, the Service removed the bald eagle from the ESA list of threatened and endangered species. However, the bald eagle currently remains protected as a threatened species throughout the range of the Sonoran Desert population because the federal district court for the District of Arizona enjoined the removal of ESA protection for that population in *Ctr. for Biological Diversity v. Kempthorne*, 2008 U.S. Dist. LEXIS 17517 at 42 (D. Ariz. 2008).

3.3.3 Disturbance

Numerous studies have sought to measure the sensitivity of bald eagles to a variety of human activities (Mathieson 1968, Stahlmaster and Newman 1979,

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[4] The bald eagle was first protected south of 40° north latitude by the Endangered Species Preservation Act in 1967, then listed as endangered in 43 contiguous states and threatened in the other five under the ESA in 1978, then reclassified to threatened in the lower 48 states in 1995.

[5] Alaskan bald eagles were largely unaffected by DDT and were never protected under the ESA. Today, there are perhaps 50,000 to 70,000 bald eagles in Alaska.

Skagen 1980, Gerard et al. 1984, Fraser et al. 1985, Russell and Lewis 1993, Brown and Stevens 1997, Buehler 2000, Grubb et al. 2002), and have shown that bald eagle pairs may react to human activities very differently. Some pairs nest successfully just dozens of yards from human activity, while others abandon nest sites in response to activities much farther away. This variability may be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the individual nesting pairs.

Human activities that cause prolonged absences of breeding adult bald eagles from their nests can jeopardize eggs or nestlings. Depending on weather conditions, this may cause the eggs to either overheat or cool down too much, and then fail to hatch. Unattended eggs and nestlings are subject to predation. Irregular feeding due to human disruption can harm nestlings and adults. Adults startled while incubating or brooding nestlings may damage eggs or injure their nestlings as they abruptly leave the nest. Older nestlings may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly.

Human activities near or within foraging areas and communal roost sites may prevent eagles from feeding or taking shelter, especially if no other adequate feeding or roosting sites are available. Human disturbances may constitute a threat to wintering bald eagle populations by causing displacement to areas of lower human activity (Stalmaster 1976, Stalmaster and Newman 1978, Brown and Stevens 1997). Human disturbances may also interfere with foraging behavior of eagles (Mathiesen 1968, Stalmaster 1976).

Additional information regarding the response of bald eagles to disturbance can be found in the final rule removing the bald eagle in the lower 48 states from the list of endangered and threatened wildlife (72 FR 37346, July 7, 2007).

3.4 Golden Eagle

3.4.1 General Conditions

Worldwide, the golden eagle is widely distributed, with five or six subspecies found throughout the northern hemisphere in Europe, Asia, and northern Africa and occasionally in the southern hemisphere (Kochert et al. 2002). In North America, golden eagles occur mainly west of the 100th Meridian and in western Canada, nesting and wintering from Alaska south to central Mexico. Historically, the breeding range of the golden eagle included most of North America (Bent 1937). Today, the golden eagle is primarily a winter resident in the eastern United States (Kochert et al. 2002), but in 1997 a nesting pair was documented in Michigan (Wheeler 2003).

In North America, northern breeding golden eagles migrate longer distances to wintering areas than do southern eagles, sometimes up to thousands of kilometers. Golden eagles south of 55° north latitude migrate smaller distances or not at all. More research is needed to establish migration routes or areas, but they appear to be concentrated along the Rocky Mountains and Appalachians (Kochert et al. 2002). In some western states golden eagles are year-round

residents on breeding territories. Golden eagles will occasionally roost communally during severe weather or when prey is abundant (Kochert et al. 2002; Craig and Craig 1984). Edwards (1969) observed in Utah that immature golden eagles often associate with one another during winter and they also may roost with bald eagles during winter.

Golden eagles usually occupy open areas (canyon land, open desert, grassland, and shrub habitat) where their preferred prey can be found. However, in southwestern Idaho, eagles selected shrub habitats and avoided grasslands in addition to disturbed areas and agriculture (Marzluff et al. 1997). Golden eagles feed primarily on small mammals, most commonly rabbits (*Sylvilagus* spp.), hares (*Lepus* spp.), ground squirrels (*Spermophilus* spp.), marmots (*Marmota* spp.), and prairie dogs (*Cynomys* spp.). They also eat carrion, birds, and reptiles, and less often fish and larger mammals. Millsap and Vana (1984) reported on the importance of waterfowl to wintering golden eagles in the eastern United States.

Nest sites are most often on cliffs or bluffs, less often in trees, and occasionally on the ground. Pairs establish and defend breeding territories that may contain multiple nests built and/or maintained by the pair, which are often re-used or attended in subsequent nesting seasons. Individual eagle nests left unused for a number of years may be reoccupied. In a review of the available literature and reports regarding nest use by raptors, Megown et al. (2007) reported an interval of over 22 years during which golden eagles did not occupy a nest.

3.4.2 Population

The golden eagle is a Bird of Conservation Concern in the Great Basin, Northern Rockies, Southern Rockies/Colorado Plateau, and Badlands and Prairies Bird Conservation Regions (numbers 9, 10, 16, and 17, USFWS 2002). The golden eagle is also ranked by NatureServe (2007) as critically imperiled in Georgia, Tennessee, and Vermont; breeding golden eagles as critically imperiled in Kansas and Maine; and the non-breeding population as critically imperiled in Indiana, Louisiana, Maine, Maryland, and Virginia (see Appendix B). Braun et al. (1975) estimated a North American population of perhaps 100,000 individuals in the early 1970s. United States Breeding Bird surveys show no trend for this species (P=0.39, Sauer et al. 2005). However, a report on a 2006 survey (Good et al. 2007a) showed decreasing populations in two Bird Conservation Regions (BCRs). A draft report of 2007 surveys in the same areas (BCRs 9, 10, 16, and 17, hereinafter WEST areas) found decreasing golden eagle populations in two BCRs, one of which was the same as the previous report (Good and others, 2008). The current PIF-based United States and Canada population estimate is 80,000, with a “fair” accuracy rating and a “very high” precision rating. Kirk and Hyslop (1998) suggested that golden eagle populations may be declining in some areas of Canada. Golden eagle productivity in Alaska may be lower than that for golden eagles in lower latitudes (Young et al. 1995; McIntyre and Adams, 1999). Good et al. (2004) estimated that there were just over 27,000 golden eagles in the 4 BCRs in which the species is of conservation concern. These

same BCRs encompass much of the western U.S. population and most of the North American population of this species. A preliminary report on the 2008 surveys in the WEST areas showed population declines in all four BCRs covered in the survey, an area which is believed to contain approximately 80% of the golden eagle population in the lower 48 states (Good et al., personal communication, January 14, 2009). Breeding bird surveys and migration counts are inconclusive but suggest lowered reproduction rates in the western United States, possibly due to habitat alteration and loss, with concomitant declines in prey (Kochert et al. 2002). Kochert and Steenhof (2002) noted that the status of nesting golden eagles in the western U.S. is less clear than that of golden eagles in Alaska and Canada, where information suggests that nesting populations are stable. In addition, McIntyre et al. (2006), provided evidence that estimates of annual productivity were not good predictors of first-year survival in migratory juvenile golden eagles. They further suggested more research is needed to determine whether productivity is an accurate predictor of survival in both non-migratory and migratory populations of golden eagles.

In addition to gaps in knowledge regarding post-fledgling mortality, there is a need to gather more information regarding dispersal patterns of juvenile golden eagles (Edwards et al. 1988) as well as adult female survivorship, a key population indicator. They remarked that an apparent male bias in fledgling sex ratios was less skewed than expected because, as Newton (1979) noted, female golden eagles usually suffer greater post-fledging mortality than males. They also suggested that, among golden eagles from the Snake River Birds of Prey area in Idaho, subadult males may either have lower survivorship relative to females or have greater dispersal tendencies. Greater knowledge regarding sex ratios of survivorship and dispersal tendencies can yield information relevant to adult sex ratios, important for evaluating monitoring results. In addition, skewed sex ratios in wild bird populations may have implications for conservation (Donald 2007).

Good et al. (2007b) noted that determining if the golden eagle population in the Western United States is increasing, decreasing, or stable is more important than knowing how many golden eagles are present. Harmata (2002) suggested that conservation and management of golden eagles may be better served if, in addition to productivity, efforts were focused on determining the number of breeding pairs and turnover of breeding eagles over multiple years. In a personal communication (September 25, 2007), Carol McIntyre, wildlife biologist and eagle specialist from Denali National Park and Preserve, reported a general concern among raptor biologists over the proposal to issue take for golden eagles, given the lack of data on population size, productivity, and survival. In addition, McIntyre et al. (2008) suggested that conservation strategies for migratory golden eagles require a continental approach.

3.4.3 Disturbance

Golden eagles appear to be sensitive to human activity, and may be much more sensitive to disturbance than bald eagles (Dr. M. W. Collopy, personal communication, May 15, 2007). They commonly avoid urban and agricultural

areas, but this is likely due at least in part to low availability of preferred prey species in those locations. 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 juveniles less frequently, and fed themselves and their juveniles up to 67% less food than when observers were camped 800 m from nests. 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% of all known nest losses. Breeding adults are sometimes flushed from the nest by recreational climbers and researchers, sometimes resulting in the loss of the eggs or juveniles due to nest abandonment, exposure of juveniles or eggs to the elements, collapse of the nest, eggs being knocked from the nest by startled adults, or juveniles fledging prematurely. However, golden eagles rarely flushed from the nest during close approaches by fixed-wing aircraft and helicopters during various surveys in Montana, Idaho, and Alaska (Kochert et al. 2002).

3.5 Biological and Physical Environment

3.5.1 General Habitat Factors

As described above, bald eagles typically occupy coastal areas and shorelines of rivers and lakes, while golden eagles favor the open, more arid habitat of the western states. However, in reality, both species use a variety of habitats and geographical areas. The breeding and wintering habitats of bald eagles and golden eagles together comprise a large portion of the United States. A detailed description of the biological and physical components of this large area is beyond the scope of this FEA. However, the Service can outline some factors in eagle habitat that may be related to population effects.

The Birds of North America accounts for both species make specific recommendations for research relating to eagle environments that is important for adequate and informed management. Buehler (2000) noted that research is needed to define tolerable limits of human development that will not compromise bald eagle population viability. In addition, information on the effects of habitat alteration on golden eagle populations is deficient for both breeding and wintering grounds (Kochert et al. 2002).

3.5.1.1 Climate Change

In a review of research evaluating the effects of recent climate change, McCarty (2001) noted that, while scientists have documented the response of species to interannual or geographic variations in climate, they lack sufficient information to understand or predict the responses to the kinds of long-term trends in climatic conditions that have occurred in recent decades. However, changes in the timing of avian breeding and migration and a northward expansion of the geographic range in North American birds have already been documented (McCarty 2001; Peterson 2003; LaSorte and Thompson 2007).

In the western U.S., there is evidence (Ziska et al. 2005) that increasing atmospheric CO_2 concentrations associated with climate change may have contributed to cheatgrass productivity and fuel load with subsequent effects on fire frequency and intensity, a factor in golden eagle habitat that is discussed further in Section 3.5.3, Golden Eagle Habitat Factors, page 44. In addition, elevated CO_2 concentrations may contribute to increased expansion of the exotic invasive hydrilla (*Hydrilla verticillata*) (U.S. EPA 2008) that, with an associated epiphytic cyanobacteria species, has been implicated as a link to avian vacuolar myelinopathy (AVM) (Wilde et al. 2005). First reported in 1994, AVM has caused the death of at least 100 bald eagles (Thomas et al. 1998).

3.5.2 Bald Eagle Habitat Factors

Habitat loss and encroachment from development has been a factor for bald eagles. For example, some of the states with high numbers of bald eagles have also experienced high rates of increased housing unit development from 2000 to 2004 (United States Census Bureau, 2007). Of the twenty states ranked highest in housing unit development, the following States with high concentrations of bald eagles: Florida, Georgia, North Carolina, Virginia, Michigan, Washington, Minnesota, Wisconsin, and South Carolina ranked, respectively, number 1, 4, 5, 7, 10, 14, 16, 17, and 19. In addition, 49 of the top 100 fastest growing counties from April of 2000 until July of 2006 (United States Census Bureau, 2007) have bald eagle breeding locations identified within them (Appendix G and Figure 5).

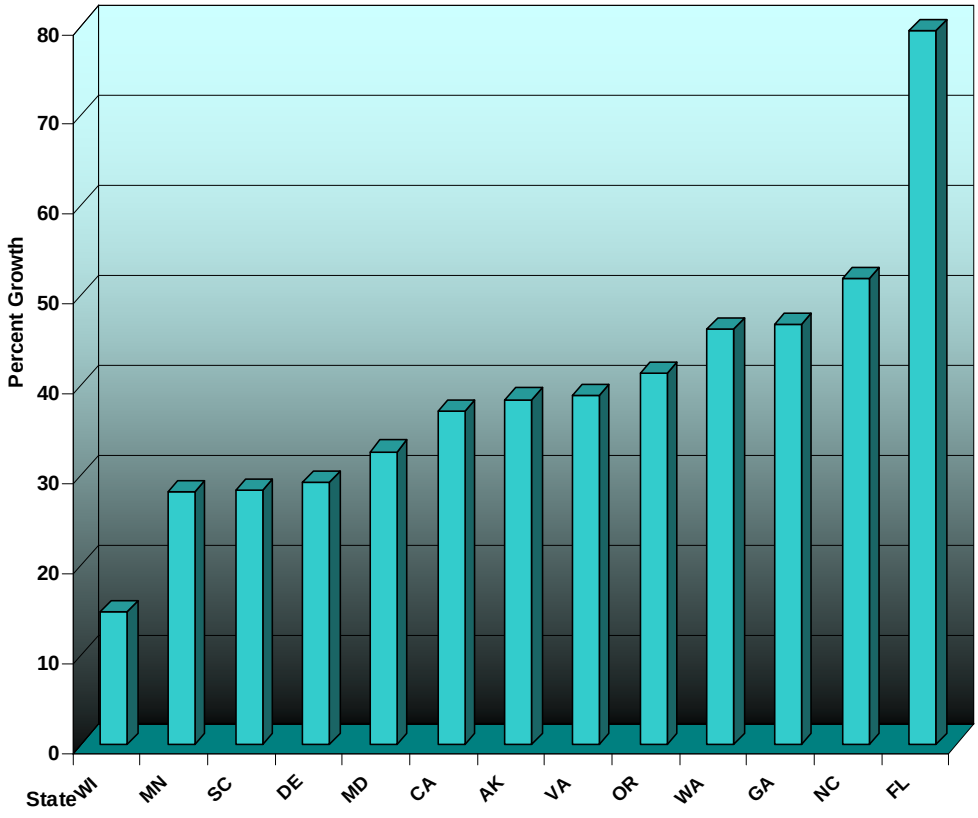

Figure 5 Expected human population growth in 10 fast-growing states with substantial bald eagle populations.

However, many of the fastest-growing counties still have relatively low human population densities and low counts of bald eagles. Bald eagle numbers in those areas are still increasing, so, while there may be impacts to individuals in local areas, the Service doesn't believe there have been adverse impacts to overall bald eagle populations so far.

Increased oil and gas (conventional and coal bed methane) development, and the increase of inter and intra-state pipelines in the Intermountain West is occurring in areas with bald eagle nest and winter roost sites, particularly along riparian corridors. The National Bald Eagle Management Guidelines ((USFWS 2007a))(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 Guidelines. In the commonly narrow riparian corridors in the Intermountain West, cottonwoods are predominantly used by bald eagles as nest and roost trees. Therefore, the decline of cottonwoods in the arid West (Miller etal. 1995; Lite and Stromberg 2005; Birken and Cooper 2006) has rendered the remaining cottonwoods more valuable as bald eagle habitat. The degree to which these activities result in impacts to habitat, either temporarily or permanently, can vary by reclamation potential in location of project, method of extraction, or success of reclamation. Quantification of these impacts is beyond the scope of this environmental analysis.

3.5.3 Golden Eagle Habitat Factors

Habitat loss and encroachment from urbanization and conversion of habitat to agricultural uses has negatively impacted golden eagles (Kochert et al. 2002). 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. Good et al. (2007b) noted that factors that could cause population declines such as habitat loss are increasing. In some areas, especially in southern California (Scott 1985) and the Colorado Front Range (Boeker 1974), urbanization and human-population growth have made areas historically used by eagles unsuitable for breeding. Widespread agricultural development in portions of the golden eagle range has contributed to reduction of jackrabbit populations and has been a factor in rendering areas less suitable for nesting and wintering eagles (Beecham and Kochert 1975; United States Dept. of the Interior 1979; Craig et al. 1986).

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. Between 2001 and 2006, fire burned approximately 566,800 acres within the range of the golden eagle in the lower 48 States (USFWS 2007b).

The fires affecting golden eagle populations in the Snake River Birds of Prey National Conservation Area were associated with the presence of cheatgrass (*Bromus tectorum*) (Kochert et al. 1999). There is evidence that the widespread abundance of cheatgrass, red brome (*Bromus rubens*), and other non-native annual grasses has led to the establishment of a frequent annual grass/fire cycle in areas that had relatively low fire frequency prior to their invasion (Link et al. 2006, Brooks et al. 2004; Whisenant 1990). The interval of natural fires in sagebrush shrub habitat has been shortened via invasions of annual non-native grasses (Crawford et al. 2004).

Empirically-derived declines in populations of prairie dogs, a prey species for golden eagles (Kochert et al. 2002), have been suggested as a habitat-related factor affecting golden eagle populations. Most of the remaining prairie dogs in the southern grasslands are associated with playas (seasonally wet depressions or dry lake beds), which, although not plowed, are small and dispersed. While apparent declines in white-tailed and black-tailed prairie dogs may not currently be sufficient to result in listing of either species under the ESA, alterations in availability of prey species can still affect golden eagles (Dr. C. Boal, personal communication, 24 August 2007).

Both the 90-Day Finding on a Petition To List the White-Tailed Prairie Dog as Threatened or Endangered (69 FR 64889, Nov. 9, 2004) and the Finding for the Resubmitted Petition To List the Black-Tailed Prairie Dog as Threatened (69 FR 51217, Aug. 18, 2004) cited research suggesting that annual fluctuations in the respective prairie dog populations may have dramatically increased over historical patterns. In the Moreno Valley, New Mexico, Cully (1991) documented a steady decline leading to an apparent disappearance of golden eagles during a period from 1985 to 1987 that correlated with the declines of Gunnison prairie dogs resulting from plague. Boal et al. (2008) suggested that persistent prairie dog control may be one of several factors contributing to data that suggests that nesting Golden Eagles in the Texas Panhandle may have declined by 40%–71% since 1983.

Energy development also affects golden eagle habitat. Numerous types of energy development occur in golden eagle nesting and wintering habitat. Surface coal mines have impacted nesting sites in Wyoming (Phillips and Beske 1982), and subsidence from underground coal mines impact nests associated with cliffs in Utah. Efforts to construct replacement, artificial nest locations have met with some success in Wyoming's coal mine region (Postovit et al. 1982). However, the geomorphology in Utah's primary coal mine region has not been as conducive to the same techniques. There, nests are located on high, steep, cliff faces, and activities under a Part 22.25 permit to remove nests or temporarily exclude birds from nesting in a hazardous situation are often extremely hazardous to human safety.

Dramatically-increased oil and gas (conventional and coal bed methane) development in Colorado, Montana, Utah, and Wyoming is occurring in areas

centered within the golden eagle range in the lower 48 states. For example, drilling applications in Utah have increased by approximately 250% over the last five years compared to the previous five-year period (Utah BLM 2007). The degree to which these activities result in impacts to habitat, either temporarily or permanently, can vary by location of project, method of extraction, or success of reclamation, and quantification is beyond the scope of this environmental analysis. However, the introduction of new or improved roads into previously, poorly-accessible golden eagle habitat is a common factor in most oil and gas development. Even if roads and well pads are eventually reclaimed, the life of some field developments can extend for decades. In addition, reclamation times for vegetation (supporting prey and providing line-of-sight screening for nests) in semi-arid to arid areas where many golden eagles occur can be lengthy. For example, a cumulative effects analysis for one field development proposal in Utah noted that reclamation times ranged from 50 to 250 years. The analysis also predicted a net decline of 10-15 nesting pairs of golden eagles within the impact analysis area over the life of the project.

In addition, the Western United States, perhaps because of its combination of wide expanses of inexpensive real estate and high winds has been the focus of extensive wind energy development.[6] In 2007, installations of new wind turbine facilities increased the national wind-energy-generation capacity by 45%, and three of the top five States in terms of capacity were in the Western United States. One of those States, Colorado, recently experienced an increase from approximately 316 Megawatts (MW) to 1066 MW, an over 200% increase (AWEA 2007). In the 17 states west of 100° west longitude, including Alaska, wind power capacity has increased from 1952 MW in 1999 to 12425 MW at the end of 2007, an increase of over 600% (Figure 6) (Department of Energy 2008).

3.6 Eagle Mortality Associated with Human Activities

Raptors in general are killed by starvation, disease, predation, electrocution, shooting, trapping, poisoning, and vehicle/aircraft collisions (Newton 1979). Analyses of records of raptors brought in to veterinary hospitals frequently cite trauma as the leading source of morbidity and mortality, with a majority of cases directly related to human activity (Deem et al. 1998, Harris and Sleeman 2007, Richards et al. 2005, and Wendell et al. 2002). Some of the trauma is from persecution. Between 1993 and 2003, trauma was the most common reason (70%) for bald eagle admission to the Wildlife Center of Virginia, and 15% of the trauma was due to gunshot (Harris and Sleeman 2007). Six percent of the golden eagle admissions to the Colorado State University Veterinary Teaching Hospital during 1995 to 1998 were from gunshot. Another source of eagle mortality is illegal killing for purposes of commercial gain from wildlife trafficking. Annual reports from1999 through 2007 of the Service's LE program have examples in all years but one of enforcement actions against individual trafficking in eagles and eagle parts of both species. In a 2002 cooperative federal/State

[6] The Department of the Interior has chartered a committee, which will advise the Secretary on effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy facilities.

investigation of the illegal killing and commercialization of eagles for the Native American pow wow trade, Service agents and Iowa conservation officers confiscated leg hold traps, a freshly killed eagle, and parts of at least 22 golden eagles and three bald eagles. A 1999 investigation resulted in seizure of eagle parts representing over 90 birds. A recent Service investigation documented the illegal killing and trade of bald and golden eagles and other protected birds, and well as their feathers and parts. One portion of the investigation revealed the illegal trafficking of over 300 eagles annually of which 60 percent were golden eagles and 40 percent were bald eagles. Illegal trafficking is a persistent source of eagle mortality and the Service is regularly engaged in detecting and apprehending individuals involved in these unlawful activities. While there is a legitimate use for eagle feathers in Native American religious practice and ceremonies, illegal trade undermines the effort to conserve eagles and will continue to be a high priority for the Service's law enforcement program.

Offsetting the adverse effects of human activity is considered the greatest conservation challenge in managing golden eagle populations (Kochert and Steenhof 2002). Estimates of mortality and causes of mortality vary with the methods of gathering data, and depend largely upon reporting to appropriate authorities. In this FEA, the Service is limiting the discussion of eagle mortality factors to those human-associated activities for which we expect eagle permits may be requested. Natural eagle mortality factors will not be discussed here, nor will we provide lengthy information on mortality from such unauthorized human-associated factors as vehicle collisions and lead poisoning, for which a permit could not practically be designed. Currently, under the Eagle Act, the Service relies on enforcement discretion and voluntary cooperation between the Service and other agencies and private entities to regulate take of eagles in the absence of an available permit for non-purposeful take.

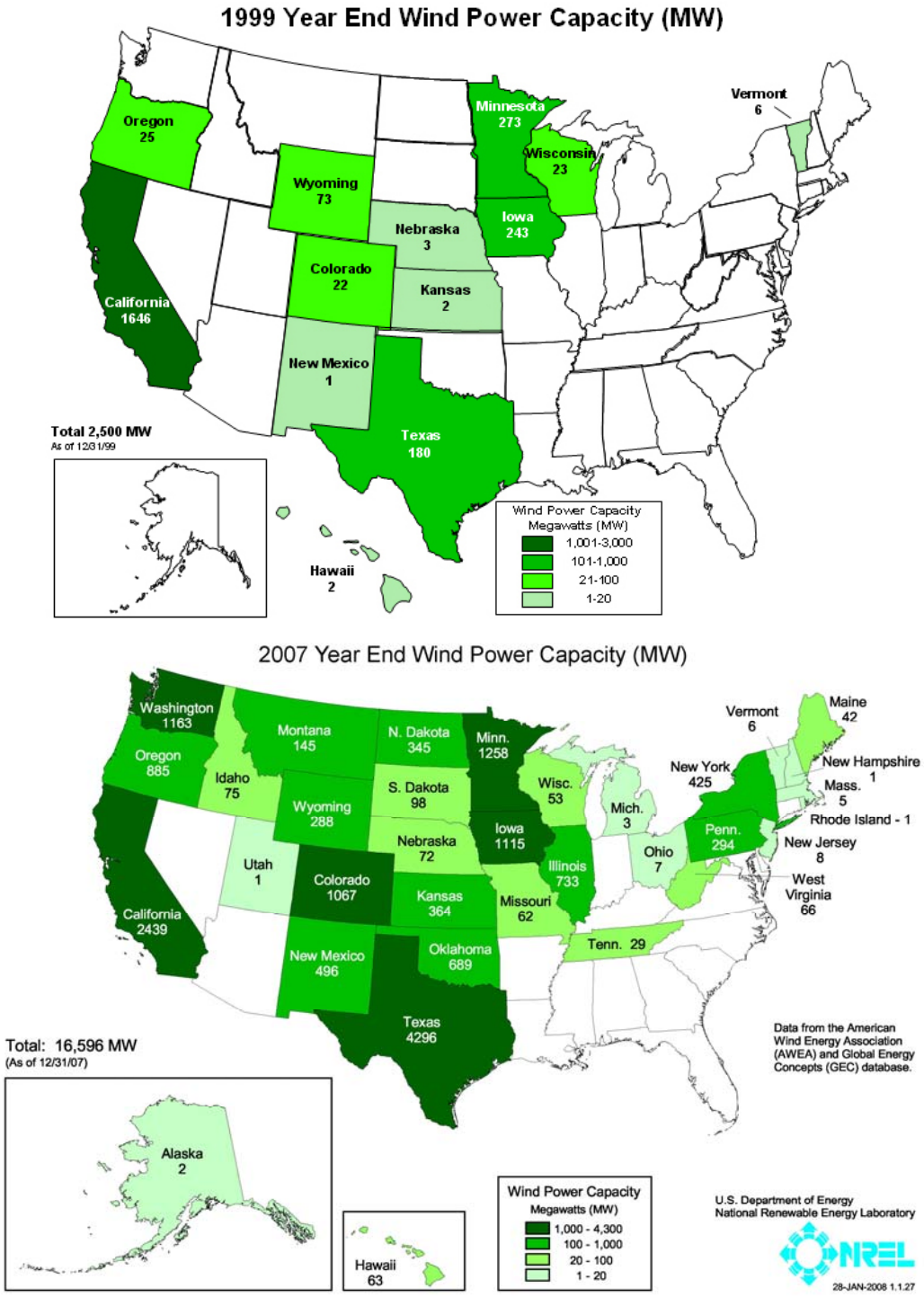

Figure 6 Installed wind power capacity from 1999 – 2007.

3.6.1 Power Lines

Improperly-constructed power lines, especially distribution lines, are one cause of direct mortality for both eagle species and can result in electrocution of birds attempting to utilize these structures for perching and nesting (Harness and Wilson 2001). Of 4,300 human-caused eagle mortalities investigated by the

Department of the 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 separate review focused only on raptor mortality due to power lines asserted that electrocution is the fourth leading cause of human-caused death for bald eagles, following accidental trauma, poisoning, and shooting (Lehman 2001).

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

3.6.2 Wind Turbines

Commercial wind turbine facilities and their impacts to birds are a recently-identified phenomenon. The problem in the U.S. surfaced in the late 1980s and early 1990s at the Altamont Pass Wind Resource Area (APWRA), 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 at Altamont due to turbine collisions, guy wire strikes, and electrocutions. Smallwood and Thelander (2005) estimated 28-34 golden eagle deaths per year at APWRA between March 1998 and September 2001.

3.6.3 Lead Poisoning

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 eagles and golden eagles in Canada and the United States (Scheuhammer and Norris 1996). Craig et al. (1998) noted that twelve of 16 (75%) eagles found in Idaho during a 9-yr period had lead exposure, and suggested that lead poisoning in golden eagles may be a greater problem than previously believed. Bald eagles and golden eagles admitted to The Raptor Research Center at the University of Minnesota had a 17.5% incidence of lead poisoning before the 1991 federal ban on lead shot for hunting waterfowl and a 26.8% incidence of lead poisoning after the ban (Kramer and Redig 1997).

3.6.4 Collision with Aircraft

Another source of mortality that results in fewer reported losses of individual eagles, but poses a greater risk to humans, is collisions with aircraft, as reported to the Federal Aviation Administration (FAA) (Figure 7 and Appendix I). Because commercial airfields in particular are generally built on flat areas, often in or

adjacent to natural wetlands, this habitat can provide shelter, nesting areas, and feeding areas for bald eagles that may not be present in surrounding metropolitan areas.

On the other hand, many of the United States Air Force's military training ranges, within which they are authorized to fly at low altitudes, are located in golden eagle habitat in the western United States. This combination of factors may contribute to the greater number of golden eagle collisions for military aircraft (28 collisions for military aircraft versus four collisions for civilian aircraft).

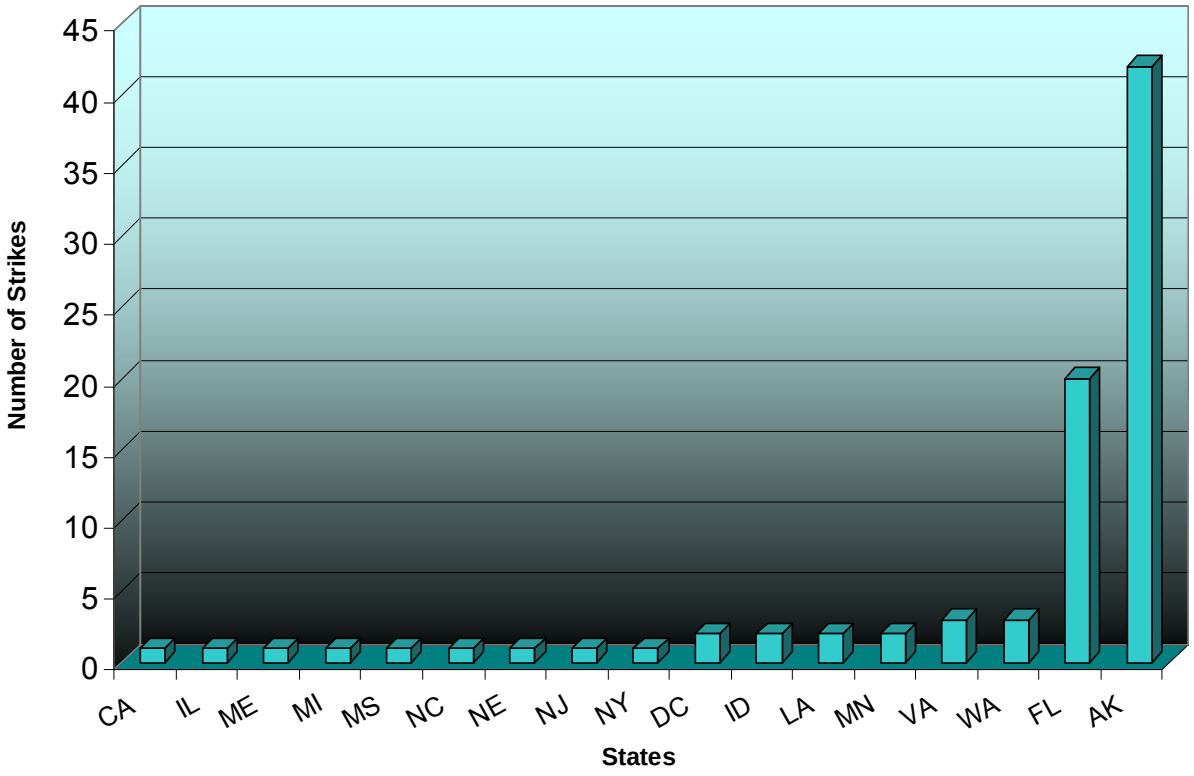

Figure 7 Bald eagle aircraft strikes reported by the FAA (January 1990-May 2007). (For 2 of the strikes, the State in which it occurred was not reported.)

There are a number of differences between commercial and military flying and associated airfields, including the proximity of fields to nesting habitat, location of activities relative to different species, and flight patterns (level and speed). Perhaps related to these differences, more commercial aircraft/eagle collisions seem to occur in the immediate vicinity of the airfield during take-off and landing operations. Although both species are involved in collisions with military aircraft, the relatively greater number of golden-eagle-related collisions may be related to training activities in the western U.S., during which pilots fly at low altitudes in more open areas.

3.7 Currently-Authorized Take of Eagles

This section of the document discusses the current take authorizations for both species under the Eagle Act as well as existing take authorizations for the

bald eagle under the Endangered Species Act (See Appendix C for detailed tables). Some permitted actions may authorize activities, for example, banding, that do not result in removal of an individual from the population or a loss of productivity and will not result in population effects. Others may result in loss of productivity for one year, and others may permanently remove eagles from the population. We are treating the estimated annual average level of all historical take from existing permits as baseline conditions for analysis and for future permitting. Because we need, at least initially, to limit take permits for golden eagles to historically-authorized take levels, we will use the prioritization issuance criteria from this rule to guide permit decisions with regard to allocating all golden eagle take permits. ,

3.7.1 Take Authorized under the Bald and Golden Eagle Protection Act

The Service already issues eagle permits under the Bald and Golden Eagle Protection Act through the implementing regulations at 50 CFR part 22. Permits enable the public to engage in legitimate eagle-related activities that will otherwise be prohibited by law. Permits are issued for scientific, educational, and Indian religious purposes, depredation, and falconry (golden eagles). We are treating the estimated annual average level of all historical take from existing Eagle Act permits as baseline conditions.

§22.21 Scientific and Collecting and Eagle Exhibition

The Service may, under the provisions of this section, issue a permit authorizing the taking, possession, transportation within the United States, or transportation into or out of the United States of lawfully-possessed bald eagles or golden eagles, or their parts, nests, or eggs for the scientific or exhibition purposes of public museums, public scientific societies, or public zoological parks. The Service will not issue a permit under this section that authorizes the transportation into or out of the United States of any live bald or golden eagles, or any live eggs of these birds.

The Service has not authorized any take from the wild for eagle exhibition. Scientific collecting permits that authorize take from the wild for bald eagles have only been authorized in Alaska, where they are numerous and have not been listed under the ESA. In addition, some scientific research was authorized under ESA Recovery permits. Within the last six years, 20 bald eagle eggs have been held under this permit, and 23 bald eagles have been sampled and released (Appendix J).

Similar to bald eagles, scientific collecting and exhibition permits for golden eagles are primarily issued within Service Region 6, where the greatest portion of breeding golden eagles occurs in the lower 48 states. Within the last six years, seven golden eagles have been trapped and released under the scientific collecting permit, and three have been relocated (Appendix J).

An estimated average annual take of 3 golden eagles (Table 2) and an estimated average annual take of 7 bald eagles (Table 3) under this section will be treated as baseline conditions.

§22.22 Eagle Parts for Native American Religious Purpose/Certification of Enrollment in a Federally Recognized Tribe

The Service may, under the provisions of this section, only issue a permit to members of Indian entities recognized and eligible to receive services from the United States Bureau of Indian Affairs (25 U.S.C. 479a–1), who are engaged in religious activities, and satisfy all the issuance criteria of this section. The permits discussed in this FEA are those for religious ceremony needs that require take of eagles from the wild, as opposed to permits under this same section for eagle carcasses, feathers, or parts acquired by another means such as gifting from one tribal member to another or obtaining from the National Eagle Repository. To date, the requests for take of eagles under this permit have been from tribal members wishing to take golden eagles from sites located on lands within Service Region 2 (Southwest Region) and approximately 23 golden eagles per year have been taken over the last six years (Table 2). All of the permits authorized have been limited to golden eagles.

The Hopi, to whom golden eagles are sacred and essential for religious practices, have been collecting eagles for centuries. The Hopi gathering practices have been authorized under annually-issued Eagle Act permits since 1986, and have been determined to be modest in scope and impacts. Because take has been occurring for some time, it is reflected in our baseline data. Therefore, the average annual take of golden eagles authorized to the Hopi nation under the Eagle Act over the last six years (23) will be considered part of the reference conditions for this document, and the Service will not count that take towards any threshold calculations for the Eagle Act permits being considered in this FEA. In addition, within Region 2, the historical baseline for take of golden eagles by other tribes includes approximately one golden eagle per year.

There are some limitations to take of wild eagles for religious ceremony. For example it is limited to tribes that can demonstrate a traditional religious need to take only live, wild eagles for which the Repository does not provide an adequate substitute. Notably, there is nothing in the regulation requiring tribal members to limit take requests to specific locales or Service Regions. If there are no permits available for take in the Service Region of residence for a tribal member's religious practices, if their own practices do not limit take to a specific location, and they have access to an eagle at a location in another Service Region, they may apply for a permit from the other location via the Permit Office in the Service Region in which they reside.

Federally-recognized tribal members may also apply for take of bald eagles for religious ceremonies, subject to the same criteria with regard to the tribe's traditional religious need to take eagles from the wild versus acquiring them from another source. To date, the Service has not received any applications for take of bald eagles that met the criteria.

§22.23 Take of Depredating Eagles

Under this provision, the Service may also issue permits to intentionally take eagles after the Service has determined that the take permit is necessary for the

protection of wildlife, agricultural, or other interests in a particular locality. Such take can either be lethal (limited to certain methods) or non-lethal (such as hazing). Criteria evaluated include: (1) The direct or indirect effect that issuing such permit will likely have upon the wild population of bald or golden eagles; (2) Whether there is evidence to show that bald or golden eagles have in fact become seriously injurious to wildlife or to agriculture or other interests in the particular locality to be covered by the permit, and the injury complained of is substantial; and (3) Whether the only way to abate the damage caused by the bald or golden eagle is to take some or all of the offending birds. The Service has also used this permit to authorize safety-related hazing activities intended to reduce the risk of eagle-aircraft collisions at airfields. Over the past six years, an average of twenty-five golden eagles per year (Table 2) and fourteen bald eagles per year (Table 3) have been permitted to be taken under this section, and that level of take will be treated as baseline conditions.

§22.24 Eagle Falconry

Under the provisions of this section, the Service may authorize the possession and transportation of golden eagles for falconry purposes. Only golden eagles from a specified depredation area may be trapped for falconry purposes. Over the past six years, an average of six golden eagles per year from Service Region 6 (Table 2) has been permitted for falconry purposes, and that level of take will be treated as baseline.

§22.25 Take of Golden Eagle Nests for Resource Development and Recovery

Under the provisions of this section, the Service may issue a permit authorizing any person to take inactive golden eagle nests during a resource-development or recovery operation, but only if the taking is compatible with the preservation of the area nesting population of golden eagles. For the purposes of the permit in existence under this section, the area nesting population has been defined as the number of pairs of golden eagles known to have a resting attempt during the preceding twelve months within a ten-mile radius of a golden eagle nest. The FEA includes more extensive information on this permit because under the current proposal the Service will apply comparable standards to permits for actions that would result in permanent loss or abandonment of a nest or territory, and for programmatic disturbance permits. An estimated average annual take of 6 inactive golden eagle nests has been authorized under this section (Table 2), and that level of take will be treated as baseline conditions.

The Service requires applicants to provide the additional information including, but not limited to the following:

- For each golden eagle nest proposed to be taken, the applicant must calculate the area nesting population of golden eagles and identify on an appropriately-scaled map or plat the exact location of each golden eagle nest used to calculate the area nesting population unless the Service has sufficient data to independently calculate the area nesting population. The map or plat

- A description of each activity to be performed during the resource development or recovery operation which involves the taking of a golden eagle nest.
- A statement with any supporting documents from ornithologists experienced with golden eagles or other qualified persons who have made on site inspections and can verify the applicant's calculation of the area nesting population.
- A statement indicating any proposed mitigation measures that are compatible with the resource development or recovery operation to encourage golden eagles to reoccupy the resource development or recovery site. Mitigation measures may include reclaiming disturbed land to enhance golden eagle nesting and foraging habitat, relocating in suitable habitat any inactive golden eagle nest taken, or establishing one or more nest sites. If the establishment of one or more nest sites is proposed, a description of the materials and methods to be used and the exact location of each artificial nest site must be included.

Additional issuance criteria that the permitting office must consider when determining whether to issue this permit include the following:

- Whether the applicant can reasonably conduct the resource development or recovery operation in a manner that avoids taking any golden eagle nest.
- The total number of golden eagle nests proposed to be taken.
- The size of the area nesting population of golden eagles.
- Whether suitable golden eagle nesting and foraging habitat unaffected by the resource development or recovery operation is available to the area nesting population of golden eagles to accommodate any golden eagles displaced by the resource development or recovery operation.
- Whether feasible mitigation measures compatible with the resource development or recovery operation are available to encourage golden eagles to reoccupy the resource development or recovery site. Mitigation measures may include reclaiming disturbed land to enhance golden eagle nesting and foraging habitat, relocating in suitable habitat any golden eagle nest taken, or establishing one or more nest sites.
- Whether the area nesting population is widely dispersed or locally concentrated.

3.7.2 Take Authorized Under the Endangered Species Act

Any take currently authorized under the ESA will be considered part of the reference conditions for this document, under the No Action Alternative, and the Service will not subject ESA-authorized take in any threshold calculations for the Eagle Act permits being considered in this FEA. This is consistent with our treatment of historical levels of average annual take authorized under the Eagle Act as baseline. Populations of the bald eagle have recovered sufficiently to be

removed from the ESA list, while supporting take during recovery. Therefore, it is logical to assume populations can continue to sustain some. Tables 2 and 3 summarize the reported take authorized under the preceding permits for an approximately six-year period.

Table 2. Estimated Average Annual Actions or Take Reported for the Golden Eagle (2002-2007)

Service Region	Number of Golden Eagle Technical Assistance Requests	22.21 (Scientific and Exhibition) Permits	22.22 (Religious Take) Permits	22.23 (Depredation) Permits	Taken for Falconry Under 22.23	22.25 (Nest Take for Resource Recovery) Permits
1	1	0	0	5	0	1[c]
2	12	1	24	0	0	3[d]
3	0	0	0	0	0	0
4	1	0	0	0	0	0
5	0	0	0	0	0	0
6	338	2	0	8	6	3
7	0	0	0	12	0	0
8	13	0	0	0	0	0
Annual Average (Total from all Regions)		3	24	25	6	6

[a] Since 2003, all 22.22 permits have been issued by Region 9, but take has occurred in Region 2.
[b] Only one nest reported destroyed, all others blocked or relocated.
[c] One nest authorized over six years.
[d] Where the permit did not specify a limit, reported take is provided.

Table 3. Estimated Average Annual Take Reported for the Bald Eagle (2002-2007)

Service Region	Endangered Species Act Authorizations (Reference for this FEA)					Eagle Act Authorizations	
	Actions Where Take Reported[a]	Total Individuals Reported	Estimated Average Individuals Reported Each Year	Total Nests or Roosts Reported	Total Territories Reported	22.21 Permits (Scientific and Exhibition) Reported[b]	22.23 Permit (Depredation/ Hazing) Reported[h]
1	49	53[c]	18	15	33	0	2
2	10	36	7	0	0	0	0
3[c]	6	4	1	0	0	0	8
4[c]	34	0	0	4	0	0	0
5	0	0	118	2	0	0	0
6	n/a[d]	112	22	6	6[f]	4	2
7[e]	0	0	0	0	0	3	2
8	24	85[g]	17	1	0	0	0
Estimated Average Annual National Total				27	39	7	14

[a] Under Biological Opinions and Habitat Conservation Plans.
[b] Permits authorized included take of eggs, trap and release of birds, and killing of birds.
[c] Information from Oregon did not differentiate among birds, nests, or territories, but total authorized take is estimated at an additional 40 birds, nests, or territories combined from 2001 through 2007.
[d] Notwithstanding their large populations of bald eagles, Service Regions 3 and 4 were by and large able to emphasize early coordination in order to avoid take.
[e] Information from Region 6 regarding the total number of actions authorizing take could not be extrapolated for comparison.
[e] The bald eagle was not ESA-listed in Alaska. Only Technical Assistance was provided, but estimated at 400 actions per year.
[f] Six adults, 12 juveniles authorized
[g] One programmatic Biological Opinion out of Ventura authorized one bald eagle per year over the life of the project, 25 years to date. That same opinion anticipated that any bald eagles on the installation could be taken by harassment over the life of the project by military maneuvers.
[h] Take authorized and reported hazing was primarily for airports and landfills.

3.8 Societal Issues

Cultural and Religious

The way in which cultural interaction takes place depends on the uniquely human capacity for using complex symbolic representation in the expression of meaning (Lamendella 1980). Ritual behavior, a human universal, is the quintessential form of symbolic expression through (largely nonverbal) action, and is often used for strengthening the social structures of society. Symbolism is the smallest unit of ritual which still retains the specific properties of ritual behavior. Symbols are, therefore, a special kind of way of conveying meaning. (Bloch 1980). Because ritual is never directed at the solution of trivial problems, but rather at those problems potentially productive of the greatest uncertainty (Laughlin and Stephens 1980), ritual, and the symbols employed, can be essential to the well-being of humans and the culture(s) in which they interact by providing a sense of meaning and purpose to their lives. .

The eagle has been a symbol of power and mystery throughout history, from the Sumerians (5000 BP) and Hittites (3500 BP) (Brentjes 2000) to the two-headed eagle of the Hapsburgs (Vermeir 2007). In the United States (U.S.), a Congress comprised of members with European ancestry chose the bald eagle to be depicted on the official seal of the United States, selecting it over the originally-proposed golden eagle because the golden eagle was also found in Europe (Lawrence, 1990), and more famously, selecting the bald eagle over the wild turkey. As the nation's symbol, the bald eagle represents U.S. citizens' sense of autonomy, courage, and power. Today, bald eagle imagery is ubiquitous in U.S. culture, attesting to the widespread symbolic importance the bald eagle holds in U.S. society.

In recent decades, the bald eagle has come to symbolize the U.S.'s growing environmental awareness of society's impact on the environment. The fluctuation of its population reflects the ecological footprint of people on this continent: being abundant prior to colonialism, declining during the expansion of the frontier and late 19th century industrialism; then nearly becoming extinct due to expansive use of chemical pesticides during the booming post World War II years; only to recover as the nation's growing ecological awareness led to increased regulation of pesticides and the passage of environmental laws such as the National Environmental Policy Act and the ESA. Because of this history, for many people, the bald eagle symbolizes the ecological consciousness of the U.S. and the health of our environment.

Evidence of the symbolic role of birds and their use in ritual can be found in analyzing burial practices, which included bird bone pendants as early as 8,000 years Before Present (BP)(Mannermaa 2008). The bones of a golden eagle wing tip were placed in a 12,000 year old burial of a shaman in Israel (Grossman et al. 2008). White-tailed sea eagles were included in late Neolithic (~4,000 BP) burial practices on the island of Orkney in Scotland (Jones 1998). Parts of the golden eagle, which was considered a spirit helper, were depicted in shamanic dress by some Siberian tribes (Siikala 2002). In North American pre-history, the symbolic importance of eagles is evident. The Fort Ancient people, a mound-

building culture in Ohio, included the beak of an immature golden eagle in the grave goods of the burial site (~1500AD) of a male, perhaps signifying status (Brady-Rawlins 2007). Parmalee (1958) cites the presence of wing bones for golden eagles and bald eagles in excavations of mounds in Illinois as an indication the eagles may have been killed for their plumage and used in ceremonial functions. Other research in Iowa revealed an assemblage of more than 260 broken and splintered lower legs of raptors, including eagles, which may have been evidence of trade in ceremonial birds (Fishel 1997). The use of eagles in Tribal ceremonies in Central California was ascertained by archaeological excavations revealing their bones as burial objects in three cultural horizons (Heizer and Hewes 1940). One notable find was an eagle skull with an abalone ornament over one eye.

Bald eagles and golden eagles remain sacred to many American Indian Tribes and tribal members, and are central to the religious practices of some tribal cultures in North America and other localities throughout the species' range. Some American Indian religious ceremonies call for the harvest of eagles from the wild. As discussed in Section 3.6 (Currently Authorized Take), permits are available for this purpose in certain circumstances. In addition, it is often the case that American Indian Tribes and individual tribal members have an interest in a particular eagle nest locality because of its aboriginal cultural, spiritual, religious, or traditional values, but the locality is outside currently-recognized Indian lands. American Indian interests are unique and unlike any other interests based on the status of Tribes as governmental sovereigns and the distinctive relationship between the United States and each Tribe.

While the cultural significance of both species of eagles is broad-based and not limited to ethnic origin, there is a separate Federal trust responsibility to Tribes, which among many other things, safeguards indigenous religious practices, cultural practices, places, sites, and objects. The NHPA, for example, emphasizes mandates of preservation for "areas of traditional religious and cultural importance to an Indian Tribe." If Congress had intended that all areas of religious and cultural importance for all Americans warranted the same levels of protection, it would never have been necessary to spell out this special provision for Native Americans in the NHPA. It would also have not been necessary for Congress, the President, the Secretary of Interior, and the Service to pass any of the additional legislation, or issue Executive Orders, and special policies that are reserved for Native Americans (AIRFA, E.O. 13007, 1992 amendments to NHPA, 36 CFR 800 citations on Tribes as automatic consulting parties to all federal undertakings, Service Native American Policy, Secretarial Order 3206, and the original Eagle Act provisions for religious take).

Largely because of the aforementioned cultural values, some eagle-use areas may be eligible as potential historic properties of religious and cultural importance under the NHPA. There may also be resources of similar importance in the vicinity for which review and consultation under Section 106 of NHPA are required.

Safety

The greatest human-caused risks to eagle safety appear to be electrocution by electrical distribution lines and collisions with various anthropogenic structures. While they pose some risk to individual eagles, aircraft collisions with eagles can represent a high human safety risk at airfields. Military aircraft engaging in training activities represent a collision risk to humans and golden eagles. Human safety can also be affected by proximity of failing nest trees or platforms to human residences or other facilities. In addition, while not a case of direct risk from an eagle or nest, the ability to conduct such actions as repair of natural gas pipelines in a timely fashion, regardless of season, can be critical to ensuring the ultimate safety of large numbers of humans. The degree to which safety of eagles or humans will be affected will depend in part on the permits available and the application of the permit process.

Socioeconomic

The potentially-affected socioeconomic environment includes the economy, cultural values and norms, recreation, and aesthetic values. The degree to which businesses and industry in the vicinity of bald eagle and golden eagle habitat will be affected is difficult to quantify. Industries most likely to be affected include residential developers, energy transmission companies, timber managers, resource development and recovery operations, utilities, transportation, shipping companies, commercial fishing operations, and businesses that depend on tourism and recreation. The economic value of private land where eagles occur may also be affected.

Numerous facets of the American lifestyle could be affected beyond straightforward economics. Among the many societal “norms” that could be affected are: transportation, urban planning, energy development and consumption, recreation, location of schools and hospitals, and waste management. The magnitude of the lifestyle impacts resulting from the proposed permits depends in part on the rate at which the new permits are approved. If project proponents do not incorporate eagle avoidance and minimization measures into early project planning, they will increase the likelihood their actions will be delayed by the need to revise plans.

3.9 Summary

Although both are protected under the Eagle Act, bald eagles and golden eagles are two distinct species that are not necessarily subject to the same habitat requirements or pressures. Information available for the bald eagle, including the Sonoran Desert population, points to an expanding population. On the other hand, while the information available for the golden eagle is uncertain, it appears populations may be declining in portions of the range. In addition, the Service does not have comparable resources for management of each species. A comparative summary of the resources and pressures for golden eagle versus the bald eagle populations is presented in Table 4.

Table 4. Bald Eagle v. Golden Eagle (GOEA), comparison of parameters.

Parameter	Bald Eagle	Golden Eagle	Source of GOEA data
North American Population Size	300,000	80,000	PIF
Population Trend	Increasing in most areas	Stable or Decreasing	Expert opinion and local data
Threat Trend	Mostly Decreasing	Increasing	Energy development
Falconry Demand	Low	High	Service Permits Database
Religious Demand	Low	High	Service Permits Database
Mineral resource Nest Take Under BGEPA	No`	Low	Service Permits Database
Depredation and Persecution Issues	Low	High	Regional data
Dedicated monitoring	Yes	Limited	WEST data

Table 5 Alternatives Comparison Matrix

Management of Bald Eagles and Golden Eagles Common to All Alternatives: Bald and Golden Eagle Protection Act (the Eagle Act), including the finalized definition of disturb under the Eagle Act. Would use existing eagle management documents as guidance.		
	Management Common to All Action Alternatives: Would Establish Thresholds for Permits, Management by Population Regions for Bald Eagle, Bird Conservation Regions for Golden Eagle	
Alternative 1: No Action - Provisions to Extend Eagle Act Take Authorization to Take Authorized under ESA sections 7 and 10	**Alternative 2– Disturbance Take Nest Take for the Public Health and Safety (such as airports) Programmatic Disturbance Permit**	**Alternative 3 – Alternative 2, Plus Other Forms of Take, Including Programmatic Permit to Reduce Ongoing Take Resulting in Mortality (TRM)**
Measures covering both species		
Provisions for future take of eagles limited to Habitat Conservation Plans with eagles	Authorizes disturbance take	Authorizes disturbance take
Provisions for future take of eagles limited to Habitat Conservation Plans with eagles, which may authorize mortality	Does not authorize take resulting in mortality, even in emergency circumstances	Authorizes take resulting in mortality in emergency circumstances or where take cannot practicably be avoided. Would also authorize a "Performance-Based" programmatic permit designed to reduce ongoing TRM
No issuance criteria	Includes issuance criteria to ensure certain prioritized needs are met by authorizing take according to an established order	Includes issuance criteria to ensure certain prioritized needs are met by authorizing take according to an established order
No provisions for population-based take thresholds	Includes provisions for population-based take thresholds	Includes provisions for population-based take thresholds

Alternative 1	Alternative 2	Alternative 3
“Grandfathers” existing eagle take authorizations into Eagle Act permits	“Grandfathers” existing eagle take authorizations into Eagle Act permits	“Grandfathers” existing eagle take authorizations into Eagle Act permits
Provisions for future take of eagles limited to Habitat Conservation Plans with eagles	Authorizes, on a case-by-case basis, unless populations affected, permits for disturbance at roost and congregation sites.	Authorizes, on a case-by-case basis, unless populations affected, permits for disturbance at roost and congregation sites.
Does not include provisions for enhanced coordination.	Same as Alternative 1	Includes provisions for enhanced coordination between the Service and State and Tribal wildlife jurisdictional entities to minimize the potential for adverse impacts to local areas populations.
Golden eagle-specific		
Only addresses take of either species if previously authorized under ESA	Authorizes new take only in the Western U.S., including Alaska	Authorizes new take only in the Western U.S., including Alaska
Causes of mortality to bald eagles and golden eagles associated with human activities		
Does not have specific measures to reduce ongoing take	Has limited measures to reduce ongoing take	Establishes permits designed to reduce ongoing take on a programmatic basis
Existing Eagle Act Permit Types		
Does not make changes to process for current take authorization	Does not make changes to process for current take authorization	Does not make changes to process for current take authorization

Alternative 1	Alternative 2	Alternative 3
Does not change availability of numbers of existing permit types.	Would authorize permitting limits on existing permit types	Would authorize permitting limits on number of existing permit types
Mitigation		
	For most individual disturbance permits, no additional compensatory mitigation required, except for disturbance associated with the permanent loss of a breeding territory or important traditional communal roost site	For most individual disturbance permits, no additional compensatory mitigation required, except for disturbance associated with the permanent loss of a breeding territory or important traditional communal roost site
Compensatory mitigation may be included in HCPs, but not specifically required	Compensatory mitigation required programmatic disturbance permit	Compensatory mitigation required programmatic permit for TRM
Will meet the Service's requirements for government-to-government consultation, but no enhanced coordination and consultation measures to mitigate impacts from the proposal.	Will meet the Service's requirements for government-to-government consultation, but no enhanced coordination and consultation measures to mitigate impacts from the proposal	Includes enhanced coordination and consultation measures to mitigate impacts to eagle populations and ensure improved and consistent compliance with requirements for government-to-government consultation.
Religious and Cultural		
Does not change language relative to compliance with Tribal statutes	Would notify applicant of need to comply with Tribal statutes	Would notify applicant of need to comply with Tribal statutes

Alternative 1	Alternative 2	Alternative 3
Does not change current authorization practices regarding Native American Religious take	Would prioritize Native American Religious take	Would prioritize Native American Religious take
No enhanced consultation measures, but will consult on a permit-by-permit basis, as necessary.	No enhanced consultation measures, but will consult on a permit-by-permit basis, as necessary.	Includes consultation measures to ensure improved and consistent compliance with requirements for government-to-government consultation. Consultation will take place on a permit-by-permit basis, as necessary, and on the eagle program as a whole.
Safety & Security		
No specific measures to prevent hazards	Take of nests would be authorized for reasons of public health and safety and safety related to eagles	Take of nests would be authorized for reasons of public health and safety and safety related to eagles
No measures to prioritize safety and security activities	Would prioritize take necessary to protect public health and safety	Would prioritize take necessary to protect public health and safety
Socioeconomic Factors		
No specific measures related to socio-economic factors, may result in significant socio-economic impacts to some sectors	Allocation prioritization, after Native American Religious take, will be for activities necessary to ensure public health and safety, and (for golden eagle nests only) resource development or recovery operations	Allocation prioritization, after Native American Religious take, will be for activities necessary to ensure public health and safety, and (for golden eagle nests only) resource development or recovery operations

Alternative 1	Alternative 2	Alternative 3
Provisions for Eagle Act permits for future Habitat Conservation Plans with measures for eagles. This minimizes economic and legal burden on HCP holders.	Same as “No Action”	Same as “No Action”
No enhanced coordination measures	No enhanced coordination measures	Includes provisions for enhanced coordination between the Service and State and Tribal wildlife jurisdictional. This enhanced coordination will lead to better data regarding demographics and populations, and may therefore facilitate increased thresholds for allowable disturbance, as warranted.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

4.1 Introduction

In this chapter the FEA applies the elements described in Chapter 2 to the reference or existing conditions to produce projected environmental consequences of the alternatives. In each discussion the potential environmental consequences first, followed by the projected results for each resource and for each alternative. As with development of the alternatives, we have integrated issues and concerns raised in comment letters on the proposed regulation and internal agency scoping into the analysis.

4.1.2 Analysis of Direct and Indirect Impacts

In determining the significance of direct, indirect, and cumulative impacts of the alternatives, the Service evaluated whether each alternative or its components: 1) will be compatible with the preservation of eagles (maintaining increasing or stable regional populations, and not to exclude preservation of locally-important smaller populations within a region) on a national or regional scale; 2) will substantially burden a Tribe's free exercise of its religion; 3) may increase the probability of circumstances placing human or eagle safety or health at risk; or 4) will result in impacts deleterious to a broad regional area or sector of the national economy.

Portions of the alternatives may be additive to preceding alternatives. Our analysis of direct and indirect impacts emphasizes those subsequent components that are new or altered. The Service assumes that some components that are the same between alternatives will have similar impacts, and will identify them without redundant analysis. The FEA will analyze potential cumulative effects in a separate section.

4.2 Management Common to All Alternatives

This portion of the proposal does not contain any management prescriptions, but does provide definitions intended to make implementation of the proposal more consistent and more readily understood. Because permits issued for take of eagles under the Eagle Act may not have been evaluated cumulatively relative to population, and because there are uncertainties regarding population levels and demographics for golden eagles that we discuss in this FEA, there may be localized negative impacts to golden eagles from this management scenario. However, there will be no significant direct impacts on a national scale from any provisions in this portion of the proposal without subsequent authorization of take.

4.3 Alternative 1– No Action: Permit Existing and Future Take Authorized Under the ESA

The potential impacts from creating a permit for previously-authorized take and future take authorized under the ESA are not easy to measure. However, the Service expects the number of past and future take authorizations under HCPs to be minimal. In addition, measures that will be provided for under the ESA may include extensive habitat measures designed to avoid or minimize the ongoing, future risk of disturbance to eagles.

4.3.1 Bald Eagle

The potential impacts to bald eagles from this alternative are difficult to quantify. However, because the conservation measures required under the ESA are adequate to ensure compatibility with the preservation of the eagle, and since the take authorized to date under ESA has had no significant impact on the population, the Service expects conditions to remain the same. The extension of ESA take authorization to take under the Eagle Act provides members of the public with continuing authorization to proceed under the conditions of a pre-existing authorization. However, without provisions to effectively permit additional legal take except as associated with a future HCP, there may be greater risk of unauthorized take. In addition, without provisions for take for safety reasons, this alternative may impact a few individual bald eagles or have minor impacts to local area populations.

4.3.2 Golden Eagle

There will be minor changes through increased take relative to golden eagle management under this alternative by extending Eagle Act take authorization to HCPs that include golden eagles covered as a nonlisted species. Provisions to effectively permit take under HCPs comparable to those for bald eagles may reduce the risk of unauthorized take. However, without provisions for take of nests for reasons related to the safety of eagles, and without a permit type designed to reduce ongoing mortality, this alternative would impact individual golden eagles or have impacts to local area populations. In addition, because there are uncertainties regarding potentially declining population levels and regarding demographics for golden eagles, there may be significant negative impacts at all scales to golden eagles from the “No Action” alternative.

4.3.3 Biological and Physical Environment

There will be some direct impacts to eagle habitat from this alternative, but there may be beneficial impacts from HCP measures intended to improve habitat conditions. The Service expects few adverse, indirect impacts, primarily in cases where habitat requirements are poorly applied, or where HCPs fail to adequately address effects to other species.

4.3.4 Eagle Mortality Associated with Human Activities

This alternative is expected to have few direct impacts on the current level of eagle mortality associated with human activities. Indirectly, the lack of incentives to reduce mortality through a permit process will tend to result in increasing mortality for both species and would have negative impacts to both species. Given the apparent downward population trend for golden eagles, the long-term effects of mortality associated with human activities from Alternative 1 may be significant.

4.3.5 Currently-Authorized Take

Under the "No Action" alternative, there will be no changes and no impacts to any of the currently-authorized take. Because eagle populations have sustained existing levels of take, the Service expects conditions to remain the same (see discussions of the existing permits in Chapter 3, Affected Environment, Section 3.7, pages 57-60 for comparison to reference conditions).

4.3.6 Societal

Religious and Cultural

Because there will be no change from the current state of management, the Service anticipates no change in direct impacts to religious and cultural resources. However, without a permit type designed to reduce ongoing mortality, and if golden eagle populations continue to decline, there may be negative impacts to take of golden eagles for tribal religious practices. Because we will conduct consultation, as necessary, on a case-by-case basis, there is minimal potential for adverse affects to cultural or religious resources from inadequate consultation under Section 106 of NHPA or government-to-government consultation on actions related to eagles.

Safety

Alternative 1 will have no specific provisions for take of nests in the case of hazard or health risk to eagles or humans. It will not make provisions for a comprehensive approach to managing eagles at airfields, which will result in unnecessary delays that pose safety risks to humans and eagles. Nor will it provide for the removal or relocation of nests away from hazardous sites. Therefore, this alternative will pose significant risks to human and eagle safety at such locations.

Socioeconomic

Project proponents with existing ESA take authorizations, who will receive permits for their actions under the Eagle Act, and future developers of HCPs that include bald eagles or golden eagles as covered, non-listed species will likely be able to proceed without confusion and economic uncertainty. With a permit that clearly sets out conditions for operating within the law, those project proponents and lenders will be able to take actions that might be viewed as disturbing

eagles. While there may be small delays as the permit process is learned, there will likely be no cancellation of residential and commercial development projects, timber operations, natural resource extraction, and other activities that occur in habitat used by eagles, for take previously authorized. However, the lack of additional types of take permits for future activities, except as associated with a future HCP, will mean that projects must be re-located, re-scheduled, or dropped. The socioeconomic impacts from not providing for future take of bald eagles will result in impacts deleterious to a broad regional area or sectors of the national economy. Conversely, for golden eagles, the Service has relied on enforcement discretion and voluntary measures to this point to regulate and limit take, which has resulted in unauthorized take that is not prosecuted. Under the "No Action" alternative, the current status will continue. As in the past, many activities that incidentally take golden eagles will not be stopped, altered, or rescheduled because there will be no available permit system for non-purposeful take. Project proponents that decide to go ahead anyway without a permit may not see much effect if they are not prosecuted; but other proponents that fear prosecution may incur economic effects. Therefore, there are competing socioeconomic impacts from not providing for future take of golden eagles, and they may be deleterious to some sectors of the national economy.

4.3.7 Summary

Neither species will receive the protection offered by a permit that will allow take of a nest to protect the eagles from a hazard. Nor will there be measures to reduce ongoing TRM. There is also a potential for adverse affects to local area populations. In addition, without further guidance, this alternative may not adequately meet all our statutory requirements for consultations related to cultural resources. Therefore, this alternative is not compatible with the preservation of the eagle and will not fulfill the purpose and need for the proposal.

4.4 Management Common to Both Action Alternatives

This section discusses the impacts from the proposal to revise some regulations by establishing permit thresholds and to establish a management framework. The Service anticipates requests for take authorizations for numerous types of activities including the following: housing and commercial development; development proposed by governments at all levels (local, State, tribal and federal); energy exploration and development; transportation and energy corridors; timber harvest; and recreation (see Appendix J for Regional perspective). The Service also anticipates increases in take requests for the following reasons:

- A single section 7 exemption sometimes provided authorization to a large number of grantees or permittees; individual authorizations will be required under the Eagle Act.
- Bald eagle and human populations are increasing in most areas.

- The Eagle Act applies to Alaskan eagles, where ESA permits were not applicable, since Alaskan bald eagles were never listed under the ESA.
- Permits will be available for golden eagle take (previously only a few HCPs have covered golden eagles).
- Knowledge regarding the proposed permit will raise awareness that past practices might have resulted in take of golden eagles about which project proponents or agencies were unaware, and for which they will now seek permits.

4.4.1 Bald Eagle and Golden Eagle

The potential impacts to bald eagles and golden eagles of creating a permit for authorized take are difficult to quantify. However, since bald eagle populations flourished despite the take authorized under the ESA, and because the Service is setting permit thresholds for both species based upon half the take the populations are able to support (as predicted by models), we expect no significant adverse impacts on bald eagles or golden eagles. In addition, because the Service intends to regularly reassess the take relative to populations, the Service will be able to modify thresholds before take approaches levels that are not "compatible with the preservation of eagles." Without a provision allowing the take of nests to protect human or eagle safety, Management Common to Both Action Alternatives will result in some adverse effects to individual eagles. In addition, without provisions for managing programmatic disturbance, there will be some instances of piecemeal, iterative loss of important eagle-use areas. The proposed management, without additional measures, may result in localized, temporary loss in productivity that may be significant to a local population, but this is not expected to be significant to regional or national populations.

The Service does not expect bald eagle or golden eagle population declines at the national level as the result of the authorizations granted under Management Common to Both Action Alternatives. Instead, the Service anticipates the improved management will increase protection of eagle populations making declines less likely. However, it is possible that local area populations may be adversely affected by take authorized in a fashion disproportionate to population. It is also possible that external factors could arise that negatively affect eagle populations. In addition, take occurring at winter roost sites or important foraging areas may have the potential to take greater numbers of birds than we anticipate. Whatever the cause, if data suggest population declines **are approaching a level where additional take will be incompatible with the preservation of the eagle** (emphasis added) (as interpreted above), the Service will refrain from issuing permits until we can re-evaluate the premises upon which our estimation of take is based, and until such time that the take will be compatible with the preservation of the bald eagle and golden eagle.

4.4.2 Biological and Physical Environment

There will be no direct impacts to the biological and physical environment from the creation of a permit for authorized take of eagles. If we create this permit, issuance of take authorization will indirectly result in impacts to eagle habitat from loss, fragmentation, and reduced habitat suitability. On the other hand, especially for golden eagles, creation of this permit system may reduce impacts in many situations. Ongoing or new activities that were implemented in the past without compliance with the Eagle Act because no permit was available for non-purposeful take (e.g., wind power farms and oil or gas well pads) will be more likely to obtain a permit and apply the required mitigation and avoidance techniques. Because our permit thresholds are based upon Service Region and BCR population segments, the Service believes the impacts to habitat will be widely dispersed and not incompatible with the protection of the biological and physical environment.

4.4.3 Eagle mortality associated with human activities

The Management Common to Both Action Alternatives is expected to have few direct impacts on the current level of eagle mortality associated with human activities. However, without incentives to reduce mortality through a programmatic permit process for ongoing TRM, current rates and levels of mortality will tend to increase. Negative impacts to local populations both species may be significant.

4.4.4 Currently-Authorized Take

4.4.4 .1 Take Authorized Under the Bald and Golden Eagle Protection Act

Permits are issued for scientific, educational, and Indian religious purposes, depredation, and falconry (golden eagles) (Tables 6 and 7). The provisions under Management Common to Both Action Alternatives will not eliminate any of the existing permits. However, in some instances, existing permits may authorize activities that will take eagles under the Eagle Act. If so, then those permits will be subject to the cumulative thresholds for the permits under this proposal.

The historical levels of previously-authorized take are incorporated into the baseline conditions affecting eagle populations. Thresholds for permits involving take that affects productivity will be based upon levels above baseline that the breeding populations can support. Future take above the baseline levels authorized under existing permit types will be subject to annual thresholds under both action alternatives. Therefore, the impacts analyses on “Currently-Authorized Take” will largely consider the potential impact of the proposal on future above baseline level of existing permit types. However, if data indicate a continued decline in golden eagle populations that requires active remedial measures, then the Service may reduce the level of take currently considered baseline.

§22.21 Scientific Collecting and Eagle Exhibition

As noted previously (Section 3.7.1, p. 45), the Service has not authorized any take from the wild for eagle exhibition. Scientific-collecting permits that authorize take from the wild for bald eagles have only been authorized in Alaska, where they are numerous and have not been listed under the ESA. Within the last six years, 20 bald eagle eggs have been held under this permit, and 23 bald eagles have been sampled and released (Table 6). Within the last six years, seven golden eagles have been trapped and released under this permit, and three have been relocated (Table 7).

Because of the limited use of this type of permit, while it may temporarily impact individual eagles, it has generally not affected productivity. However, if the Service determines the permitted activity will affect eagle productivity, the permit will be subject to the annual permit thresholds. In some instances, permits for scientific collecting and eagle exhibition may not be available. For example, in those areas in Service Region 2 where the bald eagle is not listed and requests for permits exceed the number compatible with the preservation of eagles (see Tables 6 and 7), then no permits for scientific collecting would be issued.

§22.22 Eagle Parts for Native American Religious Purposes/Certification of Enrollment in a Federally-Recognized Tribe

The currently-authorized average annual take of golden eagles under this permit has been confined to Service Region 2, the Southwest Region, and birds taken have averaged approximately 24 per year over the last six years, although the permits have authorized take of up to 40 birds to the Hopi Nation and an average of one golden eagle per year to other tribes. The take by the Hopi Nation, which has occurred over centuries without adverse affect to golden eagle populations, is considered part of the baseline, and will not be subject to or factored into the allocation. In addition, the permits authorized have been limited to golden eagles (Table 7). Because the historical levels of previously-authorized take are incorporated into the baseline conditions affecting eagle populations, the implementation of permit thresholds under Management Common to Both Action Alternatives will not affect the level of take that has actually occurred, as averaged over the past six years. Therefore the Service does not believe conditions under Management Common to Both Action Alternatives will substantially burden a Tribe's free exercise of its religion. However, if data indicate a continued decline in golden eagle populations that requires active remedial measures, then the Service may reduce the level of take currently considered baseline.

§22.23 Take of Depredating Eagles

Over a six-year period, the national average annual total for this permit type was 14 for bald eagles (Table 6) and 25 for golden eagles (Table 7). However, many of the permits were for hazing or trap and removal activities (Table I.2 and Table I.6) and were generally applied to limited locales. While the permitted activity may temporarily impact individual eagles, it does not result in population

impacts at the regional or national scale. Under Management Common to All Alternatives, future take above the baseline levels authorized under this existing permit type will be subject to annual thresholds. Where requests for permits may exceed the number compatible with the preservation of eagles, permits above baseline for depredating eagles may not be available. And, if data indicate a continued decline in golden eagle populations that requires active remedial measures, then the Service may reduce the level of take currently considered baseline.

§22.24 Eagle Falconry

Only golden eagles from a specified depredation area may be trapped for falconry purposes. There is currently only one such specified depredation area, in Service Region 6, where the Service has permitted an average annual falconry take of four eagles from 2002 to 2007 (Table 7). Because of the limited use of this type of permit, while it may impact individual eagles, it does not result in national population-level impacts. Under Management Common to All Alternatives, this permit will be subject to the proposed thresholds. In some instances, where requests for permits may exceed the number compatible with the preservation of eagles, permits for eagle falconry may not be available.

§22.25 Take of Golden Eagle Nests for Resource Development and Recovery

This permit for take of inactive golden eagle nests is rarely issued during a resource development or recovery operation (Table 7). In addition, it must be determined that the taking is compatible with the preservation of the area's nesting population of golden eagles. However, there may be instances when take of an inactive nest may lead to the abandonment of a territory. In such cases, under Management Common to All Alternatives, this will be subject to the proposed thresholds. The Service expects that, with increasing development of energy-related projects, there will be instances where requests for permits may exceed the number compatible with the preservation of eagles; therefore permits for take of golden eagle nests for resource development and recovery may not be available.

4.4.4.2 Take Authorized Under the Endangered Species Act

There will be no changes to take authorized under the Endangered Species Act from any of the action alternatives; therefore, the Service will eliminate it from further detailed analysis.

4.4.5 Societal

Religious and Cultural

The degree to which religious and cultural resources may be affected under Management Common to Both Action Alternatives will depend to some degree on the number of permits available for religious take under the proposed rule and the locations in which any permits are authorized. Because we will conduct

consultation, as necessary, on a case-by-case basis, there is minimal potential for adverse affects to cultural or religious resources from inadequate consultation under Section 106 of NHPA or government-to-government consultation on actions related to eagles.

Under this alternative, the creation of this new permit does not affect the continuation of existing permits for Native American Religious Use. However, by establishing thresholds for permits that populations can sustain, it may result in the occasional unavailability of permits, especially towards the end of the year, and in areas where there are numerous requests for the new take permit. However, the Service will mitigate that impact by implementing a structured-allocation process in each Service Region if there is evidence that demand for take will exceed take thresholds for either species of eagle, to ensure that take of birds necessary to meet the religious need of a Native American Tribe will not be denied due to other take being authorized for another purpose.

Safety

The provisions under Management Common to Both Action Alternatives will have no specific provisions for take of nests in the case of hazard or health risk to eagles or humans. It will not make provisions for a programmatic approach to managing eagles at airfields, which will result in risks to humans and eagles. Nor will it provide for the removal or relocation of nests away from hazardous sites. Therefore, without additional, measures, this management scenario may pose local, but significant risks to human and eagle safety.

Socioeconomic

Energy production and distribution, manufacturing, transportation, real estate development, recreation, and other human activities can continue with more predictability because a permit will be available to disturb eagles, and the conditions for the permit will be set out in a binding rule that provides a discernible threshold that the public can comply with. However, because the Service will limit take, especially for golden eagles, in some areas of the country, the uncertainties regarding permit availability and permit limits may lead to postponement or delays in planning for some projects.

In all Service Regions, except Arizona and New Mexico, we will substantially increase the proposed permit allocations for bald eagles over the combined average annual totals for past ESA authorizations and Eagle Act permit authorizations (Table 6). However, the proposed permit allocations available for golden eagles (except in Region 6) will limit development if project proponents are unable or unwilling to include avoidance and minimization measures in project designs (Table 7). The Service anticipates minimal impacts to socioeconomic resources from the proposed thresholds for bald eagles. Initially, until data indicates the population can support take, projects seeking individual permits for take of golden eagles above baseline would not receive them, and would experience locally adverse impacts. However, permits for programmatic disturbance, or programmatic permits to reduce take resulting in mortality would be available, if the standard practices adopted as permit conditions will result in a

net reduction in take or a net take of zero, and no net loss to the breeding population. Therefore, while there would be locally adverse impacts, the provisions would not result in impacts deleterious to a broad regional area or sector of the national economy

4.4.6 Summary

The Management Common to Both Action Alternatives meets most of the purposes of the action. It is consistent with the text of the Eagle Act, feasible to implement, predictable for compliance purposes, and enforceable. In addition, while there will be some localized, socioeconomic impacts, there are provisions to ensure this alternative will not result in impacts deleterious to a broad regional area or sector of the national economy. However, neither species will receive the protection offered by a permit that will allow take of a nest to protect the eagles from a hazard. Nor will there be measures to reduce ongoing TRM. There is a potential for significant adverse affects to local area eagle populations as well as socioeconomic resources. Therefore, without additional measures, this management scenario is not compatible with the preservation of the eagle and will not, in itself, fulfill the purpose and need for the proposal.

Table 6. Previously Authorized and Estimated Annual Take and Annual Technical Assistance provided for Bald Eagles, and Proposed Annual Maximum Cumulative Take Allowable[a].

Region	Technical Assistance Actions[b] (2006-2007)	Past ESA-authorized Take/Reference (2002-2007)		Reported Bald Eagle Actions Under the Eagle Act (January 2002-July 2007)		Proposed Service Regional[c] Maximum Cumulative Take Allowable / Predicted Population[d]
		Estimated Average Annual Individuals Authorized	Total Nests or Roosts Authorized	22.21 Permit (Scientific & Exhibition) Avg. Annual Reported	22.23 Permit (Depredation/Hazing) Avg. Annual Reported	
R1	30	18	15	0	2	58 / 7,104
R2	126	7	0	0	0	5 / 797
R3	147	1[e]	0[e]	0	8	224 / 27,617
R4	85	0[e]	0[e]	0	0	106 / 13,111
R5	174	118	2	0	0	104 / 14,020
R6	52	22	6	4	2	44 / 5,385
R7	400	0	0	3	2	555 / 86,550
R8	4	17	1	0	0	7 / 888
Total	1018	148	24	7	14	1,103 / 155,473

[a] Although the majority of permits issued will authorize disturbance, the maximum cumulative take allowable includes all types of take under the new permit and other existing permits. This includes take of individual eagles; disturbance at nests, communal roosts, and important foraging areas; and nest removal. The Sonoran Desert eagles will be managed under the ESA.
[b] Technical assistance reported for Region 7 is under the Eagle Act because the bald eagle was not listed in Alaska.
[c] Regional presentation for comparison purposes only. Eagles will be managed by BCRs, but permits authorized by Region. See Table C.3. in Appendix C for detailed allocation by BCR.
[d] The predicted population estimates are based on the modeling effort explained in the text, Section 2.4.3.
[e] Notwithstanding the large populations of bald eagles in Service Regions 3 and 4, differences in the take authorized relative to other Service Regions can be partly explained by potential permittees being able to comply with the eagle guidelines so that take was avoided.

Table 7. Reported Golden Eagle Actions under the Eagle Act (January 2002-July 2007) and Proposed Annual Maximum Cumulative Take Allowable[a].

Region	Estimated Annual Technical Assistance Requests for Golden Eagle	22.21 Permit (Scientific & Exhibition) Avg. Annual Reported	22.22 Permit (Religious Take[b]) Avg. Annual Reported	22.23 Permit (Depredation/Hazing) Avg. Annual Reported	22.23 Avg. Annual Reported Transfer for Falconry	22.25 Total Permit (Nest Take for Resource Recovery) Authorized[c]	Proposed Service Regional[d] Maximum Cumulative Take Allowable / Predicted Population
R1	1	0	0	5	0	1 (in 5 years)	3 / 1896
R2	12	1	24	0	0	3/year[e]	5 / 2,453
R3	0	0	0	0	0	0	0
R4	1	0	0	0	0	0	0
R5	0	0	0	0	0	0	0
R6	338	2	0	8	4	3/year	38 / 20,430
R7	0	0	0	12	0	0	4 / 2400
R8	13	0	0	0	0	0	10 / 5,414
		Average Annual Totals					
Estimated National Totals	365	3	24	25	4	16	60 / 32, 593

[a] Although the majority of permits issued will authorize disturbance, the maximum cumulative take allowable includes all types of take under the new permit and other existing permits. This includes take of individual eagles; disturbance at nests, communal roosts, and important foraging areas; and nest removal.
[b] Since 2003, all 22.22 Permits have been authorized by Service Region 9, but take has occurred in Service Region 2.
[c] Only 1 nest reported destroyed, all others either relocated or access blocked.
[d] Regional presentation for comparison purposes only. Eagles will be managed by BCRs, but permits authorized by Region. For example, the take for BCR 16, from which the Hopi permit is allocated, will be 27 individuals (see Table C.4, in Appendix C for detailed allocation by BCR).
[e] Where permit has no limit specified, reported take used in estimation.

4.5 Alternative 2– Eagle Take Permits, Structured Allocation Authorized, Nest Take for Public Health and Safety, and Programmatic Disturbance

In Alternative 2, the Service described provisions for authorizing: disturbance take of eagles; nest take to protect public health and safety and eagles; and a proposed programmatic disturbance authorization. In Chapter 4, the FEA specifically analyzes those provisions in Alternative 2 that are additive to Management Common to Both Action Alternatives.

4.5.1 Bald Eagle and Golden Eagle

The potential impacts to both species of eagles from Alternative 2 will be similar to those under the Management Common to Both Action Alternatives. However, the provision in Alternative 2 allowing the take of nests to protect human or eagle safety will result in some benefits to individual eagles. In addition, the provisions for programmatic disturbance will reduce the risk of a piecemeal, iterative loss of important eagle-use areas. Furthermore, setting thresholds and establishing an allocation process based upon modeling and population information, and regular review of golden eagle populations will indirectly improve conditions for the species. These procedures will allow the Service to respond more quickly to declines and develop conservation measures, including the ability to adjust permit levels.

Because the Service will review take thresholds on a regular basis (at least once every five years) relative to bald eagle and golden eagle population and demographic parameters, the Service will be able to modify or adjust permitting accordingly. In addition, the Service used conservative assumptions (estimating take by survival rather than productivity) and application (initially placing a cap on permitted take at 5% estimated annual productivity for bald eagles and 0% estimated annual productivity for golden eagles) of the model used to estimate take thresholds to account for inherent uncertainties and limitations of surveys and monitoring efforts.

The Service does not expect population declines to result from the authorizations granted under Alternative 2. However, it is also possible external factors could arise that negatively affect eagle populations, and there is an increased possibility that local area populations may be adversely affected by take authorized that has disproportionate effects on a specific population. Whatever the cause, if data suggest population declines are approaching a level where additional take will be incompatible with the preservation of the eagle (as interpreted above), the Service will refrain from issuing permits until such time that the take will be compatible with the preservation of the bald eagle and golden eagle.

4.5.2 Biological and Physical Environment

There will be some short-term, direct impacts to the biological and physical environment from this alternative through the provisions for the programmatic disturbance permit. However, the permits will incorporate measures for long-

term mitigation or standard practices designed to avoid or minimize the ongoing and future risk of disturbance to eagles. If the Service creates this permit, issuance of take authorization may indirectly result in impacts to habitat from loss, fragmentation, and reduction of suitability for eagles and other wildlife. On the other hand, development may continue without a permit system, as it has to this point, without mitigation measures and standard practices in place and only the voluntary management guidelines and Service enforcement discretion available to limit or discourage take. Therefore, a permit program requiring mitigation measures and standard practices may also result in benefits to the biological and physical environment. Because we will base our permit thresholds upon Service Region and BCR population segments, the Service believes the impacts to habitat will be widely dispersed and will not be significant at the scale of permitting.

4.5.3 Eagle Mortality Associated with Human Activities

This alternative is expected to have few direct impacts on the current level of eagle mortality associated with human activities, except for the benefits from the few permits authorized for take of nests that pose a hazard to eagles. Indirectly, without incentives to reduce mortality through a programmatic permit process to reduce ongoing TRM, current rates and levels of mortality will tend to increase. Negative impacts to local populations both species may be significant.

4.5.4 Currently-Authorized Take of Eagles

4.5.4.1 Take Authorized Under the Bald and Golden Eagle Protection Act

§22.21 Scientific Collecting and Eagle Exhibition, §22.23 Take of Depredating Eagles, and §22.25 Take of Golden Eagle Nests for Resource Development and Recovery

The impacts to these permits under Alternative 2 are greater than to those under Management Common to All Alternatives. On the occasion when the Service determines the permitted activity will take eagles with an effect on the population, the permit will be subject to the annual permit thresholds. Because the prioritization hierarchy set forth in Alternative 2 does not prioritize this permit, there will be years when requests permits for scientific collecting that would affect productivity cannot be met.

§22.22 Eagle Parts for Native American Religious Purposes/Certification of Enrollment in a Federally-Recognized Tribe

The impacts to these permits under Alternative 2 are expected to be less than those under Management Common to All Alternatives or alternative 1. Under this alternative, permits for Native American Religious Purposes will receive the highest allocation priority; therefore, we expect there will be fewer cases where a request for a permit could not be met than under the previous alternatives.

4.5.5 Societal

Religious and Cultural

The degree to which religious and cultural resources may be affected will depend largely on the availability of permits under the proposed rule. However, implementation of the rule could indirectly affect religious and cultural resources if holders of take permits do not consider them in their planning. There may be some adverse effects to cultural or religious resources such as sacred places from inadequate consultation under Section 106 of NHPA or government-to-government consultation on actions related to eagles.

Safety

The provisions under Alternative 2 will have specific provisions for take of nests in the case of hazard or health risk to eagles or humans. We expect that the provisions for a programmatic approach to managing eagles at airfields will reduce permit delays, thus lowering risks to humans and eagles. The provisions for the removal or relocation of nests away from hazardous sites will also be beneficial for humans and eagles. The benefits from this alternative will be localized and for individual eagles. In addition, the Service estimates the numbers of permits authorized under this proposal will be concentrated in areas with larger eagle populations and will not exceed approximately 30 for bald eagles and one for golden eagles nationally. Therefore, we do not expect that these programmatic permits will have significant population impacts at the regional or national scale.

Socioeconomic

Energy production and distribution, manufacturing, transportation, real estate development, recreation, and other human activities could continue with more predictability because a permit will be available to disturb eagles in the course of conducting such activities. In addition, the provision for programmatic disturbance take under this alternative would potentially minimize economic impacts by allowing more actions to take place without reaching the take thresholds. On the other hand, there is no provision for programmatic permits to reduce TRM, and simplify long-term management issues for industries that currently contribute to TRM.

4.5.6 Summary

Alternative 2 meets most of the purposes of the action. It is consistent with the text of the Eagle Act, feasible to implement, predictable for compliance purposes, and enforceable. It will ensure that prioritized interests are met by authorizing take according to an established order. However, neither species will benefit from measures to reduce ongoing TRM. In addition, the lack of programmatic TRM does not meet the purpose of simplifying long-term management issues and could result in unacceptable socioeconomic impacts to local interests. For example, railway corridors that have reduced bald eagle

mortality to the extent possible, and for which incidental take may have been available under ESA, will be unable to acquire a take authorization under the Eagle Act. There is also a potential for adverse affects to local area populations. Therefore, without additional measures, this management scenario is not compatible with the preservation of the eagle and will not, in itself, fulfill the purpose and need for the proposal.

4.6 Alternative 3– Alternative 2 Plus Take Resulting in Mortality (TRM) Individual and Programmatic Option (Preferred Alternative and Environmentally-Preferred Alternative):

The only differences between Alternative 3 and Alternative 2 are the provisions for non-purposeful TRM. The primary purpose for Alternative 3 is to ensure that any authorized programmatic TRM also include measures to reduce long-term risk of take. This alternative will also authorize programmatic permits that could include TRM. We will subject authorized individual permits for TRM to the same allocation process used for individual disturbance permits.

4.6.1 Bald Eagle and Golden Eagle

Because the Service is setting thresholds for take based upon the predicted ability of the populations to support that level of take, the impacts of individually-permitted TRM should have a negligible impact on populations. The Service expects the impacts of a Programmatic Permit to Reduce or Minimize TRM Take, as proposed, will result in reductions to ongoing take of bald eagles and golden eagles, and may have population benefits at a local or regional scale. Such reductions will be compatible with the preservation of eagles (maintaining increasing or stable bald eagle and golden eagle populations) on a national or regional scale.

Because the Service will review take thresholds on a regular basis (at least once every five years) relative to bald eagle and golden eagle population and demographic parameters, the Service will be able to modify or adjust permitting accordingly. In addition, the Service used conservative assumptions (estimating take by survival rather than productivity) and application (initially placing a cap on permitted take at 5% estimated annual productivity for bald eagles and 0% estimated annual productivity for golden eagles) of the model used to estimate take thresholds to account for inherent uncertainties and limitations of surveys and monitoring efforts.

The Service does not expect population declines as the result of the authorizations granted under Alternative 3. However, it is also possible external factors could arise that negatively affect bald eagle populations. Whatever the cause, if data suggest population declines are approaching a level where additional take will be incompatible with the preservation of the eagle (as interpreted above), the Service will re-evaluate the conditions of existing permits and will refrain from issuing additional programmatic permits until such time that the take will be compatible with the preservation of the bald eagle and golden eagle.

4.6.2 Biological and Physical Environment

There will be no significant, direct impacts to the biological and physical environment from this alternative. If the permit is created, issuance of take authorization will indirectly result in impacts to habitat from loss, fragmentation, and reduced suitability for eagles and other wildlife due to implementation of projects or portions of projects that may not have proceeded without the permit because they are located in areas that are currently considered too high-risk for eagle mortality. On the other hand, a permit system with advanced conservation practices for programmatic reductions in TRM may provide indirect benefits to other wildlife and habitat if compensatory mitigation measures include habitat improvements. Because we will base our permit thresholds on Service Region and BCR population segments, the Service believes the impacts to habitat will be widely dispersed and will not be significant at the scale of permitting. In addition, if the permit is widely applied, it will provide indirect benefits to other wildlife by reducing mortality incurred from the same industries currently taking eagles, because conservation measures are likely to benefit other wildlife.

4.6.3 Eagle Mortality Associated with Human Activities

Alternative 3, via the option for programmatic permits to manage TRM, is the only alternative that will provide a mechanism to reduce eagle mortality, as opposed to disturbance, associated with human activities. While the initial benefits to populations will not be significant on a national or regional basis, they may provide substantial benefits to local area populations. If such permits become widespread, there could be a substantial positive effect on regional and even national populations. Current, ongoing take that is factored into the baseline would be reduced as well as future take. Implementation of permits for new infrastructure would have a goal of no net loss to the population, so we expect they would not lead to increased levels of take overall. At a minimum, wide-scale adoption and implementation of measures under the programmatic lethal permit may buffer the direct and indirect impacts of increased development.

4.6.4 Currently-Authorized Take of Eagles

The Service anticipates no changes to currently-authorized take of bald eagles and golden eagles under the Eagle Act, beyond those already addressed in Alternative 2. However, if the adoption and implementation of the "Performance-Based" Programmatic TRM permit is effective at a broad scale, there may be increases in regional populations. If increases in populations are documented and confirmed, an increase of available take permits may be warranted.

4.6.5 Societal

Religious and Cultural

The Service anticipates impacts to religious and cultural resources from this alternative to be similar to those under Alternative 2. If the adoption and

implementation of the “Performance-Based” Programmatic TRM permit is effective, there may be increases in Service Regional populations, thus indirectly benefitting religious and cultural resources. However, implementation of the rule could indirectly affect religious and cultural resources if holders of take permits do not consider the affects of their actions on religious and cultural resources. The commitments in this alternative to improved consultation will minimize the potential for adverse effects.

Safety

The impacts to safety under Alternative 3 will be similar to those under Alternative 2.

Socioeconomic

In addition to the same socioeconomic impacts as Alternative 2, Alternative 3 will provide a mechanism by which industries and agencies could implement practices to reduce ongoing eagle mortality, thus demonstrating their commitment to improving conditions for eagles. This will create additional costs, but those costs will be balanced by regulatory certainty that comes with knowing they are not subject to enforcement proceedings, and may not be significant. Therefore, the Service expects no impacts deleterious to any sectors of the national economy from this alternative. In addition, TRM may be necessary to protect public health and safety.

4.6.6 Measures to Minimize Uncertainty

The measures added to minimize uncertainty will tend to reduce the impacts to cultural resources by providing local information regarding the cultural significance to tribes and local communities of specific eagle nests and nest areas that would not be available to us otherwise. That kind of site-specific information will also ensure that we do not authorize take that has disproportionate effects on a specific population. In addition, implementation of goals to improve eagle management will tend to reduce impacts to local area populations by providing the service with better data and specific management goals for each species.

4.6.6.1 Structured-Coordination Process with State and Tribal Wildlife Jurisdictional Entities and Improved Implementation of Service Trust Responsibilities to Tribes

The structured-coordination measures in Alternative 3 will minimize the effects of our permit actions on local area populations, increase the ability for effective implementation, improve the ability to share monitoring reports and data, help develop standard practices for programmatic permits, and improve the ability to develop the required components for more localized thresholds and management. The measures for comprehensive standard operating procedures on government-to-government consultation, not only on each permit as necessary, but also regularly on the eagle program as w hole, will better ensure

consistent, appropriate consultation, and improve our compliance with NHPA, AIRFA, and RFRA.

4.6.6.2 Goals for Improved Ability to Manage Eagle Populations and the Permit Program

As we acquire funding and incrementally meet the goals in *2.6.5 Identified Goals for Improved Ability to Manage Eagle Populations and Permit Program,* which we set forth in this alternative to mitigate uncertainty, we expect improvements in the ability of the program to respond more quickly to effects on bald and golden eagle populations from the program and environmental and human-related factors.

4.6.8 Summary

This alternative meets the purposes of the action in all respects. It is consistent with Congress's intent to protect bald eagles and golden eagles, consistent with the text of the Eagle Act, feasible to implement, predictable for compliance purposes, and enforceable. In addition, except for safety-related permits, it will ensure that authorized take of birds necessary to meet the religious need of a Native American Tribe will not be denied due to other take being authorized for another purpose, thereby supporting our trust responsibilities to tribes. Measures for take for public health and safety and the programmatic TRM provisions will decrease the probability of circumstances placing human or eagle safety or health at risk. Most importantly, the provisions in this alternative for programmatic permits to reduce TRM also provide an important mechanism to reduce lethal take for both species of eagles, and to improve conditions for golden eagle populations. Without measures for programmatic reduction in TRM as contained in Alternative 3, our actions may not be compatible with the preservation of the golden eagle.

Setting national and Service Regional thresholds based upon the sustainability of such take of bald eagle and golden eagle populations, through provisions for programmatic approaches and through measures to reduce ongoing TRM of both species, will: (1) be compatible with the preservation of eagles; (2) develop a management system that will simplify complex, long-term eagle management issues by allowing programmatic approaches; (3) provide a consistent approach to permitting between our Service Regional offices; and (4) make take authorization available to meet socioeconomic needs.

4.7 Cumulative Effects

Cumulative effects are the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably-foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). We have focused the cumulative-effects evaluation primarily on the potential for impacts that will require modification of permit thresholds or conditions. Those impacts could either be to eagle populations or societal resources.

4.7.1 Bald Eagle and Golden Eagle

When considering the impacts of the permit, past activities, current pressures, other foreseeable activities such as development, and effects of climate change, the Service expects that bald eagle populations will continue to grow and expand overall, although there may be some localized adverse cumulative effects. The Service expects there may be localized adverse cumulative effects on golden eagles from the proposed permit, considering past, present, and reasonably-foreseeable future activities, in particular, energy development, including wind, invasive weeds, and the effects of climate change. The negative cumulative effects to both species from Alternative 1, which will not create a new permit, will be greater than the proposed alternative because it does not contain provisions for reducing ongoing take. In addition, because, under "Management Common to Both Action Alternatives", we are setting thresholds for take based upon the predicted ability of the populations to support that level of take, because cumulative impacts are considered and addressed on a case-by-case basis during the permit process, and because the Service will adjust permit thresholds to incorporate changes in existing conditions, most of the cumulative effects to eagle populations from this proposal added to other actions will be addressed through the permitting system. In addition, Alternative 3, which provides for programmatic efforts to reduce and minimize take resulting in mortality, may have cumulatively-less-negative population effects than Alternative 2.

4.7.2 Biological and Physical Environment

Bald Eagle Habitat

The United States Census Bureau (2005) interim population projections for numerical change in population between 2000 and 2030 estimate that Florida, California and Texas will account for 46% of the United States population growth (Appendix G). Habitat loss for bald eagles is likely to occur in the foreseeable future through incremental land clearing for development. For example, it is projected that between 1978 and 2020, the developed area of the Chesapeake Bay watershed will increase by 74% in Maryland and 80% in Virginia (Gray et al. 1998). North Carolina is projected to gain 4.2 million people. Most of the States that currently have the larger bald eagle populations are projected to have human population increases above 2000 levels ranging from nearly 30% to as high as 79.5% in Florida. In addition, as one commenter pointed out, there may be considerable expansion of human development into areas not now considered major growth areas. They noted that, in Montana, the fastest growing counties are where the eagles are. The cumulative effects from all alternatives, including the proposal, and human population growth may lead to localized losses and fragmentation of bald eagle habitat. However, we will be developing and implementing a structured coordination process to minimize the potential for negative local effects. Therefore, the Service does not anticipate significant negative cumulative impacts from this proposal nationally on bald eagle habitat in the foreseeable future. The Service also believes measures in Alternative 3 to improve coordination at the regional and local level as well as development of a

national golden eagle conservation and management plan will minimize the potential for negative effects to regional and local populations.

Oil and gas development within the Intermountain West is expected to continue for the foreseeable future, particularly in Montana, Wyoming, Colorado, New Mexico, and Utah, where bald eagles typically occur along narrow river corridors and reservoirs (Figure 8) (USGS 2007a). In addition, there are undiscovered, technically-recoverable oil and gas resources in other areas supporting bald eagles (Figure 8). For example, the undiscovered, technically-recoverable resources of Michigan Basin include a mean of 990 million barrels of oil and a mean of 311.5 billion cubic meters (11 trillion cubic feet) of natural gas (USGS 2005). In the foreseeable future, the cumulative effects to bald eagles from the proposal and energy development may lead to negative effects to bald eagles in areas such as the Intermountain West. However, these impacts will be localized, and the Service does not anticipate significant negative impacts from the proposal and energy development on a national scale. Re-evaluation and potential adjustments of the permit thresholds and conditions, as well as comprehensive evaluation of cumulative effects at the permit issuance stage will minimize the cumulative effects of energy development on bald eagle habitat.

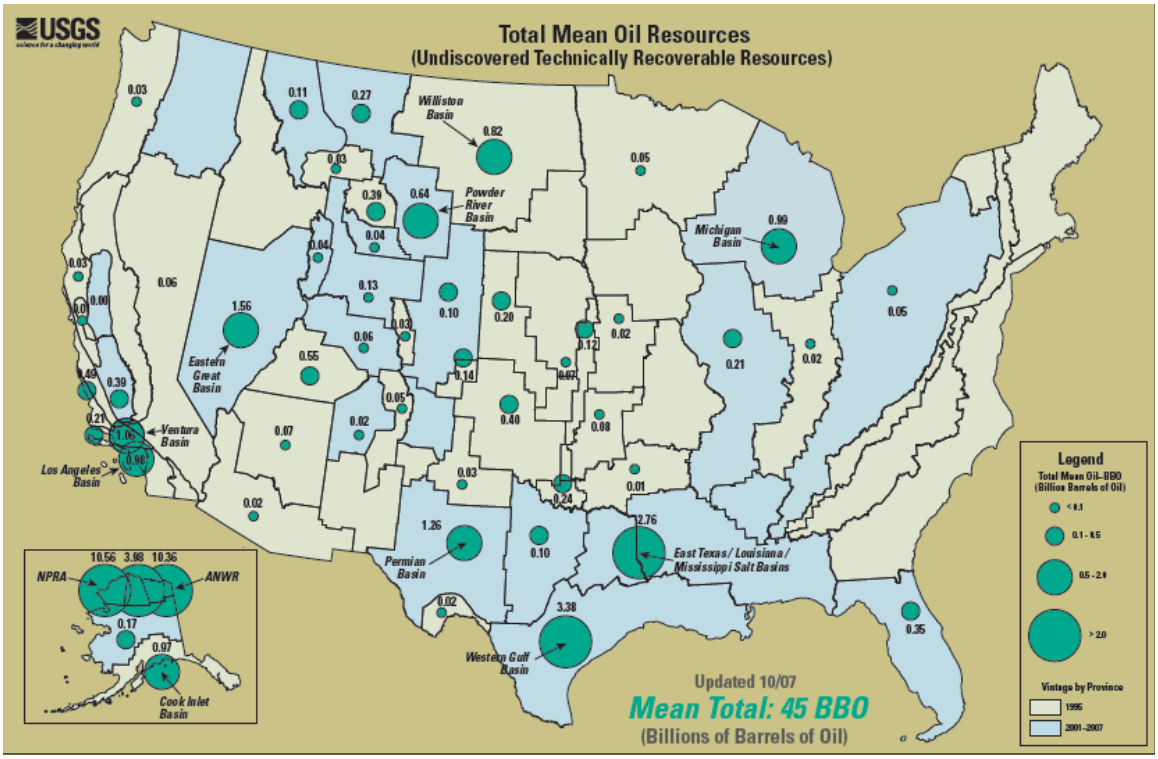

Figure 8 Total Mean United States Oil Resources

Climate Change

Global climate change could raise sea level, perhaps by as much as one meter (Titus 1990) by the end of this century by expanding ocean water, melting

mountain glaciers, and causing ice sheets to melt or slide into the oceans (Senior et al. 2002). Such a rise would inundate coastal lowlands, and impact bald eagle nest locations associated with them.

At our request, Dr. J. Weiss at the Department of Geosciences, Environmental Studies Laboratory at the University of Arizona conducted GIS analysis for FEA of predicted sea-level rise relative to coarsely identified bald eagle nest areas[7]. According to Weiss's analysis, using USGS Digital Elevation Models (DEMs) with a 30-meter resolution, a one-meter sea-level rise will impact approximately seven percent of currently-identified bald eagle nest areas (Figure 9). At the time of the analysis, the Service had no data available for nests in Alaska, so they are not shown. However, because most of the surveyed nests in Alaska are in coastal areas, there will be impacts to those nests as well.

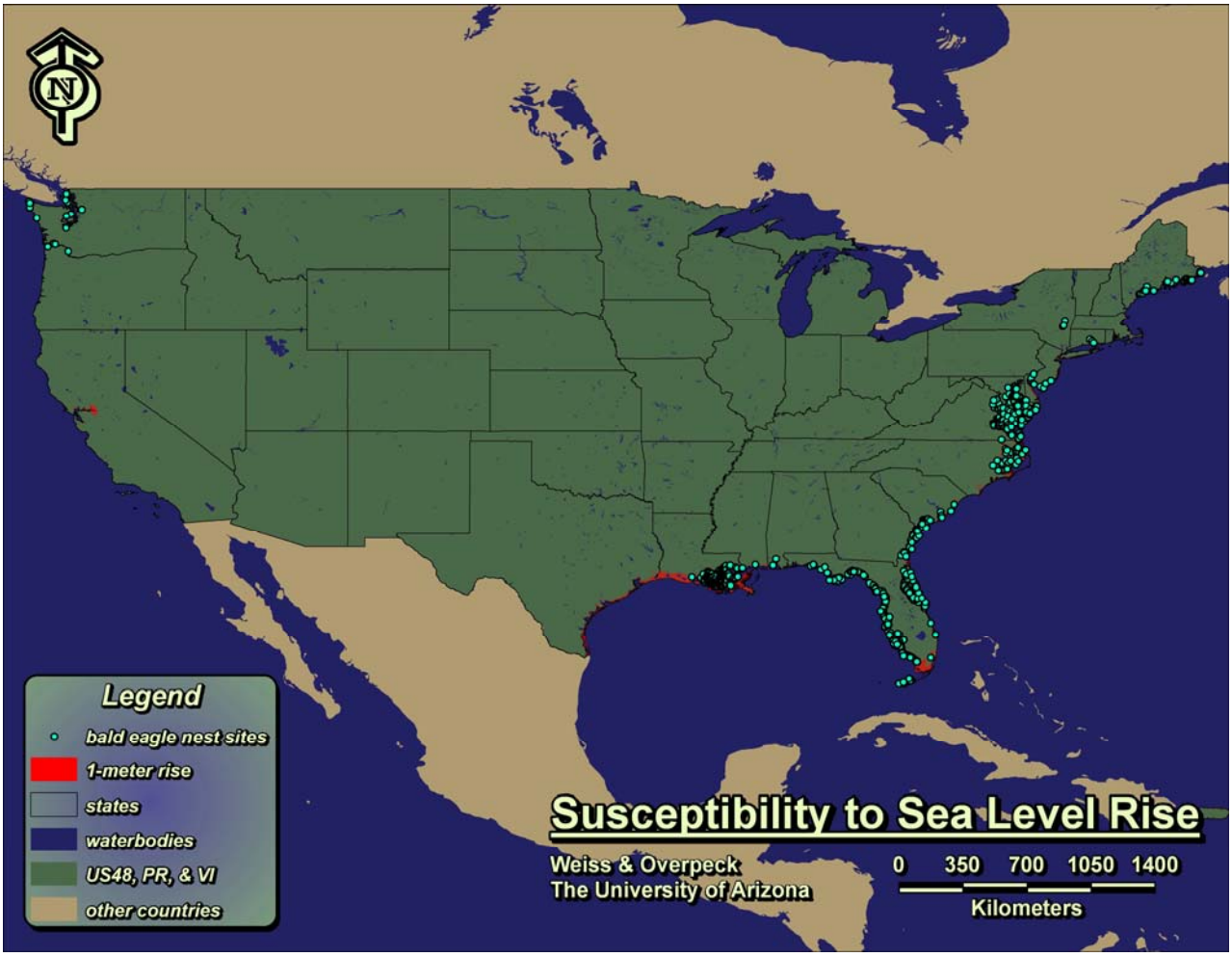

Figure 9 Bald Eagle Nest Areas Susceptible to a One-meter Sea Level Rise

[7] Details regarding this analysis can be found at: http://www.geo.arizona.edu/dgesl/research/other/climate_change_and_sea_level/sea_level_rise/sea_level_rise_technical.htm.

Because the sea-level rise is expected to take place gradually, over a span of years, bald eagles will have time to relocate. Further, in the years ensuing between now and the full extent of a one-meter sea-level rise, the Service expects bald eagle populations to continue to increase. However, because impacts will be occurring to human property in the same areas, the Service may see an increase in the requests and need for permits related to human and eagle safety in these areas.

Cumulatively, if permits thresholds are not adapted to changing conditions, the impacts of permits may exacerbate the climate-change impacts upon the bald eagle's habitat, and may have some localized, negative impacts to bald eagle populations and socio-economic factors. Alternative 1, which will not create a new permit, may therefore reduce developmental pressures on habitat, and may have fewer impacts than either Alternative 2 or 3. On the other hand, without permits setting standards and conditions, and a program setting population-based thresholds, negative cumulative effects from Alternative 1 may be significant. Re-evaluation and potential adjustments of the permit thresholds and permit conditions will minimize the cumulative effects of the permit and climate change in coastal areas.

Golden Eagle Habitat

Good et al. (2007b) state that if human activities, including development, continue to increase in the West, the Service can expect an increase in pressures on golden eagle populations. The sagebrush-shrub habitat, identified as one of the most altered and at-risk habitats in the West (Knick et al. 2003), is also the focus of widespread restoration initiatives. We expect that efforts throughout the western United States to combat cheatgrass invasions and restore sagebrush-shrub habitats will have short-term negative impacts on the availability of habitat supporting golden eagle prey species. The permits proposed, if issued for restoration projects, may contribute to short-term negative cumulative effects on golden eagle habitat. However, if the restoration projects include habitat provisions addressing the needs of golden eagles, indirect, long-term cumulative benefits should accrue from issuance of the permits.

We also expect continued energy development within the golden eagle's range to a substantial degree for the foreseeable future. For example, the combined total mean, undiscovered, technically-recoverable natural gas resources of the Powder River Basin, SW Wyoming Basin, Uintah Piceance Basin, and San Juan Basin amount to approximately 4.9 trillion cubic meters (173 trillion cubic feet) of gas (Figure 10) (USGS 2007b). In areas where the natural gas reservoirs are limited to few formations, the life of the development will be shorter than that in oil fields, particularly those in complex basins with multiple formations. In addition, reclamation and restoration of fields in arid areas may be prolonged.

We expect the trend towards greater wind-energy development to continue. Although wind development is currently unregulated, and the Service does not have authority to stop development for lack of a Service-issued permit, some developers may be reluctant to proceed without one for fear of violating the Eagle

Act. If permits are developed that adequately address eagle mortality from wind turbines, there may be even greater increases in siting of wind development in areas where eagles occur. In that case, issuance of permits for wind development will indirectly lead to increasing loss and fragmentation of golden eagle habitat. In areas where restoration projects and energy development coincide, issuance of permits under the proposal may cumulatively lead to local degradation of golden eagle habitat. The impacts of the no action alternative, Alternative 1, (assuming that projects will continue to go forward anyway) will significantly outweigh the impacts of the action alternatives, which require minimization and mitigation.

However, these impacts will be localized, although there may be some regional impacts. The Service does not anticipate significant negative impacts to golden eagle habitat from the proposal and energy development on a national scale, although there will be significant impacts to habitat on a regional scale, and to individual golden eagles from direct mortality. Re-evaluation and potential adjustments of the permit thresholds and conditions, as well as comprehensive evaluation of cumulative effects at the permit-issuance stage will minimize the cumulative effects of the permit and factors affecting habitat.

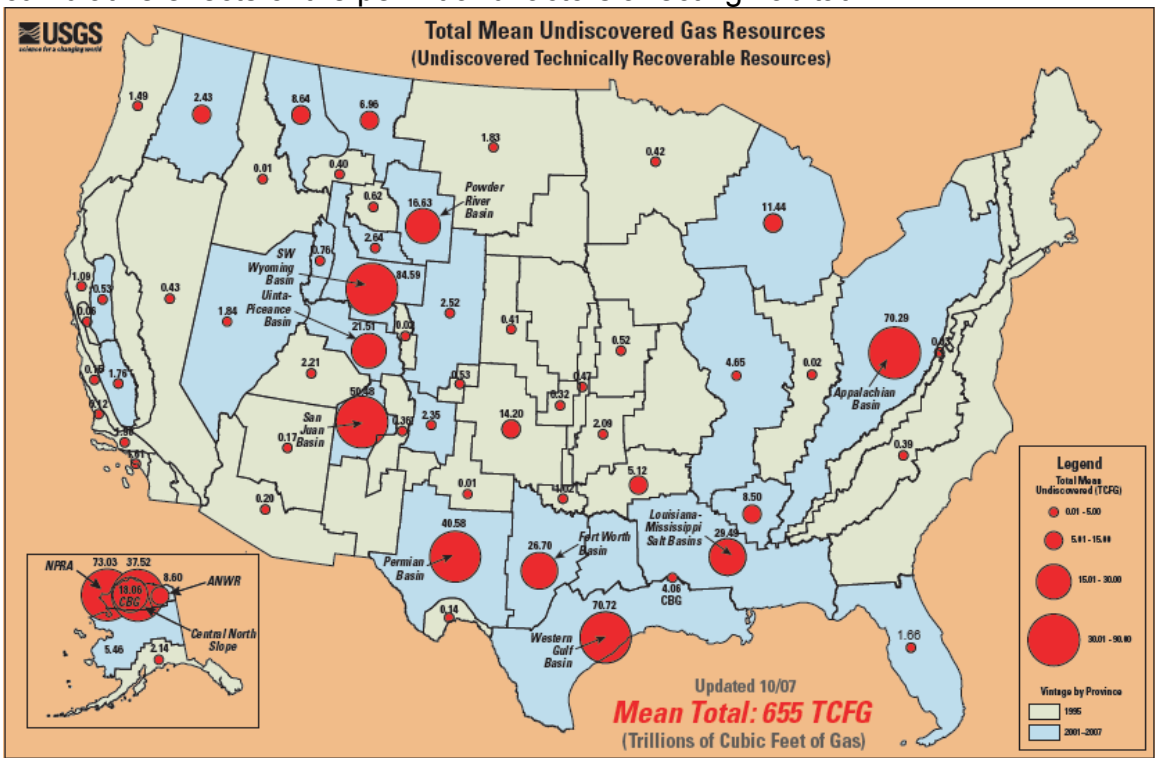

Figure 10 Total Mean Undiscovered Gas Resources

Climate Change

It is difficult to predict the cumulative effects of the permit and global climate change. Climate-change effects will locally lead to increased or lower average annual or seasonal temperatures, or increased or lowered precipitation. Predicting impacts to eagles from the permit and the local effects of climate change is subject to changes or fluctuations in such variables as land use,

vegetation, predation dynamics, parasites, prey abundance or cycles of prey abundance, and changes in human behavior that leads to increased disturbance (Mustin et al. 2007). For example, effects from climate change in the Great Basin are predicted to exacerbate to some degree the existing golden eagle habitat impacts from altered fire regimes and invasive annual grasses (Wagner 1998). Climate change-related increases in nitrogen deposition and atmospheric CO_2 concentration favor groups of species that share certain physiological or life-history traits that are common among invasive species, allowing them to benefit from global change (Dukes and Mooney 1999). Raptors in general may be able, through behavioral adaptations such as dispersal to areas with better conditions, to mitigate some of the predicted impacts from climate change (Wichmann et al. 2005). However, particularly in areas with expanding human development or habitat degradation, we expect to see increasingly-limited areas with better conditions to which eagles may disperse.

Cumulatively, the Service does not anticipate significant impacts from the proposal when coupled with climate change impacts. However, if permit thresholds were not modified to reflect the altered habitat, the proposal may exacerbate the impacts from climate change and other activities affecting golden eagles and their habitat. The proposal may have some localized cumulative effects that will require adjustments to permit conditions or thresholds.

4.7.3 Eagle Mortality Associated with Human Activities

The Service does not anticipate significant negative cumulative effects from the permit proposal to eagle mortality associated with human activities, although achievement of mortality-reduction goals in the programmatic lethal permit could mitigate some of the cumulative effects. In addition, (Alternative 3, which provides for programmatic efforts to reduce and minimize take resulting in mortality, may have cumulatively-less-negative population effects than Alternative 2. Activities currently leading to eagle mortalities will likely increase in scale and there may be additional sources of mortality the FEA has not considered or anticipated. If bald eagle populations continue to increase, the numbers of deaths, but not necessarily the proportion of the population affected, will increase regardless of changes in risks or availability of permits. If current estimates regarding the potential decline of golden eagle population trends are accurate and continue, an increase in the number of deaths will result in an increase in the proportion of the population affected. For both species, if factors leading to habitat alteration remain the same, the numbers of deaths will be expected to rise. If the Service does not modify permit thresholds to reflect the altered mortality, there may be some additional, localized effects on eagles. Notwithstanding predictions, because the Service will review take thresholds on a regular basis relative to eagle population and demographic parameters, we will be able to modify or adjust permitting. In addition, wide-scale adoption and implementation of measures under the programmatic lethal take permit will tend to buffer the direct and indirect lethal impacts of increased development.

4.7.4 Currently-Authorized Take of Eagles

Cumulatively, the Service does not expect changes or appreciable impacts to the continuation or magnitude of currently-authorized take of eagles from this permit proposal. Nor do we expect the cumulative effect on eagles from the permit proposal and currently-authorized take to alter in the foreseeable future. Notwithstanding predictions, because the Service will review take thresholds on a regular basis relative to eagle populations and demographic parameters, we will be able to modify or adjust permitting. Alternative 1, which will not create a new permit, will have cumulatively fewer impacts on other forms of currently-authorized take of eagles than Alternative 2. Alternative 3, which provides for programmatic efforts to reduce and minimize take resulting in mortality, may minimize the cumulative effects to currently-authorized permits by resulting in increased populations and higher take thresholds.

4.7.5 Societal

Religious and Cultural

In some regions of the country, particularly in the Southwest, cumulative effects from the proposed permit to eagles and habitat from all types of development and climate change may result in local population declines. Because the Service will review take thresholds on a regular basis relative to eagle population and demographic parameters, the Service will modify or adjust permitting accordingly. This will have some negative impacts on local religious and cultural resources. However, we do not expect significant cumulative effects to religious and cultural resources from the proposal.

Safety

Cumulatively, the Service does not anticipate appreciable changes or impacts to human or eagle safety from the proposal. There may be some localized impacts to safety if eagle populations increase to the point of becoming over-abundant, or in areas experiencing habitat changes from energy development, invasive species, or climate change effects, or TRM from energy development. Because the Service will review take thresholds on a regular basis relative to eagle population and demographic parameters, the Service will be able to modify or adjust permitting to ameliorate most impacts.

Socioeconomic

The Service does not expect significant cumulative effects to socioeconomic resources in the foreseeable future. If the bald eagle populations continue to grow in the same Service Regions as the greatest human population growth, there will also likely be an increase in the permit thresholds. That will minimize the potential impacts to development. If bald eagle populations decline while human populations increase, there may also be a decline in available permits, leading to a localized impact on economic development. In some local areas,

because of annual permit thresholds and impacts to population from other factors, there may be limitations to the rate of development.

Permit thresholds may have some negative impacts on energy development if it takes place near areas subject to other development pressures.

However, this will be localized and likely not significant on a regional or national scale. Because the Service will review take thresholds on a regular basis relative to eagle population and demographic parameters, the Service will be able to modify or adjust permitting accordingly. Therefore, the Service expects no impacts deleterious to a broad regional sector of the national economy.

4.7.6 Summary

There are few differences between alternatives relative to the cumulative effects from factors presented in this FEA. Alternative 3, with provisions for permitting TRM once mortality-reducing performance standards are met, may serve to buffer some negative impacts to eagle populations. Overall, the cumulative effects to eagle populations from other resources will tend to overshadow the impacts of the proposed permits and render them more difficult to detect. Because the Service will review take thresholds on a regular basis (at least once every five years) relative to eagle population and demographic parameters, the Service will be able to modify or adjust permitting accordingly. In addition, the Service will adopt conservative assumptions (estimating take by survival rather than productivity) and application (setting a limit consistent with Millsap and Allen (2006)) of the model used to estimate take thresholds to account for inherent uncertainties and limitations of surveys and monitoring efforts. The periodic review and conservative approach to thresholds will mitigate the cumulative effects to eagle populations from the proposal and other reasonably-foreseeable activities conducted by other entities.

4.8 Trans-boundary Effects of the Alternatives

The Service foresees no impacts of Alternative 1 on bald eagles or golden eagles in Canada or in Mexico. Alternatives 2 and 3 may have some impacts to individual eagles of either species from Canada or Mexico by permitting disturbance of birds at winter roosts or other concentration areas during migration. However, because the majority of the permits are for disturbance and for take during the breeding season, there will be no significant population impacts. The preferred alternative (proposed action), because of measures designed to reduce ongoing mortality, is expected to protect the current populations of both species in the United States and is likely to provide a greater level of protection for bald eagles or golden eagles breeding in Canada or Mexico but migrating or wintering in the United States.

Preparers

The assessment was prepared by Diana M. Whittington and George T. Allen, Ph. D., both from the Division of Migratory Bird Management, in Service Region 9. Preparers from Service Region 2 were Brian A. Millsap, Ecological Services, and David Siegel, Cultural Resources Manager.

Ms. Whittington has a number of years experience in land use and energy-related wildlife management issues, with an emphasis on raptor conservation.

Dr. Allen has approximately 20 years experience in wildlife research and management, with an emphasis on raptors. He is a Certified Wildlife Biologist.

Mr. Millsap has 29 years of experience in wildlife research and management, with an emphasis on raptor conservation.

Mr. Siegel has had 40 years experience in cultural resources management with D.O.I., and state and private museums in the western US.

Agencies, Organizations, and Persons Consulted for Purposes of this EA

Name	Purpose and/or Authorities for Consultation or Coordination	Summary
U.S. Fish & Wildlife Service (USFWS)	Information on Intra-Service Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	We have determined, through Intra-Service coordination, that consultation pursuant to section 7(a)(2) of the Endangered Species Act is not required for these regulations. The regulations do not directly or indirectly authorize any activities that would result in adverse effects to listed species, so they will not affect any listed species or critical habitat. We will conduct section 7 consultations on the issuance of any future permits where the authorized activities may affect listed species or critical habitat.
Advisory Council on Historic Preservation John Eddins, PhD., Historic Preservation Specialist	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	Advised that as long as the EA and the actual regulations indicate that FWS will do Section 106 process on a case by case basis as appropriate, ACHP will not suggest that FWS needs to do Section 106 for the development of the regulations.
Navajo Natural Heritage Program David Mikesic, Zoologist	Consult with as an agency or individual with expertise on impacts on eagles.	Coordination regarding conservation measures for and status of bald eagles and golden eagles as maintained by the Navajo Nation.
USGS, Forest and Rangeland Ecosystem Science Center, Snake River Field Station, and Boise State University - Raptor Research Center Mark Fuller	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of golden eagles. Topics discussed included survey and monitoring tools, management applications, demographic information, habitat modeling, and impact analysis of annual grass invasion and fire regime effects upon golden eagle prey base.
USGS, Forest and Rangeland Ecosystem Science Center Michael N. Kochert, Research Wildlife Biologist	Consult with as an agency or individual with expertise on golden eagles.	Coordination regarding conservation recommendations for and status of golden eagles. Topics discussed included survey and monitoring tools, long term management issues, and impact analysis of annual grass invasion and fire regime effects upon golden eagle prey base.

Name	Purpose and/or Authorities for Consultation or Coordination	Summary
NPS, Denali National Park and Preserve, Carol McIntyre, Wildlife Biologist	Consult with as an agency or individual with expertise on golden eagles.	Coordination regarding conservation recommendations for and status of golden eagles, with emphasis on demographics and migration biology.
FS, Rocky Mountain Research Station Teryl Grubb, Wildlife Research Scientist	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of bald eagles and golden eagles, with emphasis on disturbance research and eagle biology.
University of Nevada, Reno Michael W. Collopy Executive Director Academy for the Environment	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of bald eagles and golden eagles, with emphasis on disturbance research and eagle biology.
Texas Tech University Clint Boal, Research Associate Professor	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of golden eagles in the Texas panhandle. Topics discussed included long term management issues, impact analysis of annual grass invasion and fire regime effects upon golden eagle prey base.
Nevada Division of Wildlife Larry Neel, Non-game Biologist	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of bald eagles and golden eagles in Nevada, in particular impact analysis of annual grass invasion and fire regime effects upon golden eagle prey base.
Maine Department of inland Fisheries Charles Todd, Wildlife Biologist	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of bald eagles and golden eagles in Maine
Oregon Department of Fish and Wildlife Charles Bruce, Threatened and Endangered Species Coordinator	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of bald eagles and golden eagles in Oregon.
Idaho Department of Fish and Game Bruce Haak	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of golden eagles in Idaho

Name	Purpose and/or Authorities for Consultation or Coordination	Summary
Utah Division of Wildlife Resources Jimmie R. Parrish, Avian Program Coordinator,	Consult with as an agency or individual with expertise on eagles.	Coordination regarding conservation recommendations for and status of golden eagles in Utah
Texas Parks and Wildlife, Danny Swepston and Dave Holderman	Consult with as an agency or individual with expertise on golden eagles.	Coordination regarding conservation recommendations for and status of golden eagles in Texas, including ecological conditions affecting populations.
USDA APHIS, Wildlife Hazard Office, Tom Seamans and Richard Dolbeer	Consult with as an agency or individual with expertise on impacts related to eagles.	Coordination regarding airport safety risks presented by bald eagles and golden eagles and management tools
U.S. Air Force Bird Air Strike Hazard (BASH) Team Eugene LeBoeuf, Chief	Consult with as an agency or individual with expertise on impacts related to eagles	Coordination regarding flight safety risks presented by bald eagles and golden eagles
U.S. Air Force, Air Combat Command Alton Chavis, Deputy Chief, Environmental Division	Consult with as an agency or individual with expertise on impacts related to eagles	Coordination regarding general applicability of programmatic permit concept to flight operations

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APPENDIX A

Native American Traditional Cultural Properties

State	County	Resource Name
Arizona	La Paz	Eagletail Petroglyph Site
Georgia	Putnam	Rock Eagle Site
Montana	Lewis and Clark	Eagle's Site
Nebraska	Holt	Eagle Creek Archeological Site
Oregon	Curry	Eagle Rock
Wisconsin	Grant	Eagle Valley Mound District
Wisconsin	Richland	Clipped Wing Eagle Mound
Wisconsin	Richland	Eagle Township Mound Group
Wisconsin	Richland	Hunting Eagle Mound

[a] Data are from a database search on search term >eagle= on 18 September 2007, from http://www.nps.gov/history/NR/research/index.htm.

[b] Data further refined by conducting a site-by-site, screen for potential association with sites with cultural significance associated with eagles. Information accessed on 10 October 2007, from www.nationalregisterofhistoricalplaces.com.

We consider this list to be far from comprehensive, and include it primarily to illustrate the minimal information currently available. A lack of formal listing does not lessen the need to consider a property; instead, it emphasizes the need for close coordination with appropriate parties at the project planning stage

Appendix B

Tribal Status

State Status and NatureServe Conservation Status

We recognize that the information regarding Tribal protection status is not exhaustive.

NatureServe Subnational Conservation Status Ranks
S1 - Critically imperiled in the State
S2 - Imperiled in the State
S3 - Vulnerable in the State
S4 - Apparently secure

Breeding Status Qualifiers
B - Status of Breeding Population
N - Status of Nonbreeding Population
M - Status of Migratory Population

Status Terms:
Other Protected- includes statutes specifically prohibiting take of migratory birds, eagles, and/or raptors
SOC - Species of Concern
SSC - Species of Special Concern
U -Unable to find government-specific measures

Table B.1. Tribal Status for Bald Eagles and Golden Eagles, Known as of the Date of This FEA

Tribal Status[a]		
Tribal Entity	**Bald Eagle**	**Golden Eagle**
Eastern Band of Cherokee	Other protected	Other protected
Jamestown Tribe S'Klallam	Other protected	Other protected
Mille Lacs Band of the Ojibwe	Endangered	Endangered
Navajo Nation	Endangered	Endangered
Nez Perce	Endangered	U
Oneida Nation of New York	Other protected	Other protected
Sault Ste Marie Tribe of the Chippewa	Other protected	Other protected
White Earth Band of the Chippewa	Other protected	Other protected

[a]. Information obtained online by a search of resources provided by the Tribal Court Clearing House, a project of the Tribal Law and Policy Institute.(http://www.tribal-institute.org/lists/codes.htm) and the National Tribal Justice Resource Center (http://www.tribalresourcecenter.org/tribalcourts/codes/default.asp) Data last accessed on October 10, 2007.

Table B.2. State Status and NatureServe Conservation Status Rank for Bald Eagles and Golden Eagles

State Status/NatureServe Conservation Status Rank				
State	**Bald Eagle**		**Golden Eagle**	
	Status	**NatureServe Subnational Conservation Status Rank**	**Status**	**NatureServe Subnational Conservation Status Rank**
Alabama	Other Protected	S3B	Other Protected	SNA
Alaska	No Special Status	S4B, S4N	No Special Status	S4
Arizona	Other Protected	S2S3B, S4N	Other Protected	S4
Arkansas	Other Protected	S2B, S4N	Other Protected	S3N
California	Endangered	S2	SSC Protected	S3
Colorado	Threatened	S1B, S3N	Other Protected	S3S4B, S4N
Connecticut	Endangered	S1B, S3N	U	SNA
Delaware	Endangered	S2B, S3N	U	SNA
District of Columbia	No Special	SXB, S2N	U	U
Florida	Other Protected	S3	U	SNA
Georgia	Endangered	S2	Other Protected	S1
Idaho	Endangered	S3B, S4N	No Special Status	S4B, S4N
Illinois	Threatened	S2B, S3N	Other Protected	SNA
Indiana	Endangered	S2	Other Protected	S1N
Iowa	Endangered	S3B, S3N	No Special Status	SNA
Kansas	Threatened	S1B, S4N	Other Protected	S1B
Kentucky	Endangered	S2B, S2S3N	Other Protected	SXB, S2N

State Status/NatureServe Conservation Status Rank				
State	Bald Eagle		Golden Eagle	
	Status	NatureServe Subnational Conservation Status Rank	Status	NatureServe Subnational Conservation Status Rank
Louisiana	Endangered	S3B, S2N	No Special Status	S1N
Maine	Threatened	S4B,S4N	Endangered	S1B,S1N
Maryland	Threatened	S2S3B, S3N	No Special Status	S1N
Massachusetts	Endangered	S1	Other Protected	S1N
Michigan	Other Protected	S4	Other Protected	SNRN
Minnesota	Threatened	S3B, S3N	No Special Status	SNA
Mississippi	Endangered	S1B, S2N	Other Protected	S1N
Missouri	Endangered	S3	Other Protected	SNRN
Montana	Other Protected	S3	No Special Status	S4
Nebraska	Threatened	S1	Other Protected	S3
Nevada	Threatened	S1B, S2N	Other Protected	S4
New Hampshire	Endangered	S1	Endangered	SHB
New Jersey	Endangered	S1B, S2N	No Special Status	S4N
New Mexico	Threatened	S1B, S4N	Fully Protected	S3B, S4N
New York	Threatened	S2S3B, S2N	E (extirpated)	SHB, S1N
North Carolina	Threatened	S3B, S3N	Other Protected	SXB
North Dakota	Other Protected	S1	Other Protected	S3

State Status/NatureServe Conservation Status Rank				
State	Bald Eagle		Golden Eagle	
	Status	NatureServe Subnational Conservation Status Rank	Status	NatureServe Subnational Conservation Status Rank
Ohio	Threatened	S2	Other Protected	SNA
Oklahoma	Threatened	SNR	SSC Protected	S2
Oregon	Threatened	S4B, S4N	U	S4
Pennsylvania	Endangered	S2B	U	SNA
Rhode Island	No Special Status	S1B, S1N	No Special Status	U
South Carolina	Endangered	S2	U	U
South Dakota	Threatened	S1B, S2N	U	S3S4B, S3N
Tennessee	Other Protected	S3	Threatened	S1
Texas	Threatened	S3B, S3N	Other Protected	S3B
Utah	Other Protected	S1B, S3N	Other Protected	S4
Vermont	Endangered	S1B, S2N	U	S1S2N
Virginia	Threatened	S2S3B, S3N	Other Protected	SHB, S1N
Washington	Threatened	S4B, S4N	SOC candidate	S3
West Virginia	Other Protected	S2B, S3N	Other Protected	S3N
Wisconsin	Other Protected	S4B, S2N	Other Protected	S2N
Wyoming	Other Protected	S3B, S5N	Other Protected	S3B, S3N

APPENDIX C

Methods for Determining Eagle Take Thresholds

Introduction

In general, the study of demographics looks at life events such as births, deaths, immigration, and emigration, factors that affect the size and composition of a population. The timing of these events in life history may be critical; a population with high juvenile mortality will have a very different structure from a population with high adult mortality, a factor that would be removing breeding members of a population at a higher rate. The models applied in developing the permit thresholds rely on published estimates and have been used to develop estimates regarding overall survivorship and productivity of individuals within a population.

The FEA offers here a demonstration of how such data can be applied, in order to help explain how the Service arrived at the permit thresholds. At its most basic, data from a group or groups of individuals all born in the same time period (cohort) can be used to estimate such things as age- or stage-specific mortality rates, survivorship, and basic reproductive rates. Those rates can be compared from cohort to cohort to provide an idea of annual variation within one population and variation between different populations. For example, a juvenile survival rate of 0.47 means, of 100 first-year birds, 47 survived until the end of the first year. If juvenile survival is 0.84, 84 of 100 survived. There are survival ratios for each succeeding cohort, typically calculated by using juvenile, subadult, and adult stages; in eagles, adult stage is generally assumed to be reached at the fifth year. To illustrate, we present an idealized comparison of 2 first-year cohorts from 2 eagle populations. With only the difference in juvenile survival, and subadult and adult survival of 0.89, we would have notable differences in the total of individuals remaining in this cohort of 100 young at the end of the fifth year (Tables C.1. and C.2.).

Table C.1. Cohort/Population 1 .47 Juvenile Survival Rate

Year (survival Rate)	Starting number 100
1 (.47)	47
2 (.89)	41
3 (.89)	36
4 (.89)	32
5 (.89)	28

Table C.2. Cohort/Population 2 .84 Juvenile Survival Rate

Year (survival Rate)	Starting number 100
1 (.84)	84
2 (.89)	74
3 (.89)	65
4 (.89)	57
5 (.89)	50

The following more detailed discussion relies heavily on published papers by Hunt (1998) and Millsap and Allen (2006). Terms used are defined as follows: productivity is the number of young fledged on average per nesting attempt per nest site; survival rates are the proportion of individuals surviving each year; equilibrium is the stable age structure that eventually results from a given set of productivity and survival rate values in an eagle population; nest site includes the nesting structures and surrounding foraging areas required by a pair of eagles for successful breeding.

Our overall management objective for bald and golden eagle populations is to ensure authorized actions do not result in declines in breeding populations of either species. Determining appropriate levels of take directly is not practical because important population parameters like productivity and survival fluctuate from year-to-year, and direct counts of nests and young (the typical method for estimating eagle population size and health) do not account for non-breeding eagles, which can make up as much as 30% of healthy eagle populations. For this reason, we used a demographic population model to estimate the likely impact of permitted take at different levels on eagle populations over the long-term (defined here as 100 years). In their simplest form, population models use point estimates, usually mean values, for productivity and survival rates for different age classes in an algebraic formula to estimate population size at different points in time. The calculations are relatively straightforward, with population size in year 2 being equal to population size in year 1 minus deaths plus the number of breeding pairs times annual productivity. Such models are termed deterministic models. Complex models, known as stochastic models, incorporate measures of annual variation for the population parameters, and can allow fairly precise estimates of take potential within defined confidence intervals.

In the case of eagles, we lack adequate data on population parameters and annual variation for rigorous stochastic modeling. Instead, we adopted a more conservative approach using a deterministic model to estimate the maximum number of individuals that could be taken annually under a given set of productivity and survival rate values without reducing the number of breeders in the population in the future. The critical point where take is maximized without compromising breeding population size is termed the Maximum Sustainable Yield (MSY) for the population. Because deterministic models are based on average conditions, they overestimate take potential in years with low reproduction or high mortality (and they underestimate take potential in years of high productivity or high survival). Additionally, our estimates of population parameters may be biased or imprecise. To compensate for this uncertainty, we followed the recommendation in Millsap and Allen (2006) and set take limits at no more than ½ MSY, or 5% (1% in cases where demographic data are lacking or questionable) of annual production, whichever is lower, to ensure that under all circumstances take does not approach the point where the number of breeders is reduced. This is a conservative approach that almost certainly underestimates the harvest potential of the population, and with better demographic information

and systematic population monitoring higher harvest rates might be supportable. We determined MSY by running the model to population equilibrium for 100 years with incremental 1% increases in first-year mortality until we reached the point where the pool of floaters was exhausted and any further increases in mortality resulted in some nest sites being unoccupied. We determined total reduction in the number of young added to the population at this take level, and then found ½ MSY by determining the midpoint between the original total annual production estimate and that at MSY. Take thresholds at the 5% and 1% harvest rates were determined directly by multiplying the estimated number of nesting pairs by mean productivity, and then multiplying the product by 0.05 or 0.01 (Figure C.1).

In healthy eagle populations the factor with the greatest impact on population size is the number of suitable breeding sites that exist on the landscape. For some species, the availability of suitable nesting places like cliffs sets this upper limit, while for others, territorial behavior establishes the upper maximum. Regardless, the net effect is to establish an upper limit on the number of pairs that can breed in a given landscape. In healthy populations there are more adults in the population than can breed, and these excess adults are called floaters. Floaters fill vacancies at nest sites as they occur, and as such, serve to buffer populations from decline in times when productivity does not offset mortality. We incorporated this concept into our models by setting an upper limit on the number of pairs that can breed equal to the number of currently known occupied nest sites in a population. This is conservative for populations that are growing, but may overestimate harvest potential in populations where nest sites are being lost.

To check our assumption that the take thresholds established would not produce declines in the number of breeders even with expected annual variation in vital rates, we incorporated stochastic effects into our final model of take thresholds for both species. We simulated natural variation in demographic parameter rates by randomly selecting 100 values from a normal random distribution with mean equal to the parameter mean and standard deviation (SD) equal to a plausible SD for each parameter, and then running the model for 100 years using the 100 randomly generated values. For productivity, we used a SD of 0.81 for both species. This value was the observed SD in a demographic study of bald eagles in Florida (Millsap et al. 2004), and exceeded the SD for productivity from a long-term study of golden eagles in Idaho (0.35; Steenhof et al. 1997), and was therefore likely conservative in the context of this analysis. There are no studies for either species that have been ongoing long enough to generate reasonable estimates of SD for annual survival. However, in the case of the closely related Spanish imperial eagle (*A. heliaca*), the SD of annual survival was 0.02 (Ferrer and Caldron 1990). We used a SD of 0.2 (10 times that observed for the Spanish imperial eagle) for juvenile survival and 0.1 for subadult and adult survival, under the assumptions that: (1) these likely overestimated the

real SD and were therefore conservative in the context of the analysis, and (2) that the SD for juvenile survival would be greater than for subadults or adults.

Types of Take and Their Impacts: We contemplated three basic types of take that might be authorized by the Service. The first is take of individual eagles, either directly (e.g., falconry take of depredating eagles or take of individual for their feathers for Native American cultural or religious use) or indirectly (e.g., powerline electrocutions or collisions with wind turbines). The second is the temporary loss of productivity by causing disturbance of breeding pairs leading to abandonment of nests, or by rending nest sites temporarily unusable (e.g., as might occur through disturbance associated with timber harvest near a nest). The third form of take is the permanent loss of a nest territory, such as might occur with a dam project that inundated a nest site and the surrounding foraging area. In all cases, we assessed the impact of take on eagle populations by determining how the action related to our objective of not allowing cumulative annual take to exceed ½ MSY, 5%, or 1% of annual production. Since these harvest metrics are in units of individual eagles, we related each form of take to the number of individuals that would be removed from the population by the permitted action. This is straightforward for take permits for individual eagles, where the number of individuals permitted to be taken can be directly subtracted from the take limit. For pairs disturbed to the point that a nesting attempt is abandoned or otherwise lost, we considered the impact to be the loss of average productivity for each site affected. Thus, for a bald eagle population with average productivity of 1.3 young fledged per active nest site, a permit authorizing disturbance of a breeding pair for one year would have the effect of removing 1.3 individuals from the subsequent year's population. For both of these forms of take, the effects are limited to the year in which the action occurs. Thus, take limits go back to their original levels each year.

In the case of the permanent loss of a nest territory, the effect is more complex. Because permanent loss of a nest site permanently reduces the number of potential breeding pairs, take of nests is inherently incompatible with our management objective of not causing declines in the breeding population. Despite this, in some cases, for example cases involving human health and safety, we anticipate needing to issue such permits. The effect of this kind of take will not be limited to the year that take initially occurs, but to all future years as well because the equilibrium population size will be permanently reduced, unless new nest territories are created that offset the loss. We determined the recurring impact of permanent loss of nest territories by running the model with incremental 1-nest site decreases in the number of suitable nesting sites, and then compared the total population size at each new population equilibrium with the original total population size at equilibrium. The permanent loss of a nest territory resulted in constant and predictable decreases in equilibrium population size ranging from 4 to 11 individuals, depending on average productivity (Figure. C.2). While this impact cannot be completely offset by modifying take levels, its

effect in reducing the overall reproductive capacity of the population can be partly addressed by permanently reducing the take limit for the population by the difference in equilibrium population size caused by the action. Thus, in a bald eagle population consisting of 1,370 breeding pairs where ½ MSY is 338, the permanent loss of a nest territory reduces equilibrium population size by 8, leading to a new annual take limit of 330 individuals in future years. This take limit remains in effect unless and until population surveys show that new nest sites have become available that offset the losses.

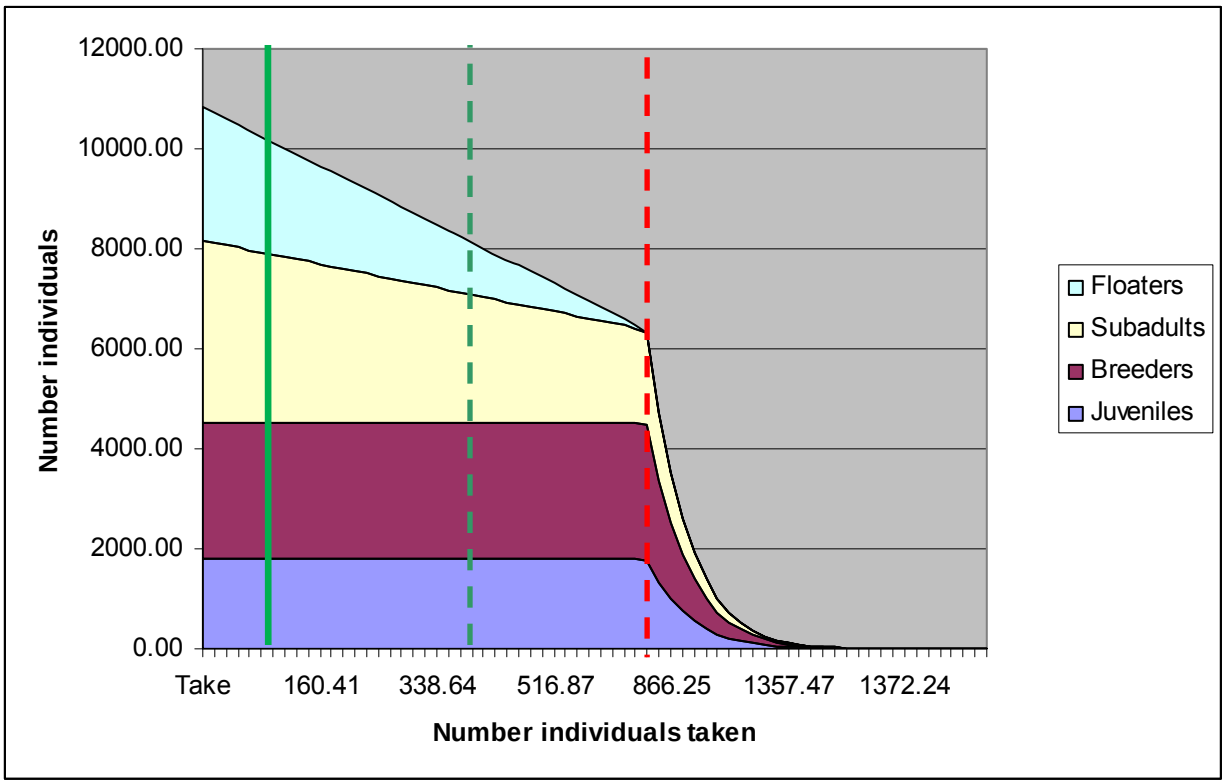

Figure C.1. Results from a series of deterministic model runs for a hypothetical **bald eagle** population under increasing levels of take. Population structure at each level of take on the X axis is the equilibrium population structure reached after 100 years at that level of take. The red dashed line indicates the point of Maximum Sustainable Yield (MSY), the green dashed line is ½ MSY, and the solid green line is a harvest rate of 5%, the proposed annual take permitting threshold for this example. Demographic values for the model are from Millsap et al. (2004): productivity = 1.3 young per nest site, juvenile survival = 0.77, subadult survival = 0.88, adult survival = 0.83, and number of nest sites = 1,371.

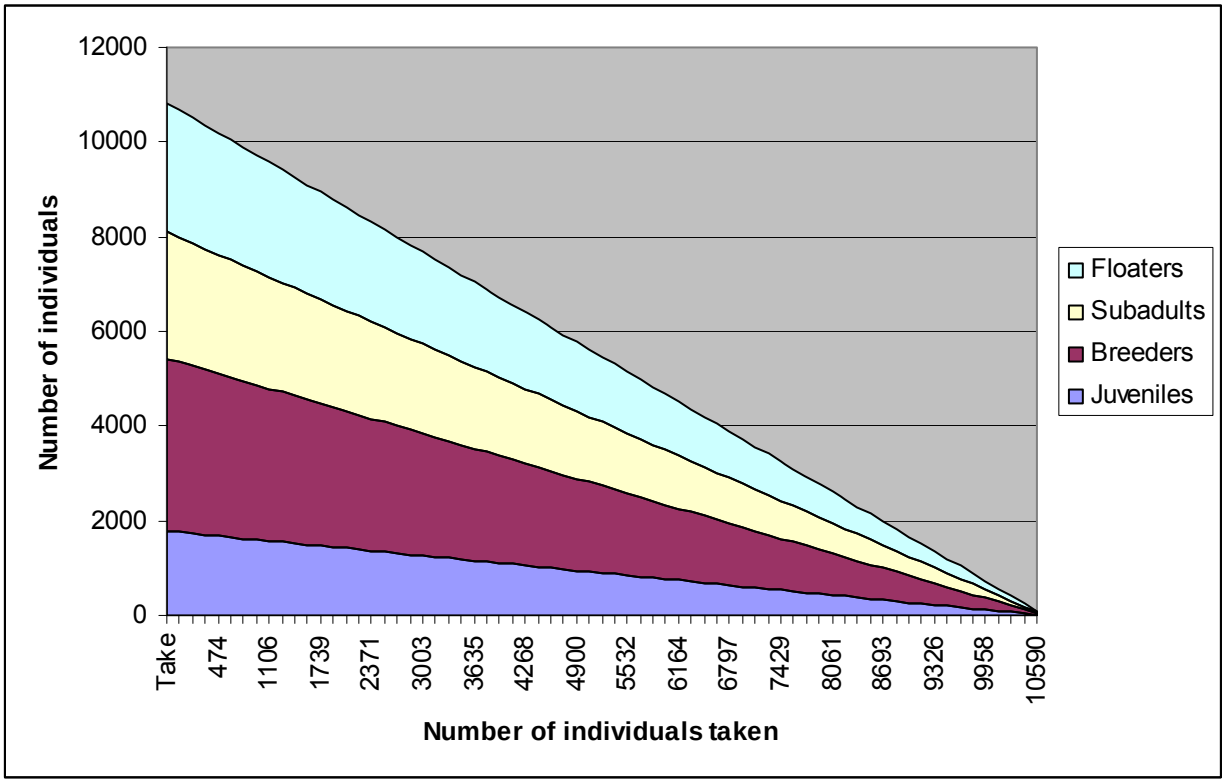

Figure C.2. Results from a series of deterministic model runs for a hypothetical **bald eagle** population under increasing levels of permanent nest territory take. Population structure at each level of take on the X axis is the equilibrium population structure reached after 100 years at that level of take. Note that there is no level of take that does not lead to a decrease in the number of breeders, hence this type of take is inherently incompatible with our stated management goal. Demographic values for the model are from Millsap et al. (2004): productivity = 1.3 young per nest site, juvenile survival = 0.77, subadult survival = 0.88, adult survival = 0.83, and number of nest sites = 1,371.

Determining Bald Eagle Take Thresholds

Derivation of Bald Eagle Regional Management Populations: We present here a brief description of the steps we took to delineate potential bald eagle regional management populations for the Eagle Act post-delisting permitting purposes. Our goal was to identify regional management populations for which take permitting thresholds would be calculated to ensure permitted take does not disproportionately negatively affect any regional management population.

1. We obtained from a variety of sources, but mainly State fish and wildlife agencies, latitude and longitude coordinates of all known recently occupied bald eagle nest sites in the lower 48 states (~15,0000 point records). This data set was used by the Service and the USGS in development of the plot-based post-delisting monitoring approach. It will also be a reference point for permitting purposes.

2. We then obtained all bald eagle band recovery records since 1937, and screened that dataset for records that were of eagles banded as nestlings that were recovered > 5 yr later during months that corresponded to egg-laying or early nestling periods for the natal "population" for the individual. We extracted from this subset of records data for the states of FL, VA, MN, AK, and AZ (n = 50), and computed the median "natal" dispersal distance (assuming that birds that met the criteria were likely breeding or in locations awaiting opportunities to breed). We then buffered the nest point data with the median natal dispersal distance (43 miles), and connected buffers around points where they overlapped.

3. We drew lines connecting gaps in the interconnected buffers to delineate potential management populations, under the presumption that, while certainly not genetically or demographically isolated, dispersal of individuals was likely greater within than between the populations given the relative distribution of nest sites (Figure C.3).

4. As a check on the hand-drawn lines, we computed fixed-kernel contours for the nationwide pooled nest point data. The contours largely supported the "eyeballed" management populations we had identified, though some management populations (such as southwest) have too few nest points to even be included in the 95% contour (Figure C.4).

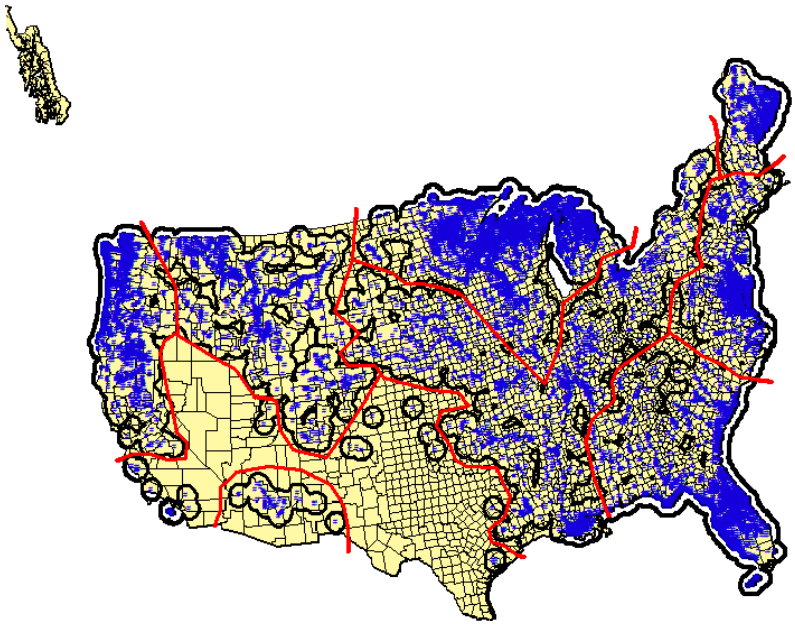

Figure C.3. Preliminary bald eagle population management boundaries (red lines)

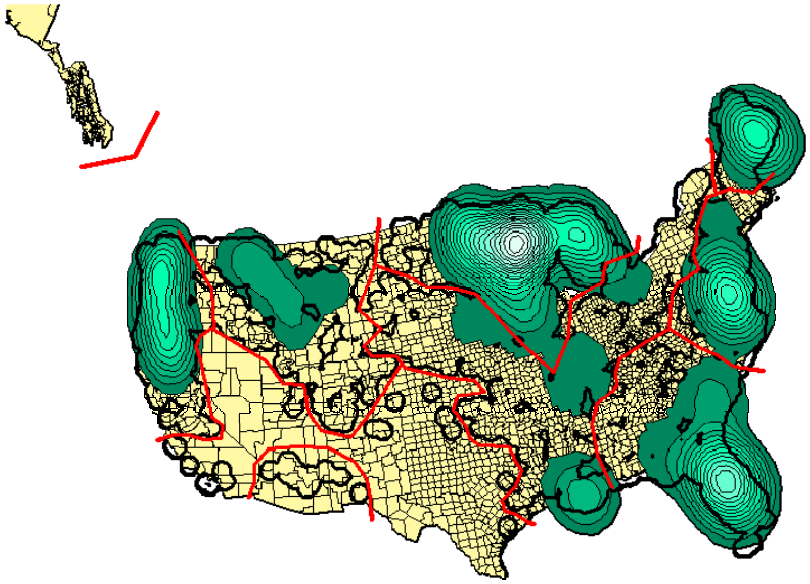

Figure C.4. Bald eagle population density and preliminary management boundaries (red lines)

5. Because the management 'regions' resulting from the preceding steps would have posed heightened administrative difficulties (one 'region' would have overlapped three separate Service Regions), we developed a proposal combining aspects of both biological and administrative boundaries (Figure C.5). One notable benefit to using Service Regional boundaries when possible is that they also correspond to State boundaries, further simplifying the coordination needs.

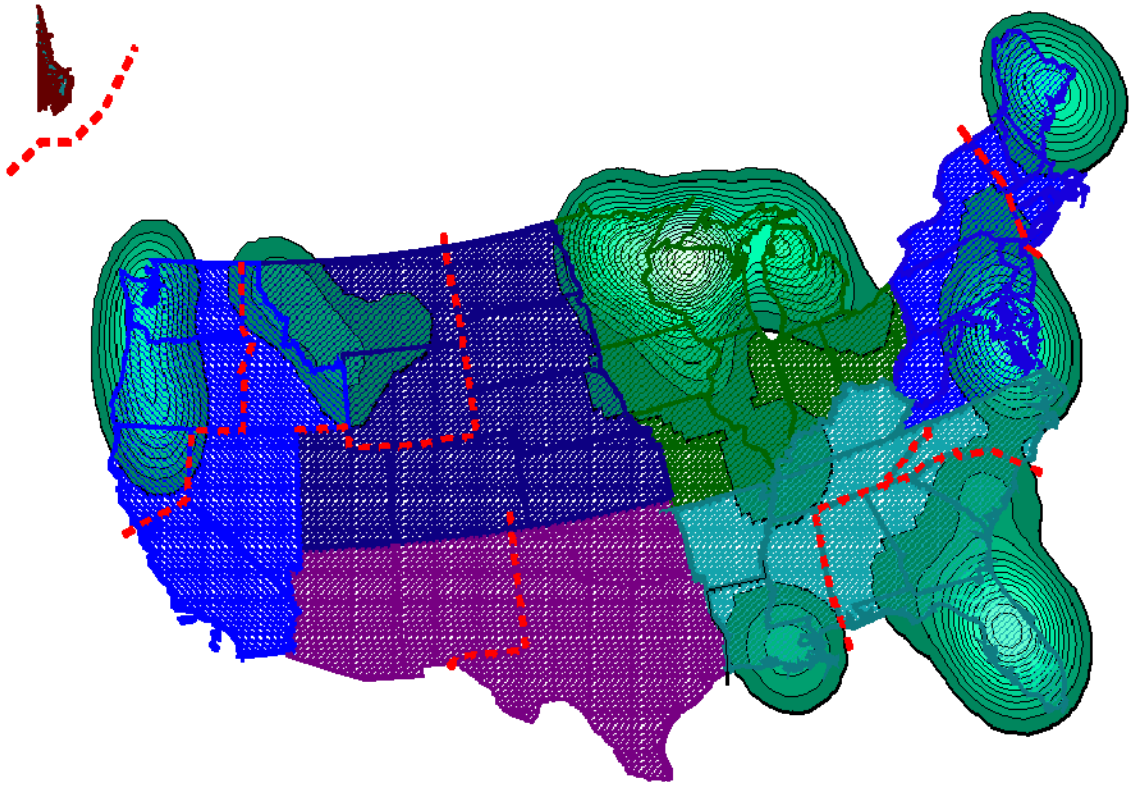

Figure C.5. Bald eagle population density analysis within proposed administration boundaries (within-Service Region population boundaries identified in red)

The red discontinuous lines in Figure C.4 shows the areas within Service Regions that we propose to treat as separate management populations. Figure C.6 reintroduces the general nest point location data as additional confirmation that the approach taken is supportable.

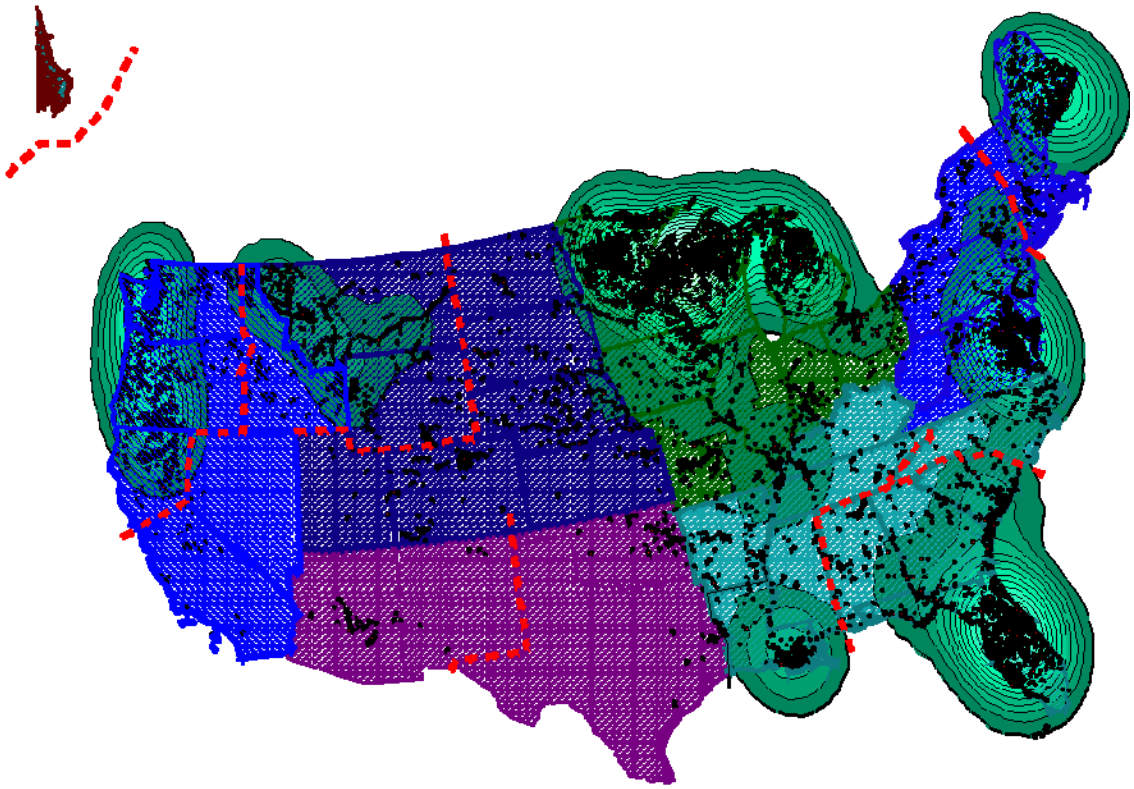

Figure C.6. Proposed general bald eagle management boundaries, relative to populations and population density analysis. States in each Service region are colored similarly and red lines denote bald eagle management population boundaries within Service regions.

Estimates of Population Size: For bald eagles, the state fish and wildlife agencies had provided the Service with locations of known nest sites, and separately, a count of occupied nest sites at the time of delisting (8,563; 72 FR 37345, July 9, 2007). These two data sets did not agree, because the dataset of mapped nests included both occupied and, in some cases, unoccupied sites. We felt it was reasonable to presume the state nest data proportionally reflect the distribution of eagles by regional management population. Accordingly, for the coterminous states, we estimated the number of occupied nest sites by multiplying the minimum number of occupied nest sites at the time of delisting by the proportion of nests in the State database in each region (Table C.3.). The Service conservatively assumed 15,000 occupied nest sites in Alaska based on partial surveys there (P. Schempf, U.S. Fish and Wildlife Service, personal communication). We adjusted these values to accommodate new or corrected information provided to us by state and tribal wildlife management agencies during the comment period on the draft EA.

For bald eagles, the Service used demographic values reported by Millsap et al. (2004) from Florida in the models for most regional management populations (annual adult survival = 83%, annual subadult survival = 88%, annual juvenile survival = 77%, number of juveniles fledged per occupied nest per year = 1.3), but we used more specific data when it was available (see citations in footnotes to Table C.3). Modeling provided us with an estimate of the number of bald eagles within each regional management population (Table C.3.).

Take of Individual Eagles: Population size estimates in Table C.3 provide a direct means of establishing annual thresholds for take of individual eagles while maintaining increasing or stable populations, assuming a direct relationship between the loss of individuals and overall population size. This approach assumes that all eagles are equal as long as population growth rates are positive, because under this condition there is a surplus of adult eagles in the population relative to the number of suitable breeding areas. We tested this assumption by running models with incremental decreases in adult (rather than juvenile) survival, and at the harvest rates contemplated we saw no difference in the effects on populations. To provide for uncertainty, and to allow for randomness not accounted for in the model, the Service followed the recommendation in Millsap and Allen (2006) and established recommended thresholds for take of bald eagles at levels of 5% of annual production, except that ½ MSY was more conservative in the case of the Southwestern management population, so ½ MSY was used in that case. The total estimated take allocated to each Service Region in Table C.3. is the total for all types of take, of individuals, disturbance of breeding pairs, disturbance of communal roosts and important foraging areas, as well as the permanent loss of nesting territories. Under the proposed management scenarios for each regional management population, the lower 90% confidence limit for lambda in the stochastic model exceeded 1.0 (Table C.5).

Permanent Loss of Nest Territories Resulting in Permanent Abandonment of Territories: As noted earlier, permanent loss of nest territories, resulting in permanent abandonment has more profound long-term effects on eagle populations than the loss of individual eagles. The Service employed the same model described above to set thresholds on the number of eagle territories that could be permanently taken each year while maintaining increasing or stable populations, again assuming conservatively that populations are at equilibrium. The Service initiated modeling with the current population size estimates in Table C.3., and then recalculated population size estimates with iterative decreases in the number of available nest sites to determine what level of territory loss would decrease in overall population size at population equilibrium. For bald eagles at

current population levels, model results indicated the permanent loss of a nest site or abandonment of a territory leading to loss of a nesting pair was demographically equivalent to the loss of 5 to 11 individuals, depending on vital rates. As noted earlier, because loss of a territory confers a recurring decrease in population potential, the authorization to take a territory permanently reduces subsequent year's take thresholds by 5 to 11, depending on the management population, unless subsequent surveys show the regional bald eagle nesting population is growing.

Cumulative Effects: Recommended thresholds for take of individual bald eagles and nests are not independent of one another. To ensure overall levels of take do not exceed the recommended thresholds, the Service would consider the permitted likely permanent loss of a nest territory or abandonment of a territory resulting in the loss of a nesting pair to be the effective equivalent of the permitted take of 5 to 11 individual bald eagles from the regional management population, depending on the population. For most management populations, we used demographic data from Florida (Millsap et al. 2004), an din these cases take affecting 1 individual = 1 individual from the threshold; take resulting from disturbance at 1 nest for only 1 time = 1.3 individuals from the threshold, 1 nest take resulting in the permanent abandonment of a territory = 1.3 individuals from the threshold the first year, and a reduction in 8 individuals from the annual threshold each year thereafter until data show the number of breeding pairs has returned to the original estimated, or until it can be demonstrated that the predicted loss has not occurred.

Determining Golden Eagle Take Thresholds

Under the same basic management objective as for bald eagles (i.e., permitting take at a level that would be consistent with the goal of stable or increasing breeding populations), and using the same modeling framework (i.e., that described in Millsap and Allen 2006 as developed by Grainger Hunt), annual take thresholds for golden eagles in the western United States (excluding Alaska) are as indicated in Table C.4.

The approach used here is somewhat different than that taken for bald eagles. For golden eagles, the best available demographic data are from Hunt et al. (2002) and Kochert et al. (2002), and these data sets were used by Millsap and Allen (2006) to estimate sustainable falconry harvest. However, the Service also has recent golden eagle population size and juvenile: non-juvenile age ratio information from BCRs 9, 10, 16, and 17 from Good et al. (2008), covering a greater area extent than the data from Hunt et al. (2002). The Good et al. (2008) report suggested the average golden eagle population size for the sampled BCRs in 2003, 2006, and 2007 was 24,602, 18.6% of which were juveniles ($\leq$ 1 year old). The Good et al. (2008) report suggests golden eagle reproduction was very high in 2003. In favorable years most if not all golden eagle pairs attempt to breed (Kochert et al. 2002). We assumed this was the case in the surveyed

BCRs in 2003, and that productivity in that year was equal to the median reported in Kochert et al. (2002) (0.87 young fledged per breeding pair). Based on the number of juveniles estimated to be present in 2003 and assuming average productivity of 0.87 per pair, we estimated these BCRs support 5,800 breeding pairs. Assuming 5,800 breeding pairs, we iteratively decreased productivity values in the population model until we reached a juvenile population size that approximated the average number of juveniles estimated in the Good et al. (2008) survey for 2003, 2006, and 2007 (4,577). Using this productivity value in the model (0.79 young per breeding pair) yielded an estimated a total population size slightly higher than 24,602, so we iteratively decreased the juvenile survival rate to 0.61, at which point the total population size from the model was approximately equal to the average in Good et al. (2008). Our rationale for varying productivity and juvenile survival to balance the equation is that these vital rates are the most variable in studied golden eagle populations (Kochert et al. 2002)

This approach could be extended to include golden eagles from Alaska, and for other BCRs outside the study area covered by Good et al. (2004). However, estimates of population size in Alaska are coarse, and juvenile survival may be far lower, so management would therefore require a conservative approach. Just as the Service used the demographic parameter estimates derived from Good et al. (2008) because they covered a greater geographic extent than other information, the Service also, for the same reason, used the golden eagle population data from the Partners in Flight Landbird Populations Estimates Database, based upon the estimates in Rich et al. (2005), using BBS data. The Service recognizes the limitations of the data, and discusses them in Millsap and Allen (2006) (Appendix E), and we recognize that the data accuracy and precision vary widely. However, the population estimate of 24,602 derived for BCRs 9, 10, 16, and 17 using data from Good et al. (2008), is comparable to the population estimate of 26,265 for the same BCRs from Rich et al. (2005). In addition, there are estimates, varying in reliability, for every BCR covered in this proposal with breeding populations of golden eagles. But because there is little evidence BCRs correspond to real breaks in golden eagle distribution, and because the estimates may not exactly reflect population data from individual States, the Service will modify our approach to establishing take thresholds and allocations as better information becomes available. At this point the Service believes the proposed approach would provide the kind of regional safeguards against regional “overharvest” that would be similar to what the Service has proposed for bald eagles.

In a subsequent step, stochastic (sensitivity) analysis indicated the lower 90% confidence interval for lambda under this management scenario is greater than 1.0 (Table C.5). After we conducted the sensitivity analysis, we received data from the 2008 golden eagle surveys (Good et al., personal communication, January 14, 2009). Combining the 2008 data with that from 2003, 2006, and

2007 (Table C.6), yielded averages which, when incorporated into the model, indicated a negative population growth rate.

Because of the uncertainty in golden eagle demographic parameter estimates and population size estimates, the results of additional sensitivity analyses we conducted (Table C.5), and new information received after the sensitivity analysis suggesting the population growth rate averaged over the span of record of the WEST survey for golden eagles may be negative, the Service will initially place a cap on permitted take (following the approach recommended in Millsap and Allen 2006) at 0% estimated annual productivity for golden eagles. If, in the future, data and modeling suggest golden eagle populations can support take, we would begin to authorize take at no greater than 1% of annual productivity, unless information available at that time demonstrates that higher levels of take can be supported (again, following Millsap and Allen 2006 for species with high uncertainty). However, at this time, of those permits authorized under the new rule, we will only consider issuance of "safety emergency take" and the Programmatic Take permits for golden eagles , the latter because it offers the most immediate potential for reducing ongoing take and improving populations.

The total estimated take allocated to each Service Region in Table C.4. is the total for all types of take, of individuals, disturbance at nests, communal roosts, and important foraging areas, as well as take of nests.

Cumulative Effects: Recommended thresholds for take of individual golden eagles and nests are not independent of one another. To ensure overall levels of take do not exceed the recommended thresholds, at the point the Service determines the populations can support take, the Service would consider the permitted likely permanent loss of a nest territory resulting in the loss of a nesting pair to be the effective equivalent of the permitted take of 4.26 individual golden eagles from the regional management population. For golden eagles: take affecting 1 individual = 1 individual from the threshold; take resulting from disturbance at 1 nest for only 1 time = .79 individuals from the threshold, 1 nest take resulting in the permanent abandonment of a territory = .79 individuals from the threshold the first year, and a reduction of 4.26 individuals from the annual individual permit limit each year thereafter until data show the number of breeding pairs has returned to the original estimated, or until it can be demonstrated that the predicted loss has not occurred.

Determining Take Allocation for Life History Traits pertaining to Both Eagles

Thresholds for Take of Communal Roosts and Important Foraging Areas: The degree to which eagles might be disturbed (as defined at 50 CFR 22.3) by the loss of a communal night roost or foraging area would probably require case-by-case evaluation. Where eagles are known to be heavily dependent on a particular roost or foraging site, abandonment of the site due to human activities constitutes a disturbance. In cases where disturbance is deemed likely to occur,

the most probable expression of that disturbance would be loss of the individual eagles. Recommended thresholds for take which results in a temporary loss of productivity would incorporate the total permitted disturbance of eagles at communal night roosts and important foraging areas. Determination of the amount of take incurred per location would be determined on a case-by-case basis by the Service Regions.

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Table C.3 Maximum Cumulative Take Allowable for Bald Eagles

REGION/MANAGEMENT UNIT	NUMBER MAPPED NESTS	% TOTAL MAPPED NESTS	PREDICTED NUMBER NESTING PAIRS[A]	PREDICTED TOTAL POPULATION SIZE[B]	HARVEST THRESHOLD (% ANNUAL PRODUCTION AND/OR % NESTS DISTURBED)[C]	MEAN NUMBER FLEDGED PER OCCUPIED NEST	ESTIMATED ANNUAL PRODUCTION	ANNUAL INDIVIDUAL TAKE THRESHOLD[D]	ANNUAL NESTING PAIR DISTURBANCE THRESHOLD[F]	TERRITORY:INDIVIUAL RATIO[G]	MAXIMUM CUMULATIVE TERRITORY TAKE THRESHOLD[H]
Region 1	**2,321.00**	**14.68%**	**1,019.31**	**7104.51**	**5.00%**		**1,160.11**	**58.01**	**50.97**		**8.33**
Northern Rocky Mountains	**168.00**	**1.06%**	**90.97**	**727.80**	**5.00%**	**1.30**	**118.27**	**5.91**	**4.55**	**8.00**	**0.74**
Pacific[I]	**2,153.00**	**13.62%**	**928.34**	**6376.72**	**5.00%**	**1.30**	**1,041.84**	**52.09**	**46.42**	**8.00**	**7.59**
Region 2	**187.00**	**1.18%**	**124.35**	**796.56**			**133.77**	**4.98**	**1.93**	**8.00**	**0.64**
Lower Mississippi	**136.00**	**0.86%**	**73.65**	**589.17**	**5.00%**	**1.30**	**95.74**	**4.79**	**1.68**	**8.00**	**0.60**
Southwest[J]	**51.00**	**0.32%**	**50.71**	**207.39**	**0.50%**	**0.75**	**38.03**	**0.19**	**0.25**	**4.00**	**0.05**
Region 3	**6,375.00**	**40.31%**	**3,452.17**	**27617.34**			**4,487.82**	**224.39**	**172.61**		**28.05**
Great Lakes	**6,375.00**	**40.31%**	**3,452.17**	**27617.34**	**5.00%**	**1.30**	**4,487.82**	**224.39**	**172.61**	**8.00**	**28.05**
Region 4	**3,003.00**	**18.99%**	**1,626.17**	**13110.78**			**2,120.44**	**106.02**	**81.31**		**13.16**
Lower Mississippi	**690.00**	**4.36%**	**373.65**	**2989.17**	**5.00%**	**1.30**	**485.74**	**24.29**	**18.68**	**8.00**	**3.04**
Mid Atlantic[K]	**79.00**	**0.50%**	**42.78**	**443.63**	**5.00%**	**1.45**	**62.03**	**3.10**	**2.14**	**10.37**	**0.30**
Southeast	**2,234.00**	**14.13%**	**1,209.75**	**9677.98**	**5.00%**	**1.30**	**1,572.67**	**78.63**	**60.49**	**8.00**	**9.83**
Region 5	**2,479.00**	**15.68%**	**1,512.27**	**14020.98**			**2,087.10**	**104.36**	**75.61**		**11.37**
Mid Atlantic[K]	**1,365.00**	**8.63%**	**909.02**	**9193.70**	**5.00%**	**1.30**	**1,302.79**	**65.14**	**45.45**	**9.00**	**6.47**
New England	**1,114.00**	**7.04%**	**603.25**	**4827.28**	**5.00%**	**1.30**	**784.31**	**39.22**	**30.16**	**8.00**	**4.90**
Region 6	**1,243.00**	**7.86%**	**673.10**	**5384.84**	**5.00%**		**875.04**	**43.75**	**33.66**		**5.47**
Northern Rocky Mountains	**873.00**	**5.52%**	**472.74**	**3781.95**	**5.00%**	**1.30**	**614.57**	**30.73**	**23.64**	**8.00**	**3.84**
Rocky Mountains and Plains	**370.00**	**2.34%**	**200.36**	**1602.89**	**5.00%**	**1.30**	**260.47**	**13.02**	**10.02**	**8.00**	**1.63**
Region 7[L]	**15,000.00**		**15,000.00**	**86550.00**	**5.00%**		**11,100.00**	**555.00**	**750.00**		**96.19**
Region 8	**205.00**	**1.30%**	**111.01**	**888.09**	**5.00%**	**1.30**	**144.31**	**7.22**	**5.55**	**8.00**	**0.90**
Pacific	**205.00**	**1.30%**	**111.01**	**888.09**	**5.00%**	**1.30**	**144.31**	**7.22**	**5.55**	**8.00**	**0.90**
TOTAL (less AK)	**15,813.00**		**8,563.00**	**68923.10**			**11,008.59**	**548.72**	**421.63**		**67.93**
TOTAL	**30,813.00**		**23,563.00**	**155473.10**			**22,108.59**	**1,103.72**	**1,171.63**		**164.11**

[A]Applies % distribution of mapped nests for lower 48 to total number of occupied nests, assuming a proportional relationship exists between mapped and occupied nests at the region/management units/state level. Alaska mapped number is already a large underestimate of occupied nests, so it is used as the predicted number as well.

[B]Predicted population size calculated using demographic model described in Millsap and Allen (2006). Unless otherwise specified, demographic data used come from Millsap et al. (2004) from a satellite-tagged eagle study in Florida: Adult survival = 0.83, subadult survival = 0.88, juvenile survival = 0.77, and number of young fledged per occupied territory = 1.3.

[C]Harvest threshold = 1/2 maximum sustainable yield (MSY), calculated as in Millsap and Allen (2006).

[D]1/2 estimated MSY.

[F]The maximum number of nesting pairs that can be disturbed or caused to fail annually and not exceed the individual take threshold.

[G]Given model predictions and estimated productivity, the estimated population size reduction at equilibrium resulting from the permanent loss of a nest territory.

[H]This is the maximum number of territories that can be lost without exceeding individual eagle take thresholds of the initial population. However, because loss of a territory confers a permanant decrease in population size and growth potential, this loss is not sustainable and should be managed such that the annual rate of permitting does not result in overall population decline > 0.5% per year, and cumulatively across years does not exceed the value in this column. For example in a management population where the predicted population size = 10,000 and with a territory:individual ratio of 8, the maximum number of individuals that could be permanently lost annually is 50 (10,000*0.05), thus the maximum number of territories that could be permitted to be permanently taken in 1 year is 6 (50/8 = 6.25, rounded down to 6). Note that if such a permit were issued, the individual take threshold for that management population would be reduced in each subsequent year by 48 (6*8) since the loss of a nest site is the equivalent of an annually recurring permit to take 8 individuals.

[I]Productivity for the Oregon portion of this Region/Management Unit = 0.97, based on comments provided in response to draft EA.

[J]Predicted population size calculated using the following demographic data provided by G. Beatty, USFWS: Adult survival = 0.88, subadult survival (average survival of age classes 2 - 4 years) = 0.78, juvenile survival = 0.73, number of young fledged per occupied territory = 0.75 (0.995 nestlings per territory * 0.75 survival rate through fledging). Estimated number of nesting territories is based on comments provided in response to draft EA.

[K]Predicted population size calculated using the following demographic data provided by E. Davis, USFWS: Survival rates as in footnote B, but number of young fledged per occupied territory = 1.45.

[L]Predicted population size calculated using the following demographic data provided by P. Schempf, USFWS: Adult survival = 0.88, subadult survival = 0.95, juvenile survival = 0.71, number of young fledged per occupied territory = 0.74.

Table C. 4 Maximum Cumulative Take Above Baseline Allowable for Golden Eagles

REGION/MANAGEMENT UNIT/STATE	ESTIMATED TOTAL POPULATION SIZE	PREDICTED NUMBER OF NESTING PAIRS[C]	HARVEST THRESHOLD (% ANNUAL PRODUCTION OR % NESTS DISTURBED)[C]	MEAN NUMBER FLEDGED PER OCCUPIED NEST	ESTIMATED ANNUAL PRODUCTION	ANNUAL INDIVIDUAL TAKE THRESHOLD[D]	ANNUAL NESTING PAIR DISTURBANCE THRESHOLD[F]	TERRITORY:INDIVIUAL RATIO[G]	MAXIMUM CUMULATIVE TERRITORY TAKE THRESHOLD[H]
Alaska[A]	2,400.00	588.24	0.00%	0.61	358.82	0.00	0.00	4.08	0.00
California portion of Northern Pacific Rainforest (BCR 5)[A]	108.00	26.47	0.00%	0.61	16.15	0.00	0.00	4.08	0.00
Prairie Potholes (BCR 11)[A]	1,680.00	411.76	0.00%	0.61	251.18	0.00	0.00	4.08	0.00
Sierra Nevada (BCR 15)[A]	84.00	20.59	0.00%	0.61	12.56	0.00	0.00	4.08	0.00
Shortgrass Prairie (BCR 18)[A]	1,080.00	264.71	0.00%	0.61	161.47	0.00	0.00	4.08	0.00
Coastal California (BCR 32)[A]	960.00	235.29	0.00%	0.61	143.53	0.00	0.00	4.08	0.00
Sonoran and Mojave Deserts (BCR 33)[A]	600.00	147.06	0.00%	0.61	89.71	0.00	0.00	4.08	0.00
Sierra Madre Occidental (BCR 34)[A]	360.00	88.24	0.00%	0.61	53.82	0.00	0.00	4.08	0.00
Chihuahuan Desert (BCR 35)[A]	720.00	176.47	0.00%	0.61	107.65	0.00	0.00	4.08	0.00
Great Basin (BCR 9)[B]	6,859.00	1,681.13	0.00%	0.61	1,025.49	0.00	0.00	4.08	0.00
Northern Rockies (BCR 10)[B]	6,172.00	1,512.75	0.00%	0.61	922.77	0.00	0.00	4.08	0.00
Southern Rockies and Colorado Plateau (BCR 16)[B]	3,770.00	924.02	0.00%	0.61	563.65	0.00	0.00	4.08	0.00
Badlands and Prairies (BCR 17)[B]	7,800.00	1,911.76	0.00%	0.61	1,166.18	0.00	0.00	4.08	0.00
TOTAL	**32,593.00**	**7,988.48**			**4,872.97**	**0.00**			**0.00**

[A]Population estimates derived from BBS counts taken in late spring (pre-fledging), following the approach used by Partners in Flight (Rich et al. 2004). These end-of-year estimates were converted to beginning of year estimates to conform with population estimates under footnote B by adding back in estimated annual mortality for all age-classes.

[B]Population estimates derived from aerial transect surveys conducted by Goode et al. (2007) in late summer (post-fledging).

[C]Number of nesting pairs and harvest thresholds predicted from estimated total population size using demographic model described in Millsap and Allen (2006). Demographic modeling started using parameter estimates reported in Millsap and Allen (2006). We then adjusted the parameter estimates to balance with the average of population size and adult:non-adult age ratios from golden Eagle surveys in BCRs 9, 10, 6,and 17 in 2003, 2006, and 2007 as reported in Goode et. al (2008). The final model used the following parameter estimates: adult survival = 0.91, subadult survival = 0.79, juvenile survival = 0.61, and number of young fledged per breeding pair = 0.79.

[D]1% of annual production.

[F]The maximum number of nesting pairs that can be disturbed or caused to fail annually and not exceed the individual take threshold.

[G]Given model predictions and estimated productivity, the estimated population size reduction at equilibrium resulting from the permanent loss of a nest territory.

[H]This is the maximum number of territories that can be lost without exceeding individual eagle take thresholds of the initial population. However, because loss of a territory confers a permanent decrease in population size and growth potential, this loss is not sustainable and should be managed such that the annual rate of permitting does not result in overall population decline > 0.5% per year, and cumulatively across years does not exceed the value in this column. For example in a management population where the predicted population size = 10,000 and with a territory:individual ratio of 8, the maximum number of individuals that could be permanently lost annually is 50 (10,000*0.05), thus the maximum number of territories that could be permitted to be permanently taken in 1 year is 6 (50/8 = 6.25, rounded down to 6). Note that if such a permit were issued, the individual take threshold for that management population would be reduced in each subsequent year by 48 (6*8) since the loss of a nest site is the equivalent of an annually recurring permit to take 8 individuals.

Table C.5. Results of stochastic analysis of proposed take thresholds, modeled as worse-case scenarios with all harvest of adults. Analysis was conducted prior to acquisition of data from 2008 golden eagle surveys (Good et al., personal communication, January 14, 2009).

	Productivity		Juvenile Survival		Subadult Survival		Adult Survival		Lambda		
Population	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	Lower 90% CL	Upper 90% CL
Bald Eagle - Millsap et al. (2004) vital rates[A]	1.3	0.81	0.77	0.2	0.88	0.1	0.82	0.1	1.069	1.0677	1.0706
Bald Eagle - R2/Southwest[B]	0.75	0.81	0.73	0.2	0.88	0.1	0.82	0.1	1.004	1.0040	1.0041
Bald Eagle - R1/Pacific (Oregon)[A]	0.97	0.81	0.77	0.2	0.88	0.1	0.82	0.1	1.036	1.0355	1.0367
Bald Eagle - R5/Mid-Atlantic (New York)[A]	1.28	0.81	0.77	0.2	0.88	0.1	0.82	0.1	1.066	1.0648	1.0675
Bald Eagle - R5/Mid-Atlantic[A]	1.43	0.81	0.77	0.2	0.88	0.1	0.82	0.1	1.073	1.0717	1.0749
Bald Eagle - R7[A]	0.74	0.81	0.71	0.2	0.95	0.1	0.87	0.1	1.051	1.0500	1.0513
Golden Eagle[C]	0.79	0.81	0.61	0.2	0.79	0.1	0.909	0.1	1.011	1.0107	1.0113

[A]indicated harvest rate = 5% of annual production.

[B]indicated harvest rate = 1/2 MSY.

[C]indicated harvest rate = 1% of annual production. Analysis conducted prior to acquisition of data from 2008 golden eagle surveys. Subsequent analysis indicated harvest rate should initially be set at 0%.

Table C.6 Golden Eagle Population Estimates From WEST Surveys by BCR
With 90% Confidence Intervals (CI)

	2003		2006		2007		2008	
	Total	**Juveniles**	**Total**	**Juveniles**	**Total**	**Juveniles**	**Total**	**Juveniles**
BCR 9	10939 (7522-15754)	1190 (544-2605)	4209 (2889-7346)	783 (350-1498)	5765 (3860-8983)	497 (187-955)	5046 (2618-8904)	632 (4-1547)
BCR 10	4831 (2262-8580)	1286 (628-2634)	6335 (4064-10877)	1584 (791-3101)	7654 (4476-12284)	1168 (184-2360)	7475 (4180-11958)	965 (416-1705)
BCR 16	4998 (3199-7275)	498 (204-1216)	3309 (2419-5522)	517 (121-1142)	3187 (1972-5047)	0*	2022 (903-3670)	289 (2-771)**
BCR 17	6624 (4611-9207)	2072 (1296-3312)	9030 (6354-14082)	1306 (617-2555)	8128 (5575-11987)	774 (315-1367)	5783 (3332-9360)	248 (2-724)**

* No juveniles seen on BCR 16 survey so estimate of juveniles for BCR could not be calculated
** lower limit estimated via Bootstrap was 0, so lower limit set to # juveniles observed during the survey

4 BCRs Combined

Year	Estimate	Lower 90% CI	Upper 90% CI
2003	27392	21556	35369
2006	22883	18491	34245
2007	24734	19084	34516
2008	20326	12704	32500

APPENDIX D

Millsap, B.A. and G.T. Allen. 2006. Effects of falconry harvest on wild raptor populations in the United States: theoretical considerations and management recommendations. Wildlife Society Bulletin 34: 1392-1400.

FEA page numbers are added (centered at bottom of page) to the copy of the published document.

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Effects of Falconry Harvest on Wild Raptor Populations in the United States: Theoretical Considerations and Management Recommendations

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Abstract

*We used recent population data and a deterministic matrix model that accounted for important aspects of raptor population biology to evaluate the likely impact of falconry harvest (including take of different age classes) on wild raptor populations in the United States. The harvest rate at maximum sustainable yield (MSY) ranged from 0.03 to 0.41 for the species examined. At least for peregrine falcons (*Falco peregrinus*), harvest rate at MSY was greatest for nestlings and lowest for adults. The quality of demographic data for the species influenced MSY. For most species the state of current knowledge probably underestimates the capacity for allowed harvest because estimates of vital rates, particularly survival, are biased low, because emigration is not distinguished from survival. This is offset somewhat by biases that might overestimate sustainability inherent in MSY-based analyses and deterministic models. Taking these factors into consideration and recognizing the impracticality of monitoring raptor populations to determine actual effects of harvest, we recommend that falconry harvest rates for juvenile raptors in the United States not exceed one-half of the estimated MSY up to a maximum of 5%, depending on species-specific estimates of capacity to sustain harvest. Under this guideline, harvest rates of up to 5% of annual production are supported for northern goshawks (*Accipter gentilis*), Harris's hawks (*Parabuteo unicinctus*), peregrine falcons, and golden eagles (*Aquila chrysaetos*); lower harvest rates are recommended for other species until better estimates of vital rates confirm greater harvest potential.* (WILDLIFE SOCIETY BULLETIN 34(5):1392–1400; 2006)

Key words

demographics, falconry, harvest, maximum sustainable yield, modeling, raptors, United States.

Falconry has been practiced in the United States since at least the 1920s. Prior to inclusion of Falconiformes and Strigiformes under the Migratory Bird Treaty Act (MBTA) with amendment of the treaty with Mexico in 1972, falconry was not federally regulated, and no comprehensive records are available on the number of falconers or number of raptors removed from the wild annually. Regulations promulgated by the United States Fish and Wildlife Service (USFWS) in 1976 (50 CFR Part 21) formally legalized falconry under MBTA and necessitated that the USFWS assess the likely impacts of falconry harvest on wild raptor populations. Those regulations required falconers to be permitted and to report the harvest and subsequent disposition of raptors acquired for use in the sport. The requirements resulted in data useful in assessing the likely impacts of falconry on wild raptor populations, and the USFWS used those data to conduct its first environmental assessment of falconry in 1988 (United States Department of the Interior 1988). The 1988 environmental assessment concluded that the impact of falconry on wild raptor populations in the United States was inconsequential.

Since 1988 2 important things have changed. First, the American peregrine falcon (*Falco peregrinus anatum*) was removed from the federal list of endangered and threatened wildlife in 1999. The subspecies had been protected from falconry harvest since federal regulation of the sport began because of its listed status. Subsequent to delisting, a conservative and carefully controlled harvest was allowed in the western United States (USFWS 2004). This action prompted a legal challenge to the USFWS's assertion that falconry harvest of American peregrine falcons will have minimal impacts on the wild population and the allegation that the USFWS's failure to adequately monitor peregrine populations to determine the impact of harvest violates the MBTA (Audubon Society of Portland et al. vs. United States Fish and Wildlife Service 2004). Second, the federal government has adopted more stringent standards for information for making science-based decisions. The standard requires clearer articulation and more scientific peer review of the information used in such determinations (Office of Management and Budget 2004).

Several aspects of raptor population biology are particularly germane to an assessment of impacts of falconry harvest. In addition to the overall limiting effect of prey availability, nesting densities of healthy wild raptor populations usually are further constrained by the availability of suitable nesting sites, spatial restrictions imposed by territoriality, or both (Newton 1979, Hunt 1998). The net effect is that an upper limit exists on the number of adult individuals that can breed in a given landscape. This, in turn, may result in a large number of nonbreeding adults awaiting opportunities to occupy vacancies at breeding territories (Newton 1988, Hunt 1998). These "floating" adults are not accounted for by conventional counts of

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territorial pairs or nestlings (Newton 1988), yet they can profoundly affect populations by buffering the effects of population declines, by contributing to decreases in reproductive success of breeders directly through interference competition and direct mortality (Tordoff and Redig 1997), and, perhaps indirectly, through competition for food resources (Newton 1988). Further, as a consequence of intense competition for nesting territories, age at first breeding is increased in healthy raptor populations, presumably because younger adults face competition with established or experienced older birds for vacancies at breeding sites.

This paper describes the likely impact of falconry harvest on wild raptor populations in the United States. We use the USFWS's most recent data on numbers of raptors taken from the wild and employ deterministic models to assess estimated effects on populations. We also illustrate how the dynamics of most raptor populations make monitoring the short-term impact of falconry harvest on populations in the wild nearly impossible and certainly impractical, and we make recommendations on how this should be accounted for in harvest strategies.

Methods

Definitions

We use the term juvenile to refer to an individual <1 year old, subadult to refer to a raptor >1 year of age but typically not old enough to breed, and floater to refer to an adult that has not settled into a breeding slot at an established nesting site. Falconry harvest typically focuses on juvenile raptors, either nestlings (eyases) or fledged young <1 year old (passagers). "Harvest" and "take" in this paper refer to the capture and removal from the wild of raptors for use in falconry. Harvest rate is the difference between the annual survival rate of the harvested age class without harvest and with harvest; in the case of eyas and passage age classes, this equals the proportion of the annual cohort of young harvested by falconers. The maximum sustainable yield (MSY) is the greatest harvest rate (in 0.01-unit increments) that does not produce a decline in the number of breeding adults in the modeled populations; we refer to harvest levels below this rate as sustainable. Moffat's equilibrium is the stable age structure at equilibrium population size for a given set of demographic parameter values (Hunt 1998). When we report population size at Moffat's equilibrium, we include all age classes, unless otherwise noted. Demographic parameters of interest are productivity, defined as mean number of young fledged per occupied nest site annually (ρ) as recommended by Steenhof (1987), and the juvenile (θ_j), subadult (θ_s), and adult (θ_a) annual survival rates (proportions alive at fledging time each year).

Falconry Harvest

Falconers who take raptors from the wild generally are required to do so either by removing eyases from nests or by trapping passage birds during their first year of life. Because of difficulties distinguishing age classes, current regulations do not restrict harvest of American kestrels (*Falco sparverius*) and great horned owls (*Bubo virginianus*) to first-year individuals. In addition, golden eagles (*Aquila chrysaetos*) older than one year may be taken, but all harvest of golden eagles is restricted to depredating individuals under special circumstances by provisions in the Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d). Each falconer must report to the USFWS and the respective state fish and wildlife agency all acquisitions and dispositions of raptors taken or otherwise acquired under his or her falconry permit (50 CFR 21). United States Fish and Wildlife Service regional migratory bird permit offices input all data on raptors taken from the wild into the USFWS's permit-tracking database. We used data for 2003 and 2004 from this database to assess the number of raptors removed from the wild by species for the purposes of our analyses. Some wild take may go unreported each year, but we believe such actions are infrequent enough to be considered inconsequential in the context of this analysis.

We used the harvest statistics reported above and modified population size estimates for continental North America from the Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004) to estimate the proportion of the year-1 cohort removed from the wild by falconers in 2003 and 2004. These estimates are for Canada and the United States, which is the appropriate geographic scale for this assessment because migrant raptors from Canada are undoubtedly included in the United States harvest of passage raptors. We eliminated the ad hoc visibility correction factor employed by Rich et al. (2004) that doubled population estimates derived from breeding bird survey (BBS) counts under the general assumption that 50% of individuals were not detected because they were incubating or brooding on nests. This assumption likely is not valid for raptors because most species have large young that do not require brooding by the time BBS routes are run in May and June, and delayed maturation and nest-site limitations result in large numbers of subadult and floaters in most populations (Newton 1979). We agree that the probability of detection for raptors is certainly <1.0 on BBS routes but, in the absence of an empirically derived visibility correction factor, we chose to use the more conservative unadjusted estimates of population size. For the peregrine falcon, opportunities for falconry harvest currently are restricted to a portion of the species' North American range. Accordingly, we used population estimates for the peregrine falcon for the portion of the species' geographic range that is subject to harvest from USFWS (2004).

Demographic Effects of Harvest

We modeled the effects of falconry harvest at different rates on hypothetical closed raptor populations using the best demographic data from contemporary periods (1971–2002) available for each species. We gave preference to findings from long-term mark–recapture or radiotracking studies where emigration probabilities were estimated because such studies yield less biased estimates of juvenile and adult survival rates than simple band recovery or mark–recapture analyses (Kenward et al. 2000). For species lacking intensive

Table 1. Species, data sources, and demographic input to models used to assess effects of falconry harvest on wild raptor populations in the United States. All original data used are from contemporary time periods (1971–2002); specific dates of individual studies can be found by consulting the referenced papers.

Species	Data source	Geographic locale	Annual juvenile survival	Annual subadult survival[a]	Annual adult survival	No. young per occupied nest site	Age at first breeding (yr of age of limiting sex)	Max. age[b]
Eurasian sparrowhawk	Newton 1986	Southern Scotland	0.45		0.61	2.30	1	13
Northern goshawk	Kenward et al. 1999	Baltic Islands, Sweden	0.58	0.65	0.81	1.45	2	17
Harris's hawk	Bednarz 1995	Composite USA	0.70	0.64	0.82	2.10	2	17
Red-tailed hawk	Preston and Beane 1993	Composite USA	0.46	0.80	0.80	1.40	2	17
American kestrel	Smallwood and Bird 2002	Composite USA	0.31		0.55	3.30	1	11
Peregrine falcon	Craig et al. 2004	Colorado, USA	0.54	0.67	0.80	1.66	2	17
Prairie falcon	Steenhof 1998	Composite USA	0.25		0.75	2.78	1	14
Golden eagle	Survival rates from Hunt (2002), productivity from Kochert et al. 2002	California, USA for survival; composite USA for productivity	0.84	0.90	0.91	0.80	5	25

[a] For species indicated as breeding at 1 year of age, there is no subadult age class in the models. For others, the subadult age class includes years after year 1 (juvenile) and the age at first breeding. Most species indicated as first breeding at age 2 do occasionally breed at age 1, particularly females (Newton 1979), but we used the values reported here in our models as we felt they were appropriately conservative.
[b] Maximum age as calculated in models. We assumed no breeding senescence, so maximum breeding age equals maximum age.

long-term demographic studies that accounted for emigration rates, we used the midpoints of ranges for estimates of demographic parameters reported in applicable Birds of North America accounts.

We selected the following species for analysis because they are harvested regularly by United States falconers or they are biologically similar to harvested United States species: 1) Eurasian sparrowhawk (*Accipiter nisus*), biologically similar to the Cooper's hawk (*A. cooperii*) and sharp-shinned hawk (*A. striatus*), using data from a marked population in Southern Scotland from 1971 to 1984 (Newton 1986); 2) a radiotagged and banded population of northern goshawks (*A. gentilis*) from the Baltic island of Gotland, Sweden, using demographic data from 1980 to 1987 (Kenward et al. 1999); 3) Harris's hawk (*Parabuteo unicinctus*) using summarized demographic data from Bednarz (1995); 4) red-tailed hawk (*Buteo jamaicensis*) using summarized demographic data in Preston and Beane (1993); 5) American kestrel using summarized demographic data in Smallwood and Bird (2002); 6) peregrine falcon using demographic data from a color-marked population in Colorado, USA, collected from 1973 to 2001 (Craig et al. 2004); 7) prairie falcon (*F. mexicanus*) using summarized demographic data in Steenhof (1998); and 8) golden eagle using age-specific survival-rate estimates from a long-term radiotracking study in California by Hunt (2002) and composite productivity values from Kochert et al. (2002; Table 1). It is important to note that there are differences among species in how occupied nest sites were defined. In the case of the Eurasian sparrowhawk, occupied nests were defined as nests in which $\geq$1 egg was laid (Newton 1986). For other species, occupied nest sites were sites with a territorial pair in attendance, but the likelihood of detecting pairs whose nests fail early in the nesting cycle varies among species (Steenhof 1987). These differences affect strict comparability of productivity estimates among species, but we believe the bias does not compromise our overall conclusions.

To estimate how falconry harvest likely affects raptor populations, we used a deterministic, Excel-based matrix model (Hunt 2003) that limited the number of adults that could breed annually to 2,000 (i.e., we assumed 1,000 suitable breeding sites for each hypothetical population). The algebraic formulas used to compute equilibrium stage structure are given in Hunt (1998). Models were run for 100 years using point estimates of mean values for ρ, θ_j , θ_s (for species with delayed maturation), and θ_a from the peer-reviewed literature for the 8 species of raptors. We used the model output to estimate population size and structure at Moffat's equilibrium. We fixed parameters of the model that, in reality, likely would shift to buffer declines (e.g., a decrease in age at first breeding, an increase in mean productivity as nest sites of lesser quality became unoccupied and interference competition relaxed; Newton and Mearns 1988, Ferrer and Donazar 1996). However, we also made no effort to account for demographic or environmental stochasticity, nor did we account for potential lowered reproductive success of first-time breeders (Newton 1979), both factors that could affect population structure and growth rates. We recognize that not incorporating these features of raptor populations in our models oversimplifies what likely occurs in nature, but we believe the model outputs adequately illustrate the probable impacts of harvest on wild raptor populations.

In our initial model runs, we incorporated harvest effects by decreasing first-year survival rates in 0.01-unit increments, which would be the case if all harvest was of passage raptors. For comparison purposes, we also simulated an eyas-only and adult-only harvest of peregrine falcons by decreasing productivity values, and by increasing adult mortality values, respectively, by 0.01-unit increments. Response variables of interest at Moffat's equilibrium after

Table 2. Number of raptors removed from the wild by licensed falconers in the United States in 2003 and 2004 according to United States Fish and Wildlife Service records. Population size estimates are from Rich et al. (2004), which are based on population size estimates derived from Breeding Bird Surveys from the 1990s. Percent harvest estimates use the mean number harvested.

Species	North American population size[a]	Estimated % juveniles[b]	No. juveniles[b]	No. harvested			% juveniles harvested	Recommended max. harvest rate
				2003	2004	Mean		
Sharp-shinned hawk	291,500	0.50	145,750	15	15	15	0.0103	1.0%
Cooper's hawk	276,450	0.50	138,225	67	72	69.5	0.0503	1.0%
Northern goshawk	120,050	0.30	36,015	52	46	49	0.1361	5.0%
Harris's hawk	19,500	0.25	4,875	50	32	41	0.8410	5.0%
Ferruginous hawk	11,500	0.30	3,450	7	6	6.5	0.1884	1.0%
Red-shouldered hawk	410,850	0.30	123,255	3	3	3	0.0024	1.0%
Red-tailed hawk	979,000	0.30	293,700	527	645	586	0.1995	4.5%
American kestrel	2,175,000	0.60	1,305,000	100	101	100.5	0.0077	1.5%
Merlin	325,000	0.60	195,000	48	52	50	0.0256	1.0%
Gyrfalcon	27,500	0.30	8,250	8	19	13.5	0.1636	1.0%
Peregrine falcon	9,870[c]	0.30	2,961	1[c]	18	18	0.6079	5.0%
Prairie falcon	17,280	0.50	8,640	31	42	36.5	0.4225	1.0%
Eastern screech-owl	369,600	0.60	221,760	1	0	0.5	0.0002	1.0%
Western screech-owl	270,100	0.60	162,060	0	3	1.5	0.0009	1.0%
Great horned owl	1,139,500	0.30	391,850	6	7	6.5	0.0020	1.0%
Snowy owl	72,500	0.30	21,750	1	1	1	0.0046	1.0%
Total				917	1,062	998		

[a] Unless otherwise noted, taken from Rich et al. (2004) but modified as described in the Methods. Units are total number of individuals.

[b] The percentage of juveniles was estimated from observed population structure in species-specific population models at equilibrium (see Fig. 1 and Table 1). Estimates for sharp-shinned hawks and Cooper's hawks are from the model for the Eurasian sparrowhawk; estimates for the red-shouldered hawk, ferruginous hawk, great horned owl, and snowy owl are from the model for the red-tailed hawk; estimates for the merlin and screech-owls are from the model for the American kestrel; and estimates for the gyrfalcon are from the model for the peregrine falcon.

[c] Harvest of peregrine falcons is limited to states west of the 100th meridian, and that is the population included here. This population size estimate is from United States Fish and Wildlife Service (2004), based on direct counts from states. Harvest of wild peregrine falcons for falconry was authorized only in Alaska in 2003 but was expanded to include other western states in 2004.

100 years of harvest at the specified rates included resultant numbers of breeders (N_b), juveniles (N_j), subadults (N_s), and floating adults (N_f); the annual rate of population change (λ) if all breeding-age adults were able to breed and produce young at the rate of the population mean; and the floater-to-breeder ratio (ζ), which is the ratio of nonbreeding adults to breeders. In general, λ is a useful way of gauging the impacts of harvest in a nonsaturated population where growth is possible, and ζ is the more useful metric when the population is at equilibrium and all breeding sites are occupied (Hunt 1998). We also developed MSY curves with harvest rate as the variable of interest for golden eagles, peregrine falcons, and American kestrels. These 3 species represent the range of harvest potential based on available data.

To estimate actual harvest rates, we divided the number of individuals of each species harvested by the estimated size of the juvenile population of each species. We used the average of the number of individuals of each species harvested in 2003 and 2004 as the numerator. We estimated the denominator by multiplying the overall population estimate for each species by an estimate of the proportion of the population that was $\leq$1 year old (and, therefore, subject to harvest). We based our estimate of the proportional size of the $\leq$1-year-old age class on the species-specific population structure from our models at the 0% harvest rate at Moffat's equilibrium. For species for which we lacked data to develop specific models, we used the model output for the species with the most similar life-history characteristics. Estimates for sharp-shinned hawks and Cooper's hawks are from the model for the Eurasian sparrowhawk; estimates for the red-shouldered hawk (*Buteo lineatus*), ferruginous hawk (*B. regalis*), great horned owl, and snowy owl (*Bubo scandiacus*) are from the model for the red-tailed hawk; the estimate for the merlin (*F. columbarius*), Eastern screech-owl (*Megascops asio*), and Western screech-owl (*M. kennicottii*) are from the model for the American kestrel, and estimates for the gyrfalcon are from the model for the peregrine falcon.

Results

Actual Falconry Harvest in 2003 and 2004

Falconers harvested 917 and 1,062 raptors of 15 species from the wild in the United States in 2003 and 2004, respectively (Table 2). Although the most frequently harvested species was the red-tailed hawk, the estimated harvest rate was greater for the Harris's hawk, peregrine falcon, and prairie falcon. For all species, the estimated harvest rate was below 1.0% of the juvenile cohort.

Modeled Impacts of Harvest on Populations

Passage harvest models for all 8 example raptor species at Moffat's equilibrium showed that numerical effects of harvest primarily are restricted to the subadult and floating adult components of populations (Fig. 1). When higher harvest rates compromise the equilibrium, floaters are absent because all adults are able to acquire breeding sites. At the highest levels of harvest, equilibrium population size of all age classes are predicted to be substantially below that at MSY, and the degree of reduction is related to the degree to which harvest rate exceeds MSY. The harvest rate at MSY

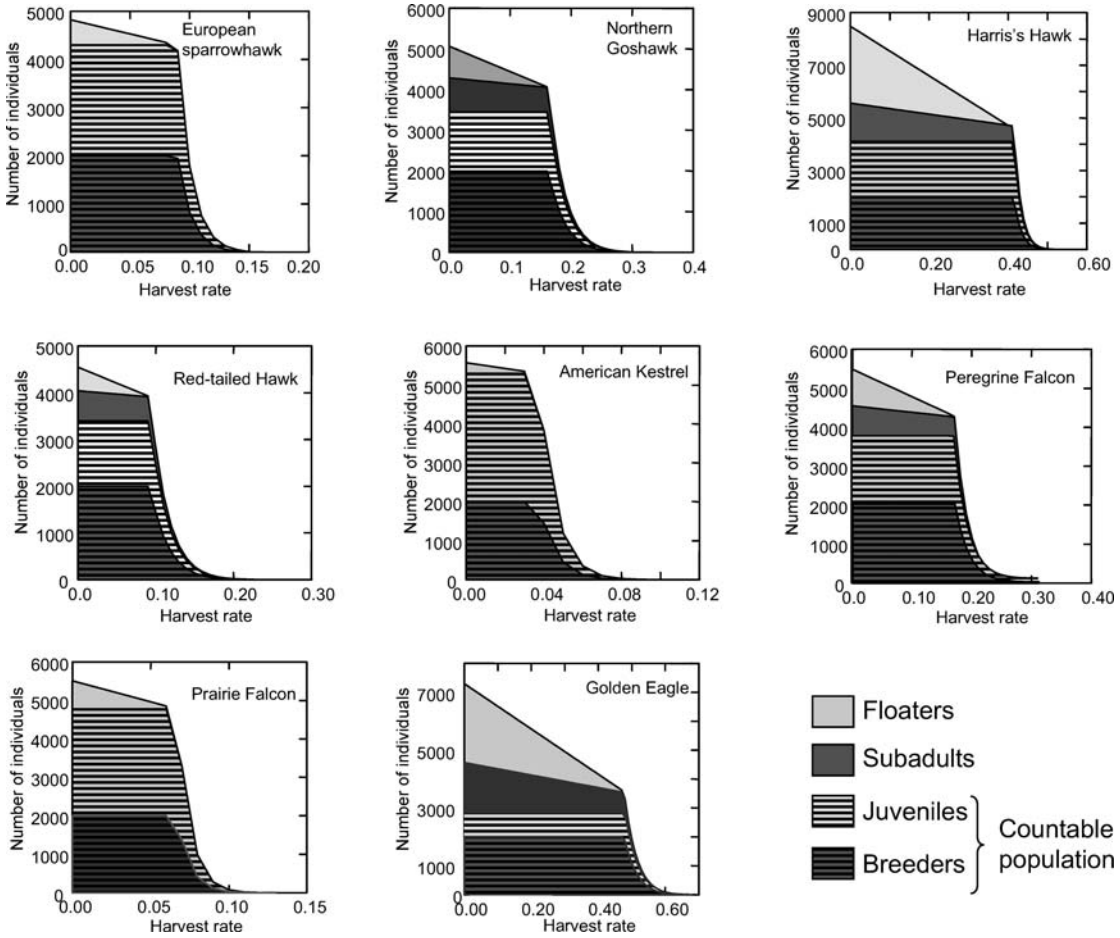

Figure 1. Estimated population structure of 8 raptor species at various passage harvest rates (percentage of juvenile cohorts taken by falconers) based on demographic data from contemporary time periods (1971–2002; see references in Table 1 for specific study periods). See Methods section in text for definitions. The component of the population that can be accounted for through nest-site monitoring is cross-hatched. For all species effects of harvest on populations below the harvest rate at maximum sustainable yield (MSY) are primarily in population segments that are not associated with nest sites. Above the MSY harvest rate, nest-site occupancy and production are maintained at lower equilibrium levels than would otherwise be supportable.

differs considerably depending on the age classes included in the harvest and, as expected, is greatest for a harvest of eyases and lowest for a harvest of adults (Table 3; Fig. 2). The MSY passage harvest rate varies among species in accordance with variation in vital rates (Fig. 3) and this variation also is apparent in changes in λ for unsaturated populations of those species (Fig. 4).

Discussion

Our results suggest that the sustainability of falconry harvest varies among raptor species in accordance with variation in vital rates. Model predictions indicate a comparatively low relative harvest potential for several species (Eurasian sparrowhawk, red-tailed hawk, American kestrel, prairie falcon). We suspect this is largely due to the underestimation of vital rates for these species because survival rates for them were derived from banding or marking studies that did not include unbiased correction for emigration, and to a lesser degree for the effects of differential mortality among age classes, which can affect reporting rates (Newton 1979, Kenward et al. 2000). In contrast, vital rate estimates for goshawks, golden eagles, and to a lesser degree, peregrine falcons, were based on radiotracking or marking studies that allowed for estimation and correction for these biases. As Kenward et al. (2000) showed, banding and marking typically greatly underestimate survival in raptors relative to findings for the same populations from radiotagging studies. Our findings highlight the need for better information on vital rates of these raptors.

Our model output confirms, at least for the peregrine falcon, that the impacts of harvest are proportional to the age of the cohort harvested, with nestling harvest having the least impact. This is consistent with findings of many previous studies that show raptor populations are most sensitive to changes in adult mortality rates (Newton 1979). Changes in raptor populations in response to sustainable harvest are largely restricted to the subadult and floating adult components of the populations, neither of which is amenable to population monitoring by traditional methods of counting breeding adults and young at nest sites. Overharvest initially would produce a decrease in the number of floating adults, which likely would increase the

Table 3. Summary of model output for 8 species of raptors using demographic data in Table 1. All original demographic data are from contemporary time periods (1971–2002); specific dates of individual studies can be found by consulting the references in Table 1. The floater/breeder ratio (ζ) is descriptive of saturated populations at Moffat's equilibrium, whereas the annual rate of population change (λ) is applicable for populations that are below carrying capacity and still capable of growth. The harvest rate at maximum sustainable yield (MSY) assumes populations are at Moffat's equilibrium and likely are not representative of maximum sustainable harvest rates for all populations of the species.

Species	Age of harvest	Initial ζ	Initial λ	Harvest rate at MSY
Eurasian sparrowhawk	Passage	0.26	1.07	0.06
Northern goshawk	Passage	0.39	1.05	0.16
Harris's hawk	Passage	0.45	1.45	0.41
Red-tailed hawk	Passage	0.25	1.03	0.09
American kestrel	Passage	0.14	1.04	0.03
Peregrine falcon	Eyas	0.46	1.06	0.31
Peregrine falcon	Passage	0.46	1.06	0.16
Prairie falcon	Passage	0.37	1.07	0.06
Golden eagle	Passage	1.35	1.07	0.31

number of younger breeders at nests (Newton 1979, Ferrer et al. 2003) and could eventually cause a decrease in nest-site occupancy. Monitoring trends in the age of breeders at nests could provide an early indication of decline (Ferrer et al. 2003), but such a pattern also would also be expected in an unsaturated population that was increasing (Newton and Mearns 1988, Tordoff and Redig 1997).

Our models oversimplify what would be expected to occur in nature, and ideally our predictions should be tested experimentally with wild populations. We encourage study in this area but recognize that the logistics of such work will be daunting given the difficulty measuring population responses among nonbreeders. Previous attempts to estimate sustainable harvest rates for raptor populations have examined empirical data on rates of recovery of depleted populations, sustainability of populations under persecution, or, in one case, population responses to experimental harvest (Conway et al. 1995, Kenward 1997). The conclusions of these analyses generally mirror what we found: that many raptor populations can sustain eyas or passage harvest rates of 10–20% and sometimes higher. This increases our confidence in the results presented here. That said, we also believe a degree of caution is warranted in applying these results. The MSY approaches to harvest management frequently overestimate sustainability, and monitoring capabilities often are not adequate to determine when harvest rates need to be reduced or modified (Ludwig et al. 1993). Moreover, deterministic models can produce overly optimistic projections of sustainability by masking the consequences of stochastic events that can temporarily depress production or elevate mortality (Beissinger and Westphal 1998).

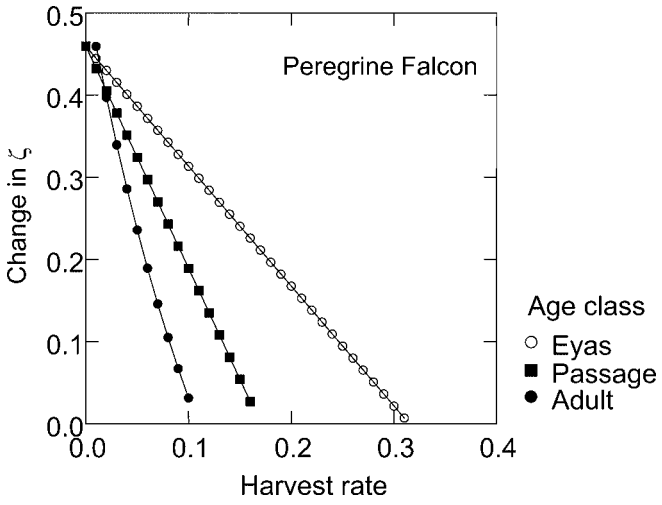

Figure 2. Change in floater/breeder ratio (ζ) with increasing harvest rate in a hypothetical peregrine falcon population at Moffat's equilibrium, using demographic data in Table 1. Under these demographic parameter values, the harvest rate at maximum sustainable yield is 3 times greater for an eyas-only harvest compared to a harvest of adults.

In our models we used demographic values that, while realistic for the species, are not likely representative of all populations of those species at all times. Though this justifies caution in applying our findings to local populations, we believe that our overall findings are representative for raptor populations in healthy condition. In declining populations, harvest would amplify declines commensurate with harvest rate. However, to determine the ultimate effects of falconry harvest on a declining raptor population, it would be important to know the cause of the decline. For example, we doubt that raptor populations declining due to locally deteriorating habitat conditions or declines in food availability would be appreciably impacted over the long term by falconry harvest if the proportion harvested remained constant through the range of changes in population size. This is because, once the population reached carrying capacity under the new conditions, demographic values would be expected to stabilize at healthy levels. On the other hand, population declines in species experiencing excessive mortality or reproductive failure would be exacerbated by harvest at any level and, unless the underlying cause of the decline was remedied or the harvest stopped, extirpation or extinction would occur more rapidly than would otherwise be the case.

Our analyses, which assume that raptor harvest constitutes an irrevocable additive mortality effect on populations, are conservative for 2 reasons. First, not all raptors harvested by falconers are permanently removed from the wild. Mullenix and Millsap (1998) reported that about 40% of falconer-

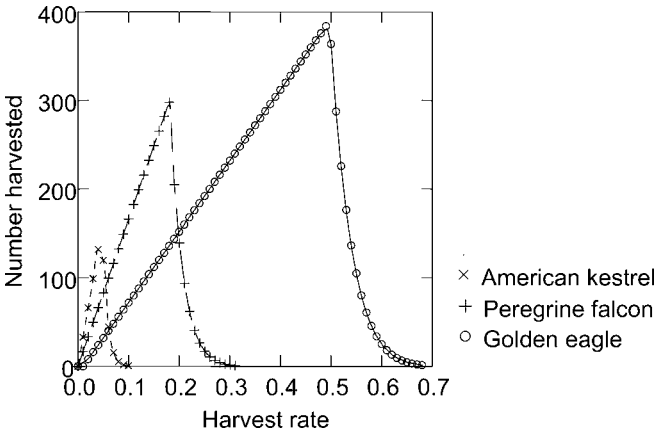

Figure 3. Harvest equilibrium curves for 3 species of raptors representing the range of harvest potential observed. Modeled harvest is of passage individuals, and models use the demographic data for each species from Table 1.

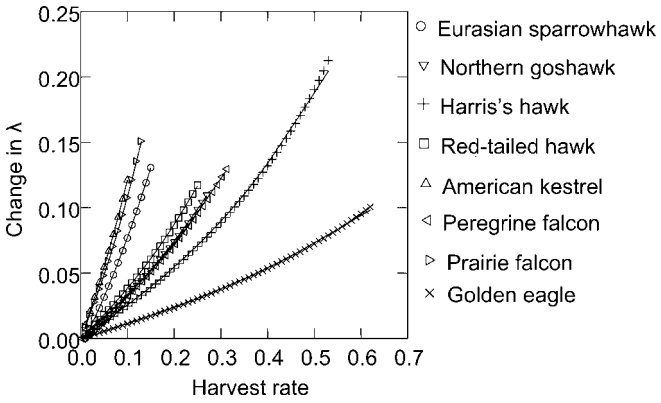

Figure 4. Change in population growth rate (λ) with changing passage harvest rate for 8 species of raptors at harvest levels below maximum sustainable yield, using demographic parameter values from Table 1.

harvested red-tailed hawks and American kestrels are either purposefully or accidentally returned to the wild each year. Survival rates and fitness of these birds are unknown, but some almost certainly survive and return successfully to the wild population. For example, in Great Britain, the northern goshawk was reestablished as a breeding species from escaped falconry stock (Kenward 1974, Kenward et al. 1981). Second, Conway et al. (1995) found that nestling prairie falcons left in nests from which siblings were harvested had higher survival and breeding-recruitment rates than nestlings from unharvested nests. This suggests that in the case of eyas harvest there may be a compensatory effect of harvest on survival of remaining nestlings.

Management Implications

Our results suggest that harvest strategies employed by agencies seeking to regulate the take of raptors by falconers should manage take based on each species' ability to sustain harvest, recognizing that for some species the state of current knowledge probably underestimates that capacity. Further, we believe that harvest rates should be conservative given the potential for MSY-based analyses to overestimate sustainability and the impracticality of measuring the actual effects of harvest on wild raptor populations. Finally, limiting take to eyas and passage raptors, as is currently the case for most species, is an effective strategy for limiting effects of harvest on populations.

As a practical guide, we recommend that in the United States, harvest of juvenile raptors be limited to one-half of the estimated MSY up to a maximum of 5%, depending on species-specific estimates of capacity to sustain harvest. We suggest that the available information on vital rates are sufficient to justify harvest rates of up to 5% for northern goshawks, Harris's hawks, peregrine falcons, and golden eagles; species with estimated MSYs greater than twice this value. We advocate harvest rates of one-half MSY for other North American species we assessed and harvest rates of 1% for species without adequate demographic data to estimate MSY until better estimates of vital rates confirm greater harvest potential (Table 2). We believe that harvest rates below these levels are unlikely to produce discernible effects on raptor numbers or the sustainability of otherwise healthy populations and probably are inconsequential in declining populations if those declines are caused by a reduction in the amount of suitable habitat or prey availability.

One obvious difficulty in this approach is the lack of reliable annual information on abundance for raptor species from which to calculate harvest rates. The BBS-based abundance estimates we used here likely are conservative for most species, particularly with the modification we employed that eliminated the visibility correction factor used by Rich et al. (2004). Given this, and considering that most raptor populations tend to be fairly stable from year to year (Newton 1979), annual estimates of abundance may not be necessary for management of falconry take. Rather, we suggest the approximate annual harvest rate estimates derived from known annual harvest divided by the estimated number of juveniles in Table 1 should suffice to identify species for which harvest might be approaching the thresholds identified here. Under this approach, we suggest that juvenile population-size estimates for species with declining BBS trends be recalculated every 3 years and that those for other species be revised every 6 years. While BBS-based population estimates will never be ideal for raptors, they could be improved if future recalculations included some measure of annual variation so that confidence intervals could be constructed for the estimates.

The approach outlined above seems particularly appropriate when one considers that estimated harvest rates in 2003 and 2004 for all raptor species in the United States were well below the recommended thresholds. The primary harvest regulation mechanism in effect in these years was a 2-bird-per-falconer limit on the number of raptors that could be removed from the wild each year, in conjunction with an overall maximum possession limit of 3 birds. Thus, even with some 4,250 licensed falconers in the United States (USFWS files) and a potential harvest of up to 8,500 raptors, harvest rates were extremely conservative under this

regulatory framework; only 11.7% of the recommended allowable take occurred.

Although we include golden eagles in our analysis, harvest of golden eagles is regulated differently than other falconry species. The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d) provides added restrictions specific to the take of golden eagles: only falconers with >7 years of overall falconry experience and eagle-handling experience may take golden eagles from the wild and only in certified depredation areas. Therefore, take of golden eagles for falconry is far more limited than is other falconry harvest.

Our assessment indicates take of wild raptors for falconry is very unlikely to have a significant adverse impact on wild raptor populations in the United States. Because of the limited participation in falconry and because nearly half of all raptors used in the sport are produced through captive breeding and not taken from the wild (Peyton et al. 1995), we believe impacts are unlikely to increase. Nevertheless, our recommendations provide a relatively easy and cost-effective way to track the potential national impact on an annual basis using harvest reports already being provided by falconers. Only if the potential for impacts increase, either through substantial growth in the number of licensed falconers or an increase in harvest rates for a particular species, would additional safeguards be necessary.

Acknowledgments

We are indebted to G. Hunt for help in all phases of this analysis, but particularly for sharing software for modeling raptor population structure at Moffat's equilibrium. The manuscript benefited greatly from reviews and constructive criticism by W. Burnham, J. Enderson, G. Hunt, R. Kenward, M. Mullenix, K. Wilkins, and an anonymous reviewer.

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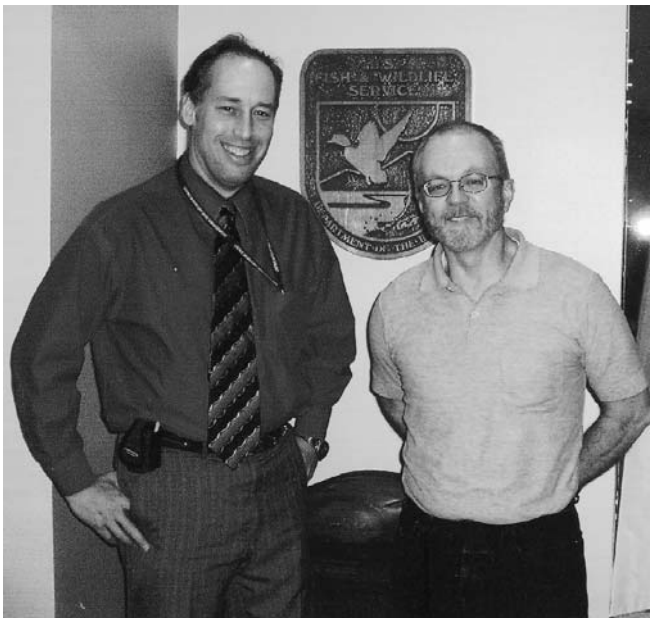

Brian A. Millsap (left) is currently New Mexico State Administrator for the United States Fish and Wildlife Service, but at the time this paper was written he was Chief of the United States Fish and Wildlife Service's Division of Migratory Bird Management in Arlington, Virginia, a position he held since 2002. He holds a B.S. in wildlife biology from Colorado State University and an M.S. in evolutionary and systematics biology from George Mason University. Prior to working for the Fish and Wildlife Service, he served as Chief of the Bureau of Wildlife Diversity Conservation for the Florida Fish and Wildlife Conservation Commission, as a raptor biologist for the National Wildlife Federation, and as a wildlife biologist for the Bureau of Land Management in Arizona and Wyoming. He is a past president of the Raptor Research Foundation, North American Falconers Association, and Florida Chapter of the Wildlife Society. ***George T. Allen*** (right) is the Chief of the Branch of Policy, Permits, and Regulations in the Division of Migratory Bird Management. He completed a B.S. at the Pennsylvania State University, an M.S. in Environmental Science at Washington State University, and a Ph.D. in zoology at North Dakota State University. He has worked for the Washington Department of Wildlife and for the Fish and Wildlife Service. He spent about 10 years assessing environmental contaminants for the Service before moving to Migratory Bird Management, where he's been for about 9 years. He served as President of the Kansas Chapter of the Wildlife Society and Newsletter Editor for the Central Mountain and Plains Section.

Associate Editor: *Euler.*

APPENDIX E

Draft Reporting Forms

U.S. FISH & WILDLIFE SERVICE - MIGRATORY BIRD PERMIT OFFICE
EAGLE TAKE (§ 22.26) - ANNUAL REPORT

PERMITTEE: _____
ADDRESS: _____
_____
City State Zip Code
9 Check here if reporting a change of name, address, or contact inform

PERMIT NUMBER: _____
REPORT FOR CALENDAR YEAR*: _____
REPORT DUE DATE: _____
PHONE: (_____)_____-_____
Email: _____

INSTRUCTIONS: Type or print the information requested below for each Important Eagle-Use Area (IEUA) identified on your permit during the year covered by this report and return the completed report to the above address by the due date. Filing an accurate annual report is a condition of your permit. Failure to file a timely report can result in permit suspension. Please note that the absence of eagles from an IEUA you are monitoring will in no way affect the continued validity of your permit. Accurate reporting will play an essential role in future eagle management**. Use a separate supplemental sheet for each IEUA identified on your permit.**
MAKE SURE YOU SIGN & DATE THE CERTIFICATION STATEMENT BELOW BEFORE YOU SUBMIT YOUR REPORT. (50 CFR parts 13, 21, & 22)

IMPORTANT USE AREA :

Identify nest, communal roost, or foraging area. If more than one of one type of IEUA is identified on your permit, designate which nest (or roost or foraging area) data applies to.

DATE EAGLES OBSERVED	**TIME OF DAY**	**NUMBER OF EAGLES OBSERVED** (If in large numbers, please estimate)	**OBSERVED BEHAVIOR** P – perched F – feeding N – sitting on or attending nest IF– in flight	**DESCRIPTION OF HUMAN ACTIVITY AT TIME EAGLES WERE OBSERVED** (e.g., surveying; excavation; pile driving; interior work, etc.) If activity is completed, enter "Completed"

CERTIFICATION: I certify that the information in this report is true and correct to the best of my knowledge. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

Signature: _____ Date:

OMB No. 1018-xxxx Expires x/xx/xxxx Form 3-202-15

SUPPLEMENTAL SHEET

EAGLE TAKE ANNUAL REPORT **REPORT YEAR_____** **SUPPLEMENTAL PAGE #:____**

PERMITTEE:_____ **PERMIT NUMBER:_____**

IMPORTANT USE AREA :

Identify nest, communal roost, or foraging area. Use a separate supplemental sheet for each IUA

DATE EAGLES OBSERVED	**TIME OF DAY**	**NUMBER OF EAGLES OBSERVED** (If in large numbers, please estimate)	**OBSERVED BEHAVIOR** P – perched F – feeding N – sitting on or attending nest IF– in flight	**DESCRIPTION OF HUMAN ACTIVITY AT TIME EAGLES WERE OBSERVED** (e.g., surveying; excavation; pile driving; interior work, etc.) **If activity is completed, enter "Completed"**

FWS FORM 3-202-15

U.S. FISH & WILDLIFE SERVICE - MIGRATORY BIRD PERMIT OFFICE
EAGLE NEST TAKE (§ 22.27) - REPORT

PERMITTEE: _____
ADDRESS: _____
_____
City State Zip Code
9 Check here if reporting a change of name, address, or contact information

PERMIT NUMBER: _____
REPORT FOR CALENDAR YEAR*: _____
*Programmatic take only
PHONE: (_____)_____-_____
Email: _____

Instructions: Complete all sections. MAKE SURE YOU SIGN & DATE THE CERTIFICATION STATEMENT BELOW BEFORE YOU SUBMIT YOUR REPORT.

1. ☐ Bald Eagle Nest Take ☐ Golden Eagle Nest Take

2. Did (does) the permit authorize take of a specific nest or nests?

☐ Yes. ☐ No, the permit authorizes programmatic nest take.

3. Provide the following information for each authorized nest take. If more than one nest was taken, please complete a supplemental page for each nest.

A. Date the authorized nest take occurred: ____ /____/_____

B. Location of the nest that was taken: _____

C. Disposition of the nest: ____Destroyed ____Relocated within territory ____Relocated outside territory ____Donated to a permitted recipient ____Destroyed, substitute nest provided in territory ____Destroyed, substitute nest provided outside territory

D. If nest was relocated or a substitute nest provided, are adult eagles tending the new nest? ____Yes ____No ____No, but nest removal was conducted outside eagle breeding season ____ Do not know

E. If nest was active, disposition of chicks and eggs (e.g., name and contact information of permitted rehabilitator, State agency, or USFWS):

_____

4. Describe the mitigation measures you have conducted to offset the nest take. If your permit does not require mitigation, you may leave this blank.

CERTIFICATION: I certify that the information in this report is true and correct to the best of my knowledge. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. 1001.

Signature: _____ Date:

EAGLE NEST TAKE REPORT **SUPPLEMENTAL SHEET**

PERMITTEE:_____	**REPORT DATE _____** **PERMIT NUMBER:_____**	**SUPPLEMENTAL PAGE #:____**

3. Provide the following information for each authorized nest take.

A. Date the authorized nest take occurred: ____ /____/_____

B. Location of the nest that was taken: _____

C. Disposition of the nest: ____Destroyed ____Relocated within territory ____Relocated outside territory ____Donated to a permitted recipient ____Destroyed, substitute nest provided in territory ____Destroyed, substitute nest provided outside territory

D. If nest was relocated or a substitute nest provided, are adult eagles tending the new nest? ____Yes ____No ____No, but nest removal occurred outside the eagles breeding season ____ Do not know.

E. If nest was active, disposition of chicks and eggs (e.g., name and contact information of permitted rehabilitator, State agency, or USFWS):

_____

4. Describe the mitigation measures you have conducted to offset the nest take. If your permit does not require mitigation, you may leave this blank.

FWS FORM 3-202-16

APPENDIX F

Projected Change in Total Population for States Having Large Bald Eagle Populations, 2000 to 2030

State	Numerical Change	Percent Change
Wisconsin	787,089	14.7
Minnesota	1,386,651	28.2
Delaware	229,058	29.2
Maryland	1,725,765	32.6
Virginia	2,746,504	38.8
North Carolina	4,178,426	51.9
South Carolina	1,136,557	28.3
Georgia	3,831,385	46.8
Florida	12,703,391	79.5
Washington	2,730,680	46.3
Oregon	1,412,519	41.3
California	12,573,213	37.1
Alaska	240,742	38.4

Data from United States Census Bureau, Population Division, Interim State Population Projections, 2005. Internet release date: 21 April 2005.

Appendix G

Counties among the 100 Fastest Growing that Also have Bald Eagle Breeding Sites

Rank	Geographic Area	Rank	Geographic Area
1	Flagler County, FL	48	Stafford County, VA
2	Sumter County, FL	49	Canyon County, ID
5	Loudoun County, VA	55	Bryan County, GA
6	Henry County, GA	57	Carver County, MN
7	Pinal County, AZ	59	Montgomery County, TX
11	Osceola County, FL	61	Lake County, FL
12	Douglas County, CO	63	Collier County, FL
14	Lincoln County, SD	64	Horry County, SC
15	Cherokee County, GA	65	Baldwin County, AL
17	Delaware County, OH	66	James City County, VA
19	Madison County, ID	69	Clay County, FL
20	Scott County, MN	71	Union County, GA
22	Lee County, FL	72	Beaufort County, SC
23	St. Johns County, FL	75	Archuleta County, CO
26	Walton County, FL	76	King George County, VA
27	St. Lucie County, FL	77	Wakulla County, FL
30	Culpeper County, VA	79	Indian River County, FL
32	Weld County, CO	80	Suffolk City, VA
34	Wright County, MN	82	Grand County, CO
36	Sherburne County, MN	85	Isanti County, MN
41	Brunswick County, NC	87	New Kent County, VA
42	St. Croix County, WI	89	Lee County, GA
44	Deschutes County, OR	90	Currituck County, NC
45	Prince William County, VA	96	Williamson County, TN
46	Dallas County, IA		

From Housing Unit Estimates for the 100 Fastest Growing Counties With 5,000 or More Housing Units in 2006, United States Census Bureau, August 2007.

Appendix H

Eagle/Aircraft Collisions

Table H.1. Bald Eagle/Aircraft Collision Information

USAF Bird Air Strike Hazard Data 1985-2006[a]		FAA Wildlife Strikes Jan 1990-May 2007[b]	
State	Strikes	State	Strikes
Alaska	1	Alaska	42
Idaho	1	California	1
Michigan	1	District of Columbia	2
Nebraska	1	Florida	20
North Carolina	1	Idaho	2
Oklahoma	1	Illinois	1
Texas	2	Louisiana	2
Unknown	1	Maine	1
Washington	2	Michigan	1
		Minnesota	2
		Mississippi	1
		North Carolina	1
		Nebraska	1
		New Jersey	1
		New York	1
		Unknown	2
		Virginia	3
		Washington	3
Totals	11		87

[a] Data acquired via e-mail from the United States Air Force Bird Airstrike Hazard Team on 8 August 2007.

[b] Source: FAA National Wildlife Strike Database (Level IIIA) - Version 8.8. Downloaded Oct 1, 2007.

Table H.2.Golden Eagle/Aircraft Collision Information

USAF Bird Air Strike Hazard Data 1985-2006[a]		FAA Wildlife Strikes Jan 1990-May 2007[b]	
State	Strikes	State	Strikes
Arizona	3	California	2
Arkansas	1	Montana	1
California	2	Unknown	1
Colorado	1		
Kansas	1		
Louisiana	1		
Maryland	1		
Mississippi	2		
Nebraska	1		
Nevada	1		
New Mexico	2		
North Carolina	1		
Oklahoma	1		
Oregon	1		
Texas	2		
Unknown	7		
Totals	28		4

[a] Data acquired via e-mail from the United States Air Force Bird Airstrike Hazard (B.A.S.H.) Team on 8 August 2007. Table reflects only those confirmed by experts at the Smithsonion Institute as eagles. There are an additional 203 strikes falling under the general categories of “hawks, eagles, kites” and “hawks, eagles, vultures, falcons” for which the species was not determined.

[b] Source: FAA National Wildlife Strike Database (Level IIIA) - Version 8.8. Data accessed 1 October 2007.

Appendix I

Existing Eagle Permits

Bald Eagle

Table I.1. Scientific Collecting

Year	State	Actions Authorized						Actions Reported			
		Birds	Trap and Release	Relocate	Eggs	Nests	Age	Eggs	Action	Birds	Action
2002	AK	0	0	0	5	0		0			
2002	AK	0	0	0	15	0		2	Held		
2002	AK	0	0	0	15	0		1	Held		
2002	AK	0	0	0	15	0		0			
2002	AK	0	0	0	30	0		7	Held		
2002	AK	0	0	0	15	0		0			
2002	AK	0	0	0	15	0		10	Held		
2004	AK	20	0	0	20	0	Eggs, Runt Chicks				
2006		0	100	0	0	0		0		23	Sampled, Released

No permits were given to trap and retain bald eagles.

Bald Eagle

Table I.2. Depredation

Year	Service Region	State	Relocate	Haze	Birds	Action
2002	1	OR	0	4	0	
2004	6	UT	0	10	10	Hazed
2005	3	WI	0	1	50	Hazed
2005	6	NE	0	20	0	
2006	1	OR	0	12	6	Hazed
2006	1	WA	0	1	3	Hazed
2006	3	MO	0	1	0	
2006	6	CO		4	2	Hazed
2006	6	NE		20	0	
2007	1	OR	0	12	5	Hazed
2007	6	NE	0	20	0	
2007	3	MN	5	1	0	
2007	3	WI	0	1	0	

No permits were given to take, trap and retain, or take eggs or nests.

Golden Eagle

Table I.3. Scientific Collecting

Year	State	Trap and Release	Relocate	Haze/Harass	Birds
2002	WY	30	0	0	7
2002	WY	40 over 3 years	0	0	7
2003	WY, CO	0	15 over 3 years	0	0
2006	UT	0	0	30 Nests	0
2007	NM	0	3	0	3
2007	UT	0	0	10 Nests	0
2007	WY	0	0	10 Nests	0
2007	CO	0	0	10 Nests	0

No permits were given for take of eggs or nests.

Table I.4. Resource Recovery Nest Take

Year	State	Authorized	Action	Number	Action
2002	WY	1	Relocate man-made nest	0	-
2002	WY	1	Take	0	-
2002	WY	2	Take/Transport - mine	0	-
2002	WY	1	Relocate - mine	0	-
2003	CO	1	Remove from tower	1	Relocated
2003	NM	1	Remove from tower	1	Relocated
2003	WY	1	Take -mine reclamation	0	-
2004	WY	2	Relocate - mine	2	Relocated
2005	CA	1	Take	1	Destroyed
2005	NM	1	Remove/relocate/block access - cliffs near turbines	2	Relocated
2005	MT	1	Take - mine	0	-
2006	SD	2	Remove/relocate - transmission line	2	Relocated
2006	WY	1	Relocate	0	-
2006	WY	2	Relocate	1	Relocated
2007[a]	NM	3	Relocate		
2007	NM	1	Remove/block access - cliffs near turbines		

[a] Reports for 2007 not yet received.

No permits were given to kill or to trap and retain, or to relocate.

No take of eggs was authorized.

Table I.5. Indian Religious Take

Year	State	Authorized	Reported Take	Age
2002	AZ	40	14	Nestling
2003	AZ	40	12	Nestling
2004	AZ	40	26	Nestling
2005	AZ	40	25	Nestling
2006	AZ	40	22	Nestling
2006	NM	2	2	Immature
2007	AZ	40	36	Nestling
2007	NM	1	1	-
2007	NM	2	2	Mature

No permits were given for take of eggs or nests.

Table I.6. Depredation Permits

Year	State	Trap/ Retain	Relocate	Eggs	Haze	Birds	Action	Eggs	Action	Nests	Action
2002	OR	0	0	0	1	0		0			0
2002	SD	0	1	0	1	7	Relocated	0			0
2002	WY	0	1	0		1	Trapped and Released	0			0
2003	SD	0	1	0	1	0		0			0
2003	UT	0	10	0	10	0		0			0
2003	WY	0	1	0	1	6	Transferred for Falconry	0			0
2003	WY					1	Banded	0			
2004	CA	0	15	0		4	Relocated	0			0
2004	UT	0	16	0	16	9	Relocated	0			0
2004	UT					5	Hazed	0			
2004	WY	8	0	0		4	Transferred for Falconry	0			0
2005	CA	0	10	2		4	Relocated	2	Destroyed	2	Destroyed
2005	CA	0	0	0	2	2	Hazed	0			0
2005	CA	0	20	0		4	Relocated	0			0
2005	SD	0	1	0	1	0		0			0
2005	UT	0	15	0	15	0		0			0
2005	WY	8	0	0		4	Transferred for Falconry	0			0
2006	CA	0	10	0		3	Relocated	0			0
2006	CA	0	0	0	2	2	Hazed	0			0
2006	SD	0	1	0	1	0		0			0
2006	WY	10	0	0		5	Transferred for Falconry	0			0
2007	CA	0	-1	0		3	Relocated	0			0
2007	WY	10	0	0				0			0
2007	UT	0	15	0	15			0			0

No take of live eagles or nests was authorized.

Appendix J

Activities for Which Service Regions Anticipate Requests for Permits Developed Under This Proposal

Table J.1. General Development Activities

Region	Private (Housing)	Commercial	Government Sponsored	Transportation
1	X	X	X	X
2	X	X	X	X
3	X	X	X	X
4	X	X	X	X
5	X	X	X	X
6	X	X	X	X
7	X	X	X	X
8	X	X	X	X

Table J.2. Energy Exploration and Development Activities

Region	Fluid Minerals (oil, gas, geothermal)	Coal and Other Energy Mining	Geophysical Exploration	Pipelines and Transmission Corridors	Power Plants	Hydro-electric
1	X			X	X	X
2	X	X	X	X	X	
3	X	X	X	X	X	X
4	X		X	X	X	X
5	X	X		X	X	X
6	X	X	X	X	X	X
7	X		X	X	X	
8	X			X	X	X

Table J.3. Types of Activities Potentially Resulting in Disturbance

Region	Non-energy Mining	Agricultural and Habitat-related Activities[a]	Recreation	Aircraft and Airfields	Military Training	Timber Harvest
1		X	X	X		X
2		X	X	X	X	
3	X	X	X	X	X	X
4	X	X	X	X	X	X
5	X	X	X	X	X	X
6	X	X	X	X	X	X
7	X		X	X	X	X
8		X	X	X		X

[a] For disturbance associated with carrying out activities. This category also covers activities such as habitat restoration and Clean Water Act Section 404 permitting.

Table J.4. Types of Activities Potentially Resulting in Mortality

Region	Power Lines	Communication Towers	Wind Development	Transportation	Timber Harvest
1	X	X	X		X
2	X	X	X		
3	X	X	X		X
4	X	X			X
5	X	X	X	X	X
6	X	X	X	X	X
7	X	X	X		X
8	X	X	X		X

Appendix K

Comments on Draft EA with Service Responses

We include here a summary of comments provided on the DEA, with our responses. Comments specific to the proposed rule are addressed in the Final Rule, and comments limited to specific edits are addressed by making the recommended edits, as needed.

Comment	Response
The EA definition of short-term disturbance should be modified to include disruptions in the current year. As proposed, it indicates the decrease in recruitment would occur the following year.	We have revised the sentence to read: "A short-term disturbance reduces productivity in a given year and there is a decrease in recruitment into the following year equivalent to the average number fledged per occupied territory." We acknowledge there may be additional affects from disturbance such as reduced fitness of fledglings leading to reduced juvenile survival. However, we do not have data sufficient to quantify that value, and are attempting to avoid an overly-complicated and cumbersome permitting system.
The statement "TRM of individual eagles and the consequence of nest disturbance are the same" is wrong. The EA needs to reflect the fact that loss of a juvenile or nesting attempt is comparatively insignificant to loss of an adult or adult breeder."	The different impacts to the population between the losses of juvenile or nesting attempt and the loss of an adult would be true at low population levels. However, as long as there is a floater population, which is an assumption of the models, the ages of birds taken do not significantly affect the composition of the population. If we are able to increase our knowledge of key demographic parameters, such as the age distribution of the population and age-specific mortality, we will modify the parameters used in the models as indicated by the data.

Comment	Response
The EA downplays the impacts from the growing human population currently and in the future, implying that cumulative effects (at least for bald eagles) will likely be localized because population growth will be localized, but in all likelihood, human population will dramatically grow in many areas not now considered major growth areas. In MT, the fastest growing counties are where the eagles are. Such impacts should be given more attention in the EA	This issue is addressed in the Final EA (FEA). Additional potential impacts to eagle populations have led us to more conservative limits on disturbance permits and take than were proposed in the Draft EA. In addition, the FEA includes provisions for enhanced coordination with State and Tribal wildlife agencies (to be developed with the implementation guidance for the rule) that will provide local expertise to assist the Service in responding more appropriately to area-specific needs.
The EA needs to more fully address the impacts of lead poisoning which is a serious issue. The Service should consider requiring programmatic permits for ammunition manufacturers or for states that still allow lead shot to be used for upland game hunting.	While we recognize the seriousness of the issue of lead poisoning, we do not believe it is necessary to expand the discussion. In addition, the intent of the assessment is not to provide an encyclopedic discussion of individual mortality factors. For extant impacts, they are already inherent in the population information and included in the assessment of the affected environment. Additional potential impacts are addressed in the Final EA, and have led us to more conservative limits on disturbance permits and take than were proposed in the Draft EA. However, should ammunition manufacturers, States, or tribes wish to develop a programmatic permit to address the impacts of lead poisoning, we would work with them to do so.

Comment	Response
The revised definition of “compatible with the preservation of” (increasing or stable populations) is not justified by the BGEPA and is too restrictive.	We are proposing a new permit program, and we must comply with Congressional intent – which is at least a population sufficient to preserve each species. In the DEA and notice re-opening of the comment period on the rule (73 FR 47574, August 14, 2008), to elucidate the statutory standard of “preservation of the bald eagle or the golden eagle,” we proposed the following terminology: “maintaining increasing or stable populations.” We continue to support the essential meaning of that standard, but recognized that it could be misapplied to constrain any authorization of take because any take of a bald or golden eagle by some degree results in a population decrease, even if short-term and inconsequential for the long-term preservation of the species. Thus, if interpreted so narrowly, the word “maintaining” would render us unable to authorize any take. Therefore, we are revising our interpretation of “preservation of the eagle” to read “consistent with the goal of stable or increasing breeding populations.” The phrase “consistent with the goal” will allow take that is compatible with long-term stability or growth of eagle populations. Adding the word “breeding” clarifies the significance of the number of breeding pairs for maintaining or growing populations, versus floaters (non-breeding adults).

Comment	Response
The preservation standard of “increasing or stable populations” is not protective enough. The standard should be to conserve as many eagles as possible while allowing for some minimal take when absolutely necessary. The standard should be 1) significantly less than half the maximum safe values, and 2) lowered even more due to uncertainty associated with local or regional population size.	We disagree that the standard is not protective enough. However, as suggested, we have established more conservative limits on take than were proposed in the Draft EA, because we believe, by using the new thresholds, we will be more able to ensure the standard is met.
What is meant by “no discernible” population decline; is it any decline that is measurable or only one that would adversely affect the eagle’s preservation as a species?	Neither option posited by the commenter is intended. Using measurability as the sole basis for a discernible decline, by which we would base management decisions, would ignore the normal population cycles inherent in life histories of wildlife species. On the other hand, a decline that would affect the preservation of the species would be much more substantial. Such a decline would be extremely unlikely under the provisions of the preferred alternative in the Final EA. We intend, through the implementation guidance for these permits, and through implementation of a structured coordination process, to develop more specific criteria for determining when a decline is related to normal population cycles, or is one for which remedial action such as permit threshold adjustment is necessary.
Concern that the public will be required to demonstrate that populations are increasing.	This concern is unfounded. We will base our permitting on the best available population information, but the public will not be expected to provide those data.

Comment	Response
Who will be doing the necessary monitoring and data gathering, including ascertaining whether take was temporary, permanent, or didn't happen, in order to adjust thresholds appropriately? It seems doubtful that anyone has the funding or resources to conduct such monitoring. Even if accurate data could be gathered every five years, it may not be sufficient to ensure take thresholds are not exceeded.	At the national scale, the post-delisting monitoring will provide some of the population data for the bald eagle, and the WEST, Inc. monitoring will provide population demographic information and data for the golden eagle in the four BCRs in which the survey occurs. However, we are prepared to seek out and use data from other sources if available. We have included minimal requirements for reporting on the part of the permittee that would help us ascertain the affects of the activity. We intend, through the implementation guidance for these permits, and through implementation of a structured coordination process, to identify additional needs and resources for management of the thresholds.
Without better data, the conservative modeling done by Millsap (2006) should be adopted.	We agree that the modeling done by Millsap and Allen should be used, in part because of the lack of better data. In addition, our preferred alternative in the Final EA is more conservative than what Millsap and Allen (2006) recommended for falconry take of golden eagles, because new information regarding the status of golden eagle populations indicates that juvenile survival rates for golden eagles may be substantially lower than those used in the 2006 publication. However, it is consistent with the recommendations in Millsap and Allen (2006) for species with high uncertainty.

Comment	Response
The DEA states that the thresholds it includes will remain until new information warrants modification, but does not explain what kind of new information will suffice, and whether the Service will review the thresholds annually.	In general, this means new population information that meets the requirements of the Information Quality Act of 2000. We will reconsider the threshold for any segment of the population of either species when we believe that new data warrant it. Additional specifics will be included in the implementation guidance and during implementation of the enhanced coordination forums proposed in the Final EA.
There are not enough data to support permit issuance, particularly for golden eagles. At the very least, the Good et al 2008 study (survey contracted by the Service to provide statistically-rigorous estimates of golden eagle population size and juvenile to non-juvenile age-ratios in Bird Conservation Regions) needs to be made public. Estimates of vital rates will have dramatic impacts, but data for accurately assessing vital rates are not currently available for many regional populations Also, the high variability of reproductive success needs to be taken into account.	The very conservative limits on permit issuance allowed under the preferred alternative in the Final EA account for the variability in estimates of vital rates as confirmed in sensitivity analyses conducted by the Service which incorporated known variability. The Good et al. 2008 study will be available in final version at the beginning of 2009. We conducted additional sensitivity analyses of the data (Appendix C) in order to incorporate more of the known variability of vital rates into our models. We have used the results of those analyses to revise our recommended thresholds.
For golden eagles, state-to-state satellite telemetry data would yield the information that is critically needed for golden eagles. The Service should establish a National Eagle Monitoring Fund and seek Congressional support.	We agree with the first part of this statement. Studies to better evaluate travel, distribution, and vital rates for golden eagles would allow us to manage golden eagles with less uncertainty. However, the very conservative limits on permit issuance allowed under the preferred alternative in the Final EA account for the variability in estimates of vital rates.

Comment	Response
We recommend that an Alternative 4 be developed that addresses a permitting system for bald eagles only.	We believe that Alternative 1 and the provisions in "Management Common to All Action Alternatives" address all the factors that would be included in an Alternative 4 as proposed in the comment. They ensure that thresholds are compatible with the preservation of the eagle, and allow us to suspend take of either species if populations would not support take. In addition, we believe the programmatic permits proposed are needed to improve conditions for golden eagle populations, and that failure to take those steps would not be compatible with the preservation of the golden eagle.
"Absence of data" should not be used to deny take authorization for infrastructure projects that promote public safety and welfare; rather the "best available science" should be used.	Even though the Eagle Act doesn't specifically require it, the best available data was used in the FEA. However, the Eagle Act requires the Secretary of the Interior to determine that take will be compatible with the preservation of eagles before he or she may authorize the take. To permit take without sufficient data to show that it is indeed "compatible with the preservation of the eagle" would violate the statutory mandate. If an entity has sufficient knowledge to recognize that it may need a permit for disturbance or take, then it should have sufficient knowledge to allow us to assess its request for a permit.

Comment	Response
Since no funding mechanism has been identified, the program will rely on State resources for surveys and monitoring and provision of data, but States do not have the resources either (and have other management priorities). The EA should acknowledge the need for federal funding or explicitly state that it will fund monitoring through State Wildlife Grants.	We do not believe that the program will rely completely on State resources for surveys and monitoring. Post-delisting monitoring will use updated information provided by the States in partnership with the Service. The WEST, Inc. surveys, upon which we will initially rely for data on golden eagles, are funded by the Service. The Final EA includes a section outlining the kinds of needs the Service has identified in order to adequately manage the permit program and eagle populations. Additional support for surveys and monitoring are noted as priorities, because we would like to improve the amount, accuracy and precision of the data we have and use.
Bald eagle roost monitoring and golden eagle roost and nest monitoring have been inadequate in OR, casting doubt on the models used in the DEA. Baseline monitoring of roosts for both species and nesting golden eagles is needed, certainly before take of goldens is permitted. However, there is no indication that monitoring in the future will provide the necessary data. Therefore, Alternative 1 should be implemented.	Numbers of eagles in roosts are not, to our knowledge, used in determining population numbers. Therefore, monitoring of roosts has limited bearing on permit issuance, unless a permit that would affect a roost is requested. However, identification of important roost areas and intermittent monitoring may be an efficient method for determining their relative value for protective purposes. The permits allowing take of golden eagles under the preferred alternative in the FEA will be very limited, which reflects our concerns about available population information.

Comment	Response
The final EA should establish an adequate monitoring protocol for both species to collect sufficient biological data. Reliable, range-wide, and current data will be necessary.	The development of protocols lies more appropriately with the implementation guidance, the structured coordination teams, and the national golden eagle conservation and management plan as discussed in the FEA. The EA is intended to assess potential impacts due to allowing issuance of permits. Further, recognizing the limitations on data that we will always face, the preferred alternative in the Final EA establishes extremely conservative levels of allowed take.
The PDM cannot be relied on for purposes of permitting, since it can detect only very coarse-scale population changes. And has no bearing to AK (or Texas).	While we agree that the PDM can detect changes at a very coarse scale, it can provide important information on national trends. We will reconsider the threshold for any segment of the population of either species when we believe that new data warrant it. We intend, through the implementation guidance for these permits, and through implementation of a structured coordination process, to identify additional monitoring needs and for management of the thresholds. In addition, if finer-scale, long-term monitoring efforts meet the needs of our permitting program, the Service would rely upon them
We question whether the Service will be able to deny permits based on insufficient data in the face of political pressure.	Our constraint in issuing permits under the Eagle Act is that we cannot authorize take without determining if it is compatible with the preservation of the eagles. Permit issuance will be based on criteria in the preferred alternative in the Final EA, which have been developed using that constraint as our mandate.

Comment	Response
Any reliance on permit thresholds should: (1) be scientifically supported, including peer-review, (2) include objective criteria to take into account natural population fluctuations, and (3) be consistent with federal data quality guidelines.	Permit thresholds are based on a model that was peer-reviewed as part of the publication process. The Final EA establishes extremely conservative levels of allowed take, based on consideration of fluctuations in vital rates, and using the best available data.
The model to be adopted should be developed in collaboration with industry and NGOs and it should be peer-reviewed.	The model was peer-reviewed as part of the publication process. As more information becomes available, we may adopt different models, as developed and agreed to within the context of the structured coordination framework.
The study that was the foundation of the deterministic model for a hypothetical bald eagle population was based on too small a sample size and lacks peer review or any input from other scientists (e.g., Petra Wood, Tom Murphy) who have conducted these types of studies.	The study to which the commenter appears to be commenting (Millsap et al. 2004, Comparative fecundity and survival of bald eagles fledged from suburban and rural natal areas in Florida.), was published in the Journal of Wildlife Management .The model was peer-reviewed as part of the publication process (also, see previous comment response). The Millsap et al. (2004) study is the only contemporary study that provides highly reliable estimates of actual annual bald eagle survival because satellite transmitters were used to determine survival on a relatively large sample of individuals. The survival values used in the demographic model is the most conservative interpretation of the survival data from the Millsap et al. (2004) study, and probably underestimates actual juvenile survival by as much as 4%. The Millsap et al. (2004) estimates were not the only estimates used in the analyses. Where similarly unbiased data were available, the Service used it. For example, for the Region 2 Southwest and Alaskan regional management populations, we employed regionally derived survival estimates from contemporary radio and satellite telemetry studies (as cited in footnotes to table C.3).

Comment	Response
The falconry model used in the DEA does not address the loss of adults from the population. The models used in the DEA will not detect declines in the breeding population. Since take authorizations for these permit regulations are not limited to juveniles and can result in nest failure, and take authorizations will often include effects on the quality and availability of habitat and prey; wild bald and golden eagle populations do not meet these hypothetical population assumptions. Furthermore, the models have not been validated by data from wild populations.	The model cannot be expected to "detect declines in the population," though the model does address the effects of take. Determining appropriate levels of take directly is not practical because important population parameters like productivity and survival fluctuate from year-to-year, and direct counts of nests and young (the typical method for estimating eagle population size and health) do not account for non-breeding eagles, which can make up as much as 30% of healthy eagle populations. For this reason, we used a demographic population model to estimate the likely impact of permitted take at different levels on eagle populations over the long-term. However, the model does incorporate assumptions and known vital rates for all age classes, and the vital rates used were from studies based upon wild populations. In addition, it is important to note that use of the models forms only one portion of the permitting approach. All decisions on individual permits will be based upon site-specific information, including the area population and habitat. In addition, we will be developing and implementing a structured coordination process with State and tribal wildlife jurisdictional entities to enhance our ability to include information on such factors as quality and availability as well as prey.
The Millsap model may not be suitable for bald eagles, since it primarily looks at raptor species with shorter life-spans and higher reproductive rates.	The model can be used for species with different ages at first breeding and survival. It is equally applicable to different raptor species if these factors are considered.
More detailed information should be included in the EA describing the analysis behind the model used – and perhaps some outreach to the states.	The Draft and the Final EA include the Wildlife Society paper, in which the authors describe the model in Appendix D—a relatively simple life-table analysis.

Comment	Response
Take thresholds should not be based on models; the result is overly restrictive, jeopardizing health and safety due to limitations imposed on maintenance of critical infrastructure. Take in the Southwestern Region will be lower than was permitted under the ESA. The Service should abandon the models and base permit issuance on the best available science, and local environmental conditions and local eagle biology, as is done under the ESA.	The models used are based upon the best available science regarding population dynamics and the best available data for the populations considered. Indeed, models are a component of "best available science," along with such things as a good experimental design, a standardized method for gathering data, rigorous statistical analysis, and peer review. However, we readily acknowledge there is always room for improvement, both in the models used, the way they are applied, as well as the amount and quality of the data collected and the methods used. We believe the commitments in the Final EA, which include working towards more localized management when feasible, will provide us with the best opportunity to make those improvements in coordination with States and Tribes. As stated above, the models form only one part of our permitting program, but the models can easily be re-run with regionally derived credible survival rate estimates if those data are shared with the Service. All decisions on individual permits will be based upon site-specific information, including the area population and habitat.
The EA is based on a faulty assumption that each permit will result in a loss of productivity. The presumption should be that each activity will not be likely to result in a loss of productivity.	Our assumption that each permit will result in a loss of productivity is related to the fact we did not want to issue permits unless take was likely to occur. It frames the underlying need for a permit. If the activity is not likely to "disturb" or otherwise take an eagle, then a permit should not be needed. The Service must ensure that the population of either species will not decline as a result of issuance of disturb or take permits. Therefore, we have been conservative in all considerations that affect issuance of permits under the preferred alternative in the Final EA.

Comment	Response
The EA should make the assumption that each take is a long-term take until evidence shows otherwise.	Some of the take permits are to be issued both for the year in which they are requested, and some will be multi-year permits. Given the demonstrated adaptability and resilience of bald eagles (for which most disturb permits will be issued), the approach we are proposing is warranted. The model we used incorporates and demonstrates that any take has a long-term effect, which is reflected by the conservative allowance of take permits for the two species.
What period of time will be used to decide whether the take was temporary or permanent, so that thresholds are adjusted accordingly?	We believe that we will have to assess this on a site-by-site basis, considering how many nests are in a territory, where they are, and who monitors the site.
The EA should commit the Service to reducing or halting permit issuance if any population declines are detected at a regional level.	If data confirm populations at either national or regional scales are declining, depending on the source and severity of the decline, the Service will either establish lower take permit thresholds where appropriate or suspend permitting until data confirm the populations can support take.
Take under the ESA, emergency nest take, and programmatic TRM take should be included in the thresholds because take is take.	We disagree with stating that all the take examples mentioned by the commenter should be unequivocally included in the thresholds. However, we have already stated in the DEA that if we determine that take from emergency nest or programmatic TRM take affects productivity, or if individual permits are likely to have such effects, they will be subject to the thresholds. “Carryover” take under ESA provisions is very limited, and it will actually occur only rarely. For any incidental take exempted under ESA section 7 that is authorized after the date this rule is finalized and that also constitutes take under the Eagle Act, the only permit that is available to provide Eagle Act take authorization is the § 22.26 permit being finalized herein.

Comment	Response
Some TX bald eagles should be grouped with the AZ population rather than eagles to the east, and are greater than 43 miles from the eastern populations. Many of these are relatively isolated; will they be protected?	This population will be protected to the same extent that most other bald eagle populations are protected. A limited population would, by default, mean that few disturb or take permits for that population are issued. Although data available to us distinguish the Sonoran Desert population from other bald eagle populations, our FEA notes that we will include some of the TX bald eagles within the same general management area as those in AZ.
Local populations may not be adequately protected without a process that involves more State input. While a regional approach makes sense it will be critical that the Service protect eagles in more localized areas with lower population densities by coordinating closely with States. CBD: The proposal has inadequate provisions to protect local populations. The Service should examine and delineate other specific populations that require separate analysis.	We expect that each Service Regional office will cooperate with affected States to ensure support of local populations. In addition, the FEA includes provisions that would address cumulative effects, cultural resources, review, and for enhanced coordination with State and Tribal wildlife agencies (to be developed with the implementation guidance for the rule). Provisions for protection of local populations will be developed within the context of the enhanced coordination forums. Furthermore, States and tribes can enact more protective regulations, and the permits under the federal regulation will not be valid if they are in violation of other laws.
Where local and detailed data sets exist (e.g., Sonoran Desert BE pop.), the Service should use those instead of oversimplified models.	The EA **does** use these data when they are available, in order for the models to more closely approximate local conditions. In addition, if finer-scale, long-term monitoring efforts meet the needs of our permitting program, the Service would rely upon them.

Comment	Response
There should be allowances for localized land-use actions that can deal with disturbance take through appropriate mitigation supported by a locally agreed-upon interagency planning effort. This would allow specific solutions to localized land-use issues and would prevent all but very minor or temporary declines in local populations.	While we are unsure we have interpreted the question accurately, we believe the provisions of the programmatic permits and the enhanced coordination forums would meet the concerns expressed in the comment.
The EA needs to address how take will be assessed when it affects both local and distant populations (e.g., wind turbines and migrating eagles). [No suggestion is made as to how to do that.]	At this time, we lack the specific information that would allow us to distinguish between which birds taken are from local and distant populations, so will assume they are resident until and unless information is supplied to demonstrate otherwise. The Final EA also outlines program goals that would include research to more accurately assess the impacts to the population of origin by take of migrant birds.
Take of wintering eagles should not be subtracted from regional take thresholds.	Until much better data on eagle (particularly golden eagle) movements and survival are available, we see no logical alternative to this process (Also, see previous response).
For bald eagles, the regions should be those used in the PDMP, based on eagle population centers and their status, rather than arbitrary USFWS Regional boundaries. Also, the levels of potential take given on pages 103-104 do not relate to the defined population centers (CFC).	We disagree. All other migratory bird permits are issued by Region. We considered other population boundaries, but basing permitting on those boundaries would make the process confusing for permit applicants and more difficult for our Regional migratory bird permits offices. Furthermore, the PDMP doesn't cover all of the U.S.

Comment	Response
More explanation is needed as to why take thresholds are much higher than current take levels.	With the exception of the Sonoran Desert bald eagle population, neither species is listed under the ESA. In the FEA, we have reduced the take thresholds, and, while greater than under the ESA for bald eagles, they are considerably lower than in the DEA. Based upon new information from an ongoing survey, we are also proposing to maintain historical levels of permits for golden eagles and not issue permits under this proposal except for emergency situations, and where the permit will benefit the species. Issuance of permits that will still allow a stable or increasing breeding population is warranted.
Because golden eagle populations are currently declining in some areas, the EA should revise its statement that permit issuance will be predicated on increasing or stable populations, and should state instead that it will be based on the *permitted take* not resulting in discernible declines.	The FEA and the rule have revised the definition of compatible with the preservation of the bald eagle or the golden eagle" to mean consistent with the goal of stable or increasing breeding populations. The current monitoring for the golden eagle does not have the precision or accuracy to detect whether the permitted take is resulting in discernible declines, nor is there currently a thorough evaluation of the magnitude and significance of the ongoing take from un-regulated sources. We designed the TRM programmatic permit expressly to reduce that kind of take, but do not have the resources to conduct monitoring that could discern the relative effect of different sources of take.

Comment	Response
The Sonoran Desert population should be evaluated as separate from those in OK and TX. It should be assessed along with southern CA, while OK and TX should be part of the southeast region. Also, the statement on page 56 that the Sonoran Desert population is not expanding is inaccurate.	The Sonoran Desert population **is** evaluated separately from other populations. In the U.S., the population is entirely in Arizona. Bald eagles in riparian areas of the Sonoran Desert of central Arizona are being considered as a possibly Distinct Population Segment under the Endangered Species Act. We have revised our statement on page 56 to reflect that the Sonoran Desert population is expanding.
The EA needs to be more specific that the Service will not issue any permits to take bald eagles in Arizona.	Under the preferred alternative, we would not issue individual permits for take from the Sonoran Desert population. The Draft and Final EA make it clear that this population is not large enough to allow such take, regardless of its status under the ESA. However, development of programmatic disturbance permits for ongoing activities that would have measures providing long-term benefits to the eagle population will be feasible. In addition, Ecological Services may issue permits if the bald eagle remains listed in Arizona

Comment	Response
The Service needs to identify those areas where take requests may exceed thresholds and identify the process it will use to handle the situation (particularly in light of the inconsistencies between management at the scale of population centers and BCRs with Service Regional boundaries). The allocation process should be laid out in the final EA or rule.	While we cannot predict with absolute certainty those areas where take requests may exceed thresholds, we expect it will be in those areas where the take thresholds under the proposal are only incrementally above historical take levels from existing permit types. We have identified additional allocation priorities in the FEA. However, because every Region has different management needs and approaches, more specific processes, if needed, will be developed at the Regional level. In addition, it is important to remember that the permits in this FEA and rule are not to be sought in lieu of incorporating appropriate avoidance and minimization measures into project planning. They are to be sought, for individual permits, after all practicable (capable of being done after taking into consideration, relative to the magnitude of the impacts to eagles, (1) the cost of a remedy comparative with proponent resources; (2) existing technology; and (3) logistics in light of overall project purposes) avoidance and minimization measures are incorporated, and take is still likely.
The Service should develop a national allocation process that includes prioritization of significant infrastructure and public works projects, such as highways.	We believe the prioritization provisions in the regulation for projects to promote and maintain public health and safety will largely meet the concerns expressed by the commenter. In addition, if the number of applicants for permits reaches a level the Region considers high enough to make a formal allocation process necessary, each Service Region may do so.
The process by which Service Regions allocate permits must be developed through consultations with stakeholders.	Each Service Region will work with stakeholders on permit allocation if the Region deems it necessary.

Comment	Response
The DEA statement "tracking the proportion of immature breeders drawn from the floating population can be used as an early warning sign of population decline" is erroneous for 3 reasons: 1) not enough tracking of immature breeders, and 2) floater population can go down in very healthy populations because of rapid population expansion, and (3) the population may already be in dramatic decline when immature breeders are detected. Adult turnover is a more reliable indicator.	We have revised the wording the DEA on this point. However, the underlying statement is correct. Changes in the floater to breeder ratio, if they can be assessed, are a good early indicator of changes in the population. We agree that changes in adult turnover also would be excellent indicators of population stability. They are, however, also difficult to assess on a large scale. In addition, the language in question was in the discussion of the biology of raptors in Chapter 3, the "Affected Environment", and was not in the section of the document that outlined the proposed actions and how we intend to manage the program Chapter 2, "Alternatives".
The data relied upon in the DEA are questionable (e.g., Audubon knows of five nests taken in Region 4 during the period in which the DEA, Table 2 (pg. 55) says there were none.)	We agree with the comment. However, the data in question apply to take of bald eagle nests authorized under the ESA, for which we do not have detailed information. We have revised the table accordingly.
It is unclear how mortality will be factored into the take thresholds and under what circumstances TRM will be triggered (pg. 25).	For the models in the EA, we assumed worst case in every circumstance. Issuance of a nest site "disturb" permit, for example, would result in a complete loss of production from that nest for the year. Thus, the permits all account for mortality or loss of production. To specifically respond to the question of a "trigger" for TRM, it would occur when we determine that mortality is likely to occur, even with implementation of all achievable avoidance and minimization measures.

Comment	Response
The permanent loss of a nest site in FL could have larger impacts than is indicated in Table C.3 because of limited unoccupied nesting habitat. Also, the EA doesn't factor in the quality of the territory. FL is doing a study (available after September 26) comparing core nesting territories with other nesting areas (productivity, re-activation, persistence, etc.), and the study should be considered for the EA.	We agree that loss of a territory could affect a population. However, for most permits, we do not expect a nest to be lost.. We also believe the provisions of the programmatic permits and the enhanced coordination forums would meet the concerns expressed in the comment by developing protocols for adjusting thresholds based on the quality of the territory. Given the time constraints of the FEA, the results of the State-contracted study offered, when provided to us, will be incorporated into the workings and considerations of the enhanced coordination process.
The take thresholds may make it difficult or impossible in some high-activity areas for resource developers to get permits. The rule should provide that a certain portion of the available take permits be allocated for resource development projects, or exceptions should be made in some cases to make permits available above and beyond the take thresholds.	The Final Rule has included, for golden eagles, a third priority for take of inactive nests for resource recovery activity areas. Therefore, resource development his prioritized to the degree that is necessary for public health and safety, i.e., to provide a public benefit. Furthermore, the provisions for the two programmatic permits would allow activities to proceed, if the standard practices adopted as permit conditions will result in a net reduction in take or a net take of zero, and no net loss to the breeding population. Because, in each Service Region, our objective is for stable or increasing breeding populations, we will not issue more permits than we believe a population can sustain.
The number of OR bald eagles estimated in Table C.3 is too high; recent surveys indicate no more than 500 nesting pairs in OR. Also, the fledging rate has averaged 0.97 from 1971- 2006 (0.99 in 2006), whereas the DEA uses 1.3. The result is too high a take threshold for bald eagles in Oregon.	The assessment was based on the number of nests reported to the Service by the State of Oregon. The assessment is not intended to evaluate take at the State level. However, we have adjusted the vital rate values for the regional population to reflect the information provided.

Comment	Response
Most golden eagles that nest in the east migrate through a narrow bottleneck. There could be significant take including TRM of golden eagles due to siting of wind turbines along the major migration corridor. We need to be careful not to grant programmatic permits for wind development that could result in cumulative loss.	We will not issue programmatic permits for wind-power developments unless the applicants can demonstrate that there will be no net loss for the species.
New York's mapped bald eagle nests represent fewer territories than is presented in the DEA because as many as six nests may belong to a single territory. This makes the take thresholds too high; a smaller fraction should be used as the multiplier. How was the DEA number arrived at?	For nesting pairs, the permit issuance will be for activities around nests, not around territories. Should a proposed activity affect more than one nest, or result in abandonment of a territory, permitting for the activity will need to be carefully considered. If a permit for disturbance resulting in territory abandonment is issued, the allocation for that take would be higher, and may be incurred for several subsequent years, until there is data showing the local area breeding population is at the same level as it was at the time the permit was issued.
The juvenile survival rate for bald eagles of 0.77 used in the DEA is too high. (Various studies are cited.) Instead of using Florida's rate, why not use Millsap's model and use the midpoints of ranges reported in the Birds of North America accounts for annual juvenile survival?	The Millsap and Allen (2006) paper attempted to assess take for species for which there was little published information. However, we believe that, especially for bald eagles, the survival values used in the model are representative – especially given the expansion of the population in the U.S.

Comment	Response
Productivity in NY has never been as high as the 1.45 figure used in the DEA for the mid-Atlantic states. Historically, it's been much lower, and even in the past decade averaged only 1.28.	In the DEA we used data provided by our Ecological Services offices. The difference in productivity cited for New York makes little difference in the result of the modeling, but we have factored it into the final application of the model. In addition, we believe the provisions of the programmatic permits and the enhanced coordination forums would meet the concerns underlying the comment. In addition, a State or tribe can be more restrictive and allow no or less take on lands under its jurisdiction.
The DEA does not explain how the "predicted population size" used on Table C.3 was calculated.	The "predicted population size" is the result of assessing the outcome of the population model after many years of issuance of permits. As specified in the footnotes in Table C.3., predicted population size was calculated using demographic model described in Millsap and Allen (2006). Unless otherwise specified, demographic data used come from Millsap et al. (2004) from a satellite-tagged eagle study in Florida: Adult survival = 0.83, subadult survival = 0.88, juvenile survival = 0.77, and number of young fledged per occupied territory = 1.3.
The potential elimination of one quarter of the annual production (1/2 MSY), while defensible with the adopted values, appears indefensible logically. The Millsap paper uses a cap of 5%; why was that abandoned?	We are no longer using ½ MSY as our permit threshold. The preferred alternative in the Final EA (applying an initial 5% cap on take of annual productivity for bald eagles and an initial 0% cap for take of golden eagles above the historical baseline) is more conservative than Millsap and Allen (2006) proposed for falconry take.

Comment	Response
Lower permit thresholds should be established in areas with higher levels of uncertainty.	Because, at this time, there is uncertainty regarding many factors, we cannot accurately distinguish between degrees or levels of uncertainty in different locations. However, the preferred alternative in the Final EA recognizes and provides mitigation measures (structured coordination and a national golden eagle conservation and management plan) to help us better address the uncertainty in information at multiple scales. It also sets lower disturb and take permit thresholds than were proposed in the Draft EA.
The Service should use the Raptor Population Index as part of its monitoring efforts.	We agree that the index may be very helpful in assessing population trends. However, it is not applicable in making decisions about eagle permit issuance because it does not provide information with the resolution or precision required for permit issuance decisions.
The proposal will not ensure long-term preservation of eagles due to lack of meaningful monitoring, enforcement, and penalty provisions. Instead of improving enforcement the Service proposes to address ongoing, unlawful take by making it lawful, and then relying on the good faith of the permittee to comply.	We understand the concern, but disagree with the conclusion. The action will not make unlawful take legal. Through the modeling effort, we recognize that unauthorized take occurs, and therefore limit additional mortality. However, the permits for TRM will be earned, not witlessly distributed. We believe that implementation of these permits will indirectly improve the ability of the Service Law Enforcement to enforce the Eagle Act by establishing known and achievable performance standards for avoidance and minimization of take. Ongoing take will remain unlawful and subject to prosecution unless a permit is obtained authorizing that take.

Comment	Response
Alternative 3 of the DEA is the one that results in the most take; therefore it is not the environmentally-preferred alternative.	The preferred alternative is the best choice for meeting the Service's obligations to both protect eagles and work with landowners and government agencies. It also provides the most comprehensive tools for reducing unregulated take. Therefore, we believe it is the environmentally preferred alternative.
The EA should provide 1. Detailed requirements of alternate habitat and mitigation; 2. Determination of immediate threat of active nest on an airport; 3. Need for case-by-case determinations as opposed to programmatic nest permits; and 4. Active nest removal permit issuance for airports if the Regional take threshold has already been exceeded.	The details requested by the commenter lie more appropriately within the implementation guidance, for which we will request input, review, and comment. Regarding the last item, although more specifics will be developed, if the nest removal is determined to be an emergency, safety-related take without which eagles would also be harmed, the take may not need to come off the allocation threshold.
The WEST survey yields flawed estimates of golden eagle population size because eagle detectability is not measured and corrected for in the final product.	The criticism is incorrect. The WEST survey actually employs two approaches to account for detectability bias. First, the survey uses standard line-transect sampling methods to correct for both availability and perception biases in eagle detectability. Second, because there are some situations in which line-transect sampling methods are flawed, the WEST survey also employs a double-counting, or mark-recapture, sampling element. This sampling method provides a measure of the proportion of eagles missed in the survey by having two independent observers conduct counts on one side of the aircraft simultaneously. The two detectability estimation procedures are merged in the final WEST analysis by employing a mark-recapture distance analysis approach. The result is a highly robust estimate of population size (and confidence limits) that accounts for detectability bias in the survey.

Comment	Response
The Service has inappropriately used trend data in our population model to calculate golden eagle take thresholds.	The comment is inaccurate. The Service uses data from the WEST survey in its golden eagle demographic models. While it is true that an objective of that survey is, over a number of years, to estimate golden eagle population trends, the survey is designed to yield annual population size estimates and confidence limits for golden eagles for each sampled BCR. It is these population size estimates and associated age ratios that are incorporated into the Service's demographic models, not the trend data. Further, the Service uses the demographic model-generated estimate of lambda as our gauge of the trend, and thus ability to support take, of golden eagle populations, not the observed trend from the WEST survey.

DIVISION OF MIGRATORY BIRD MANAGEMENT