Dave Kubeczko - DNR

From: Dave Kubeczko - DNR
Sent: Wednesday, November 04, 2015 5:42 PM
To: dave.kubeczko@state.co.us
Subject: FW: Eagle information from Catamount
Attachments: Eagle use at Lemke Well location.pdf; Attachment 2 - CDOW Raptor Buffer Guidelines 02_2008.pdf; NationalBaldEagleManagementGuidelines.pdf; RAPTOR_OGCC_Testimony.pdf; Piedra River Pipeline project_Final.pdf

Categories: CPW Wildlife Information

Scan No 2107673 WILDLIFE INFORMATION 2A#400876120

From: Magee - DNR, Brian [mailto:brian.magee@state.co.us]
Sent: Thursday, September 24, 2015 3:36 PM
To: Dave Kubeczko - DNR
Cc: Greg Deranleau - DNR; Jon Holst - DNR; John Noto - DNR; creed_clayton@fws.gov; Michael Warren - DNR
Subject: Re: Eagle information from Catamount

Dave-

If I understand you correctly, you have not seen any survey data or a CPW letter regarding eagle roosting in the project area that you referenced on the call? It perplexing that without this information that you could make any judgments about the potential impacts to the eagle roost from drilling during the roosting season. We (CPW) certainly can not evaluate a third party data set without reviewing it first, and we can't ascertain whether or not a CPW comment letter is being correctly interpreted if a copy of the letter cannot be provided for our review.

As a policy CPW does not comment on SUIT projects on SUIT lands.

I have reviewed the information provided by Catamount to the COGCC in the email below. Attached is a map of eagle use activities mapped by CPW. In many instances these activity layers are created through decades of observations. As you can see the proposed well location is in an area mapped as Bald Eagle winter concentration area, Winter foraging range, and summer foraging range, and is within approximately 1000ft of a mapped winter roost site. Below are the definitions of those map layers.

> **WINTER CONCENTRATION AREA:** Areas (tree, islands, etc) within an existing winter range where eagles concentrate between November 15 and April 1. These areas may be associated with roost sites.
> **SUMMER FORAGING RANGE:** Foraging areas frequented by breeding bald eagles from November 15 to July 30. These areas are almost always associated with nesting pairs.
> **WINTER FORAGING RANGE:** Foraging areas frequented by wintering bald eagles between November 15 and March 15. May be a large area radiating from preferred roosting sites. In western Colorado preferred roosting sites are within dominant riparian zones.

Additionally attached are CPW raptor buffer guidelines for your review. Below is the excerpt on CPW recommendations for a winter night roost.

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

I have also included a copy of the USFWS National Bald eagle Guidelines referenced in the COGCC correspondence- It is helpful to have all the information to take into account the whole picture of the USFWS recommendations not just the excerpt provided to the COGCC. As you had some questions about jurisdiction, I have highlighted relevant sections where the USFWS notes that the States may have more restrictive recommendations (CPW buffer guidelines) and additional regulations and laws to benefit eagle conservation (e.g. H.B.1298). Please note CPW raptor buffer recommendations are intended to help avoid violations of the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Because the CPW recommendations do not constitute any release of liability from compliance with Federal law we recommend consulting with the U.S. Fish and Wildlife Service for additional information.

Also, attached is CPW(CDOW) written testimony to the COGCC on raptors during the promulgation of 1298 Rule making. This may be useful to you as it provides the scientific and professional expertise and background provided by CPW, and may shed some light as to why eagle roosts were included in the 1298 Rules.

Finally, attached is a CDOW letter written in 2009 with respect to a county land use request for the construction of a pipeline along the Piedra River. Please note that I believe this project area includes the same Section where the proposed Lamke well is located. I've attached it primarily to illustrate that we have been concerned about Winter eagles in this area. However, it is also a beneficial reminder that there may be some other Threatened and Endangered species issues (Yellow billed cuckoo, SW willow flycatcher, NM meadow jumping mouse) associated with the riparian area of the Piedra River at the proposed well location. It also highlights CPW recommendations for mule deer critical winter range, elk winter concentration area, and elk production areas (all SWH) located at the proposed well location.

I would request that you attach these documents to the permit, so that COGCC has a least some idea of CPW wildlife concerns at the proposed location given that we were unable to complete a consultation with the operator and landowner due to a landowner consultation waiver.

I highly recommend that the operator contact the USFWS for more information regarding federally protected species (Bald eagles, NM meadow jumping mouse, YB Cuckoo, SW willow flycatcher).

I don't think anyone expects you or anyone else at COGCC to be a biological expert on wildlife issues in Colorado. Clearly that is CPW's role. If you would like any additional information please don't hesitate to contact me.

Thanks,

Brian

On Wed, Sep 23, 2015 at 3:43 PM, Dave Kubeczko - DNR <dave.kubeczko@state.co.us> wrote:

No. Tegre Corporation did the report (and had the letter from CPW); not sure if it would be a public document since I believe it was done for the SUIT. Peter Jensen was the consultant.

If you have any questions, please do not hesitate to call me at (970) 309-2514 (cell), or email. Thanks.

Dave

David A. Kubeczko, PG
Oil and Gas Location Assessment Specialist
Western Colorado

COLORADO
Oil & Gas Conservation Commission
Department of Natural Resources

Colorado Oil & Gas Conservation Commission
Northwest Area Office
796 Megan Avenue, Suite 201
Rifle, CO 81650
FAX: (970) 625-5682
Cell: (970) 309-2514
dave.kubeczko@state.co.us | www.colorado.gov/cogcc

Please consider the environment before printing this e-mail

From: Deranleau - DNR, Greg [mailto:greg.deranleau@state.co.us]
Sent: Wednesday, September 23, 2015 12:36 PM
To: Brian Magee
Cc: Jon Holst; John Noto - DNR; Dave Kubeczko
Subject: Re: Eagle information from Catamount

I do not have the report or referenced correspondence.

Dave, do you?
Greg

Sent from my mobile device.

On Sep 23, 2015 11:30 AM, "Magee - DNR, Brian" <brian.magee@state.co.us> wrote:

Greg-

Can you send me the survey report that they reference in #2 so that I can get the whole picture of the argument they are trying to make, and a copy of any CPW/CDOW letters/correspondence that was referenced on our call this morning.

Thanks,

Brian

On Wed, Sep 23, 2015 at 9:27 AM, Deranleau - DNR, Greg <greg.deranleau@state.co.us> wrote:

Brian,

Please review the following information from Catamount regarding the Lamke site

Eagle Roosting

There are three considerations which we believe make the requirement to impose timing and activity restrictions due to a State Wildlife Habitat polygon within about 1,000 feet of the proposed well pad unnecessary. They are as follows:

1) USFWS NATIONAL BALD EAGLE MANAGEMENT GUIDELINES USFWS; May 2007. gives buffer distances for nests of 330 feet and 660 feet. ¼ mile is excessive when multiple buffers exist between the activity and the roost area (River, residence, tree screens). Furthermore the USFWS document provides the following guidelines for roosts:

Pg 14.
RECOMMENDATIONS FOR AVOIDING DISTURBANCE AT FORAGING AREAS AND COMMUNAL ROOST SITES
1. Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.
From our knowledge of the area and in our estimation, the proposed well pad will not be within a direct flight path to foraging areas.
2. Locate long-term and permanent water-dependent facilities, such as boat ramps and marinas, away from important eagle foraging areas.
The proposed well pad is not known to be within a foraging area from our background and a previous foraging area survey in the Piedra drainage.
3. Avoid recreational and commercial boating and fishing near critical eagle foraging areas during peak feeding times (usually early to mid-morning and late afternoon), except where eagles have demonstrated tolerance to such activity.
See above #2
4. Do not use explosives within ½ mile (or within 1 mile in open areas) of communal roosts when eagles are congregating, without prior coordination with the U.S. Fish and Wildlife Service and your state wildlife agency.

No explosives will be utilized for this project.
5. Locate aircraft corridors no closer than 1,000 feet vertical or horizontal distance from communal roost sites.
The well pad would result in less on-going noise and general disturbance than an aircraft corridor and we are just within 1,000 ft.

2) The identified night roost is not known to be active from surveys for other nearby projects. Eagle nest, foraging, and roost surveys throughout the project area vicinity, both in the Piedra and San Juan arms were conducted during wintering periods from 2009 through April of 2012. The area encompassed by the mapped polygon was not found to have eagle roosting, nesting, or foraging over the 3 large project periods that occurred in its proximity between November and May. No night roosts were identified in these areas over the course of the projects.

3) A visual screen will be retained between the well pad and river and overhanging trees will only be limbed maintaining a sufficient human visual screen to the mapped polygon.

--

Greg Deranleau

Environmental Manager

COLORADO
Oil & Gas Conservation Commission
Department of Natural Resources

P 303.894.2100 x5153

1120 Lincoln Street, Suite 801, Denver, CO 80203

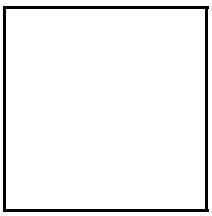
greg.deranleau@state.co.us | www.colorado.gov/cogcc

--

Brian Magee

Landuse Coordinator

Southwest Region



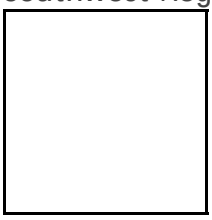
P 970.375.6707 | C 970.759.9587

415 Turner DR., Durango, CO 81303

brian.magee@state.co.us | cpw.state.co.us

--

Brian Magee
Landuse Coordinator
Southwest Region



P 970.375.6707 | C 970.759.9587
415 Turner DR., Durango, CO 81303
brian.magee@state.co.us | cpw.state.co.us

NATIONAL BALD EAGLE MANAGEMENT GUIDELINES

U.S. Fish and Wildlife Service

May 2007

TABLE OF CONTENTS

INTRODUCTION

The bald eagle (*Haliaeetus leucocephalus*) is protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The MBTA and the Eagle Act protect bald eagles from a variety of harmful actions and impacts. The U.S. Fish and Wildlife Service (Service) developed these National Bald Eagle Management Guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the Eagle Act may apply to their activities. A variety of human activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed, or raise young. The Guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute "disturbance," which is prohibited by the Eagle Act.

The Guidelines are intended to:

(1) Publicize the provisions of the Eagle Act that continue to protect bald eagles, in order to reduce the possibility that people will violate the law,

(2) Advise landowners, land managers and the general public of the potential for various human activities to disturb bald eagles, and

(3) Encourage additional nonbinding land management practices that benefit bald eagles (see Additional Recommendations section).

While the Guidelines include general recommendations for land management practices that will benefit bald eagles, the document is intended primarily as a tool for landowners and planners who seek information and recommendations regarding how to avoid disturbing bald eagles. Many States and some tribal entities have developed state-specific management plans, regulations, and/or guidance for landowners and land managers to protect and enhance bald eagle habitat, and we encourage the continued development and use of these planning tools to benefit bald eagles.

Adherence to the Guidelines herein will benefit individuals, agencies, organizations, and companies by helping them avoid violations of the law. However, the Guidelines themselves are not law. Rather, they are recommendations based on several decades of behavioral observations, science, and conservation measures to avoid or minimize adverse impacts to bald eagles.

The U.S. Fish and Wildlife Service strongly encourages adherence to these guidelines to ensure that bald and golden eagle populations will continue to be sustained. The Service realizes there may be impacts to some birds even if all reasonable measures are taken to avoid such impacts. Although it is not possible to absolve individuals and entities from liability under the Eagle Act or the MBTA, the Service exercises enforcement discretion to focus on those individuals, companies, or agencies that take migratory birds without regard for the consequences of their actions and the law, especially when conservation measures, such as these Guidelines, are available, but have not been implemented. The Service will prioritize its enforcement efforts to focus on those individuals or entities who take bald eagles or their parts, eggs, or nests without implementing appropriate measures recommended by the Guidelines.

The Service intends to pursue the development of regulations that would authorize, under limited circumstances, the use of permits if "take" of an eagle is anticipated but unavoidable. Additionally, if the bald eagle is delisted, the Service intends to provide a regulatory mechanism to honor existing (take) authorizations under the Endangered Species Act (ESA).

During the interim period until the Service completes a rulemaking for permits under the Eagle Act, the Service does not intend to refer for prosecution the incidental "*take*" of any bald eagle under the MBTA or Eagle Act, if such take is in full compliance with the terms and conditions of an incidental take statement issued to the action agency or applicant under the authority of section 7(b)(4) of the ESA or a permit issued under the authority of section 10(a)(1)(B) of the ESA.

The Guidelines are applicable throughout the United States, including Alaska. The primary purpose of these Guidelines is to provide information that will minimize or prevent violations only of *Federal* laws governing bald eagles. In addition to Federal laws, many states and some smaller jurisdictions and tribes have additional laws and regulations protecting bald eagles. In some cases those laws and regulations may be more protective (restrictive) than these Federal guidelines. If you are planning activities that may affect bald eagles, we therefore recommend that you contact both your nearest U.S. Fish and Wildlife Service Field Office (see the contact information on p.16) and your state wildlife agency for assistance.

LEGAL PROTECTIONS FOR THE BALD EAGLE

The Bald and Golden Eagle Protection Act

The Eagle Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal and civil penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb'' means:

> "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, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle=s return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

A violation of the Act can result in a criminal fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

The Migratory Bird Treaty Act
The MBTA (16 U.S.C. 703-712), prohibits the taking of any migratory bird or any part, nest, or egg, except as permitted by regulation. The MBTA was enacted in 1918; a 1972 agreement supplementing one of the bilateral treaties underlying the MBTA had the effect of expanding the scope of the Act to cover bald eagles and other raptors. Implementing regulations define "take" under the MBTA as "pursue, hunt, shoot, wound, kill, trap, capture, possess, or collect."

Copies of the Eagle Act and the MBTA are available at: http://permits.fws.gov/ltr/ltr.shtml.

State laws and regulations
Most states have their own regulations and/or guidelines for bald eagle management. Some states may continue to list the bald eagle as endangered, threatened, or of special concern. If you plan activities that may affect bald eagles, we urge you to familiarize yourself with the regulations and/or guidelines that apply to bald eagles in your state. Your adherence to the Guidelines herein does not ensure that you are in compliance with state laws and regulations because state regulations can be more specific and/or restrictive than these Guidelines.

NATURAL HISTORY OF THE BALD EAGLE

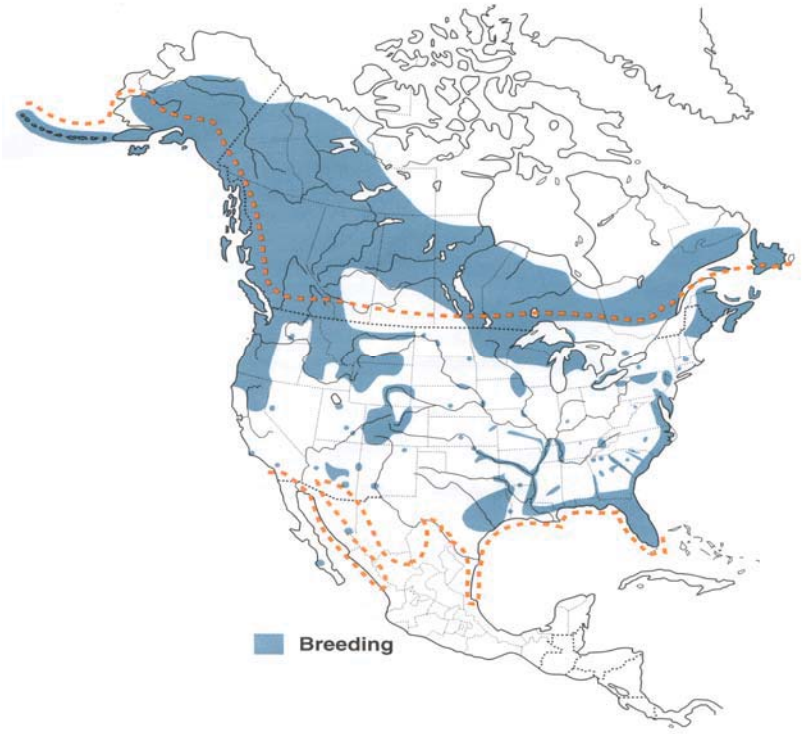
Bald eagles are a North American species that historically occurred throughout the contiguous United States and Alaska. After severely declining in the lower 48 States between the 1870s and the 1970s, bald eagles have rebounded and re-established breeding territories in each of the lower 48 states. The 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, 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. 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 sites where food is abundant and they often roost together communally. In some cases, concentration areas are used year-round: in summer by southern eagles and in winter by northern eagles.

Juvenile bald eagles have mottled brown and white plumage, gradually acquiring their dark brown body and distinctive white head and tail as they mature. Bald eagles generally attain adult plumage by 5 years of age. Most are capable of breeding at 4 or 5 years of age, but in healthy populations they may not start breeding until much older. Bald eagles may live 15 to 25 years in the wild. Adults weigh 8 to 14 pounds (occasionally reaching 16 pounds in Alaska) and have wingspans of 5 to 8 feet. Those in the northern range are larger than those in the south, and females are larger than males.

Where do bald eagles nest?

Breeding bald eagles occupy "territories," areas they will typically defend against intrusion by other eagles. In addition to the active nest, a territory may include one or more alternate nests (nests built or maintained by the eagles but not used for nesting in a given year). The Eagle Act prohibits removal or destruction of both active and alternate bald eagle nests. Bald eagles exhibit high nest site fidelity and nesting territories are often used year after year. Some territories are known to have been used continually for over half a century.

Bald eagles generally nest near coastlines, rivers, large lakes or streams that support an adequate food supply. They often nest in mature or old-growth trees; snags (dead trees); cliffs; rock promontories; rarely on the ground; and with increasing frequency on human-made structures such as power poles and communication towers. In forested areas, bald eagles often select the tallest trees with limbs strong enough to support a nest that can weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage. Shoreline trees or snags located in reservoirs provide the visibility and accessibility needed to locate aquatic prey. Eagle nests are constructed with large sticks, and may be lined with moss, grass, plant stalks, lichens, seaweed, or sod. Nests are usually about 4-6 feet in diameter and 3 feet deep, although larger nests exist.



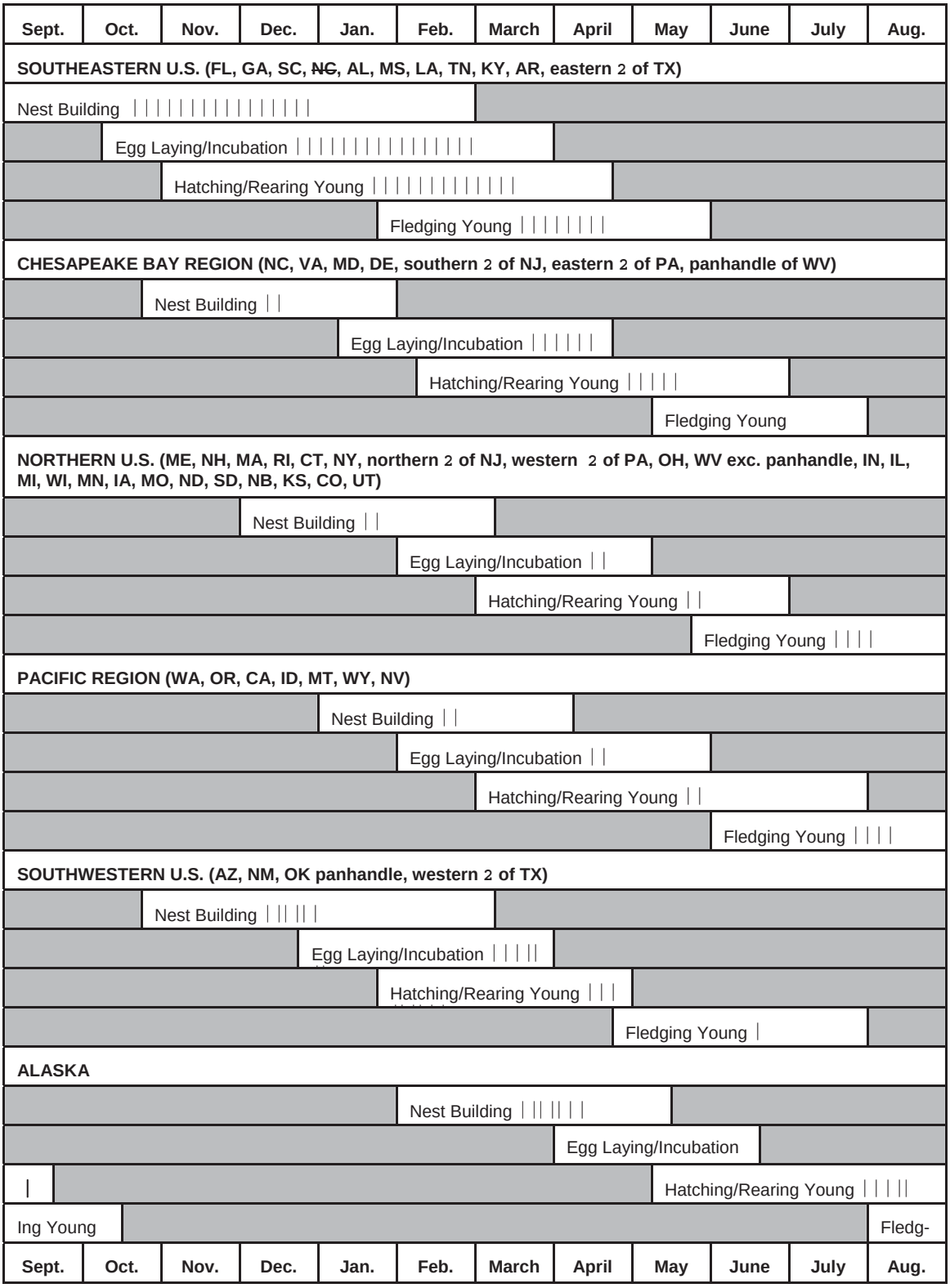
The range of breeding bald eagles in 2000 (shaded areas). This map shows only the larger concentrations of nests; eagles have continued to expand into additional nesting territories in many states. The dotted line represents the bald eagle's wintering range.

When do bald eagles nest?

Nesting activity begins several months before egg-laying. Egg-laying dates vary throughout the U.S., ranging from October in Florida, to late April or even early May in the northern United States. Incubation typically lasts 33-35 days, but can be as long as 40 days. Eaglets make their first unsteady flights about 10 to 12 weeks after hatching, and fledge (leave their nests) within a few days after that first flight. However, young birds usually remain in the vicinity of the nest for several weeks after fledging because they are almost completely dependent on their parents for food until they disperse from the nesting territory approximately 6 weeks later.

The bald eagle breeding season tends to be longer in the southern U.S., and re-nesting following an unsuccessful first nesting attempt is more common there as well. The following table shows the timing of bald eagle breeding seasons in different regions of the country. The table represents the range of time within which the majority of nesting activities occur in each region and does not apply to any specific nesting pair. Because the timing of nesting activities may vary within a given region, you should contact the nearest U.S. Fish and Wildlife Service Field Office (see page 16) and/or your state wildlife conservation agency for more specific information on nesting chronology in your area.

Chronology of typical reproductive activities of bald eagles in the United States.



How many chicks do bald eagles raise?
The number of eagle eggs laid will vary from 1-3, with 1-2 eggs being the most common. Only one eagle egg is laid per day, although not always on successive days. Hatching of young occurs on different days with the result that chicks in the same nest are sometimes of unequal size. The overall national fledging rate is approximately one chick per nest, annually, which results in a healthy expanding population.

What do bald eagles eat?
Bald eagles are opportunistic feeders. Fish comprise much of their diet, but they also eat waterfowl, shorebirds/colonial waterbirds, small mammals, turtles, and carrion. Because they are visual hunters, eagles typically locate their prey from a conspicuous perch, or soaring flight, then swoop down and strike. Wintering bald eagles often congregate in large numbers along streams to feed on spawning salmon or other fish species, and often gather in large numbers in areas below reservoirs, especially hydropower dams, where fish are abundant. Wintering eagles also take birds from rafts of ducks at reservoirs and rivers, and congregate on melting ice shelves to scavenge dead fish from the current or the soft melting ice. Bald eagles will also feed on carcasses along roads, in landfills, and at feedlots.

During the breeding season, adults carry prey to the nest to feed the young. Adults feed their chicks by tearing off pieces of food and holding them to the beaks of the eaglets. After fledging, immature eagles are slow to develop hunting skills, and must learn to locate reliable food sources and master feeding techniques. Young eagles will congregate together, often feeding upon easily acquired food such as carrion and fish found in abundance at the mouths of streams and shallow bays and at landfills.

The impact of human activity on nesting bald eagles
During the breeding season, bald eagles are sensitive to a variety of human activities. However, not all bald eagle pairs react to human activities in the same way. 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 pair. The relative sensitivity of bald eagles during various stages of the breeding season is outlined in the following table.

Nesting Bald Eagle Sensitivity to Human Activities

Phase	Activity	Sensitivity to Human Activity	Comments
I	Courtship and Nest Building	Most sensitive period; likely to respond negatively	Most critical time period. Disturbance is manifested in nest abandonment. Bald eagles in newly established territories are more prone to abandon nest sites.
II	Egg laying	Very sensitive period	Human activity of even limited duration may cause nest desertion and abandonment of territory for the breeding season.
III	Incubation and early nestling period (up to 4 weeks)	Very sensitive period	Adults are less likely to abandon the nest near and after hatching. However, flushed adults leave eggs and young unattended; eggs are susceptible to cooling, loss of moisture, overheating, and predation; young are vulnerable to elements.
IV	Nestling period, 4 to 8 weeks	Moderately sensitive period	Likelihood of nest abandonment and vulnerability of the nestlings to elements somewhat decreases. However, nestlings may miss feedings, affecting their survival.
V	Nestlings 8 weeks through fledging	Very sensitive period	Gaining flight capability, nestlings 8 weeks and older may flush from the nest prematurely due to disruption and die.

If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool too much and fail to hatch. Unattended eggs and nestlings are subject to predation. Young nestlings are particularly vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal human activity. During this period, until about six weeks after departure from the nest, the juveniles still depend on the adults to feed them.

The impact of human activity on foraging and roosting bald eagles

Disruption, destruction, or obstruction of roosting and foraging areas can also negatively affect bald eagles. Disruptive activities in or near eagle foraging areas can interfere with feeding, reducing chances of survival. Interference with feeding can also result in reduced productivity (number of young successfully fledged). Migrating and wintering bald eagles often congregate at specific sites for purposes of feeding and sheltering. Bald eagles rely on established roost sites because of their proximity to sufficient food sources. Roost sites are usually in mature trees where the eagles are somewhat sheltered from the wind and weather. Human activities near or within communal roost sites may prevent eagles

from feeding or taking shelter, especially if there are not other undisturbed and productive feeding and roosting sites available. Activities that permanently alter communal roost sites and important foraging areas can altogether eliminate the elements that are essential for feeding and sheltering eagles.

Where a human activity agitates or bothers roosting or foraging bald eagles to the degree that causes injury or substantially interferes with breeding, feeding, or sheltering behavior and causes, or is likely to cause, a loss of productivity or nest abandonment, the conduct of the activity constitutes a violation of the Eagle Act's prohibition against disturbing eagles. The circumstances that might result in such an outcome are difficult to predict without detailed site-specific information. If your activities may disturb roosting or foraging bald eagles, you should contact your local Fish and Wildlife Service Field Office (see page 16) for advice and recommendations for how to avoid such disturbance.

RECOMMENDATIONS FOR AVOIDING DISTURBANCE AT NEST SITES

In developing these Guidelines, we relied on existing state and regional bald eagle guidelines, scientific literature on bald eagle disturbance, and recommendations of state and Federal biologists who monitor the impacts of human activity on eagles. Despite these resources, uncertainties remain regarding the effects of many activities on eagles and how eagles in different situations may or may not respond to certain human activities. The Service recognizes this uncertainty and views the collection of better biological data on the response of eagles to disturbance as a high priority. To the extent that resources allow, the Service will continue to collect data on responses of bald eagles to human activities conducted according to the recommendations within these Guidelines to ensure that adequate protection from disturbance is being afforded, and to identify circumstances where the Guidelines might be modified. These data will be used to make future adjustments to the Guidelines.

To avoid disturbing nesting bald eagles, we recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees.

The size and shape of effective buffers vary depending on the topography and other ecological characteristics surrounding the nest site. In open areas where there are little or no forested or topographical buffers, such as in many western states, distance alone must serve as the buffer. Consequently, in open areas, the distance between the activity and the nest may need to be larger than the distances recommended under Categories A and B of these guidelines (pg. 12) if no landscape buffers are present. The height of the nest above the ground may also ameliorate effects of human activities; eagles at higher nests may be less prone to disturbance.

In addition to the physical features of the landscape and nest site, the appropriate size for the distance buffer may vary according to the historical tolerances of eagles to human activities in particular localities, and may also depend on the location of the nest in relation

to feeding and roosting areas used by the eagles. Increased competition for nest sites may lead bald eagles to nest closer to human activity (and other eagles).

Seasonal restrictions can prevent the potential impacts of many shorter-term, obtrusive activities that do not entail landscape alterations (e.g. fireworks, outdoor concerts). In proximity to the nest, these kinds of activities should be conducted only outside the breeding season. For activities that entail both short-term, obtrusive characteristics and more permanent impacts (e.g., building construction), we recommend a combination of both approaches: retaining a landscape buffer *and* observing seasonal restrictions.

For assistance in determining the appropriate size and configuration of buffers or the timing of activities in the vicinity of a bald eagle nest, we encourage you to contact the nearest U.S. Fish and Wildlife Service Field Office (see page 16).

Existing Uses

Eagles are unlikely to be disturbed by routine use of roads, homes, and other facilities where such use pre-dates the eagles' successful nesting activity in a given area. Therefore, in most cases *ongoing* existing uses may proceed with the same intensity with little risk of disturbing bald eagles. However, some *intermittent, occasional, or irregular* uses that pre-date eagle nesting in an area may disturb bald eagles. For example: a pair of eagles may begin nesting in an area and subsequently be disturbed by activities associated with an annual outdoor flea market, even though the flea market has been held annually at the same location. In such situations, human activity should be adjusted or relocated to minimize potential impacts on the nesting pair.

ACTIVITY-SPECIFIC GUIDELINES

The following section provides the Service=s management recommendations for avoiding bald eagle disturbance as a result of new or intermittent activities proposed in the vicinity of bald eagle nests. Activities are separated into 8 categories (A – H) based on the nature and magnitude of impacts to bald eagles that usually result from the type of activity. Activities with similar or comparable impacts are grouped together.

In most cases, impacts will vary based on the visibility of the activity from the eagle nest and the degree to which similar activities are already occurring in proximity to the nest site. Visibility is a factor because, in general, eagles are more prone to disturbance when an activity occurs in full view. For this reason, we recommend that people locate activities farther from the nest structure in areas with open vistas, in contrast to areas where the view is shielded by rolling topography, trees, or other screening factors. The recommendations also take into account the existence of similar activities in the area because the continued presence of nesting bald eagles in the vicinity of the existing activities indicates that the eagles in that area can tolerate a greater degree of human activity than we can generally expect from eagles in areas that experience fewer human impacts. To illustrate how these factors affect the likelihood of disturbing eagles, we have incorporated the recommendations for some activities into a table (categories A and B).

First, determine which category your activity falls into (between categories A – H). If the activity you plan to undertake is not specifically addressed in these guidelines, follow the recommendations for the most similar activity represented.

If your activity is under A or B, our recommendations are in table form. The vertical axis shows the degree of visibility of the activity from the nest. The horizontal axis (header row) represents the degree to which similar activities are ongoing in the vicinity of the nest. Locate the row that best describes how visible your activity will be from the eagle nest. Then, choose the column that best describes the degree to which similar activities are ongoing in the vicinity of the eagle nest. The box where the column and row come together contains our management recommendations for how far you should locate your activity from the nest to avoid disturbing the eagles. The numerical distances shown in the tables are the closest the activity should be conducted relative to the nest. In some cases we have included additional recommendations (other than recommended *distance* from the nest) you should follow to help ensure that your activity will not disturb the eagles.

Alternate nests

For activities that entail permanent landscape alterations that may result in bald eagle disturbance, these recommendations apply to both active and alternate bald eagle nests. Disturbance becomes an issue with regard to alternate nests if eagles return for breeding purposes and react to land use changes that occurred while the nest was inactive. The likelihood that an alternate nest will again become active decreases the longer it goes unused. If you plan activities in the vicinity of an alternate bald eagle nest and have information to show that the nest has not been active during the preceding 5 breeding seasons, the recommendations provided in these guidelines for avoiding disturbance around the nest site may no longer be warranted. The nest itself remains protected by other provisions of the Eagle Act, however, and may not be destroyed.

If special circumstances exist that make it unlikely an inactive nest will be reused before 5 years of disuse have passed, and you believe that the probability of reuse is low enough to warrant disregarding the recommendations for avoiding disturbance, you should be prepared to provide all the reasons for your conclusion, including information regarding past use of the nest site. Without sufficient documentation, you should continue to follow these guidelines when conducting activities around the nest site. If we are able to determine that it is unlikely the nest will be reused, we may advise you that the recommendations provided in these guidelines for avoiding disturbance are no longer necessary around that nest site.

This guidance is intended to minimize disturbance, as defined by Federal regulation. In addition to Federal laws, most states and some tribes and smaller jurisdictions have additional laws and regulations protecting bald eagles. In some cases those laws and regulations may be more protective (restrictive) than these Federal guidelines.

Temporary Impacts

For activities that have temporary impacts, such as the use of loud machinery, fireworks displays, or summer boating activities, we recommend seasonal restrictions. These types of activities can generally be carried out outside of the breeding season without causing disturbance. The recommended restrictions for these types of activities can be lifted for alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have hatched (depending on the distance between the alternate nest and the active nest).

In general, activities should be kept as far away from nest trees as possible; loud and disruptive activities should be conducted when eagles are not nesting; and activity between the nest and the nearest foraging area should be minimized. If the activity you plan to undertake is not specifically addressed in these guidelines, follow the recommendations for the most similar activity addressed, or contact your local U.S. Fish and Wildlife Service Field Office for additional guidance.

If you believe that special circumstances apply to your situation that increase or diminish the likelihood of bald eagle disturbance, or if it is not possible to adhere to the guidelines, you should contact your local Service Field Office for further guidance.

Category A:
Building construction, 1 or 2 story, with project footprint of ½ acre or less.
Construction of roads, trails, canals, power lines, and other linear utilities.
Agriculture and aquaculture – new or expanded operations.
Alteration of shorelines or wetlands.
Installation of docks or moorings.
Water impoundment.

Category B:
Building construction, 3 or more stories.
Building construction, 1 or 2 story, with project footprint of more than ½ acre.
Installation or expansion of marinas with a capacity of 6 or more boats.
Mining and associated activities.
Oil and natural gas drilling and refining and associated activities.

	If there is no similar activity within 1 mile of the nest	***If there is similar activity closer than 1 mile from the nest***
If the activity will be visible from the nest	660 feet. Landscape buffers are recommended.	660 feet, or as close as existing tolerated activity of similar scope. Landscape buffers are recommended.
If the activity will not be visible from the nest	Category A: 330 feet. Clearing, external construction, and landscaping between 330 feet and 660 feet should be done outside breeding season. Category B: 660 feet.	330 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping within 660 feet should be done outside breeding season.

The numerical distances shown in the table are the closest the activity should be conducted relative to the nest.

Category C. Timber Operations and Forestry Practices

- Avoid clear cutting or removal of overstory trees within 330 feet of the nest at any time.

- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have hatched.

- Selective thinning and other silviculture management practices designed to conserve or enhance habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season. Precautions such as raking leaves and woody debris from around the nest tree should be taken to prevent crown fire or fire climbing the nest tree. If it is determined that a burn during the breeding season would be beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree (i.e., at the beginning of, or end of, the breeding season, either before the particular nest is active or after the young have fledged from that nest). Appropriate Federal and state biologists should be consulted before any prescribed burning is conducted during the breeding season.

- Avoid construction of log transfer facilities and in-water log storage areas within 330 feet of the nest.

Category D. Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.

Category E. Motorized Watercraft use (including jet skis/personal watercraft). No buffer is necessary around nest sites outside the breeding season. During the breeding season, within 330 feet of the nest, (1) do not operate jet skis (personal watercraft), and (2) avoid concentrations of noisy vessels (e.g., commercial fishing boats and tour boats), except where eagles have demonstrated tolerance for such activity. Other motorized boat traffic passing within 330 feet of the nest should attempt to minimize trips and avoid stopping in the area where feasible, particularly where eagles are unaccustomed to boat traffic. Buffers for airboats should be larger than 330 feet due to the increased noise they generate, combined with their speed, maneuverability, and visibility.

Category F. Non-motorized recreation and human entry (e.g., hiking, camping, fishing, hunting, birdwatching, kayaking, canoeing). No buffer is necessary around nest sites outside the breeding season. If the activity will be visible or highly audible from the nest, maintain a 330-foot buffer during the breeding season, particularly where eagles are unaccustomed to such activity.

Category G. Helicopters and fixed-wing aircraft.
Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1,000 feet of the nest during the breeding season, except where eagles have demonstrated tolerance for such activity.

Category H. Blasting and other loud, intermittent noises.
Avoid blasting and other activities that produce extremely loud noises within 1/2 mile of active nests, unless greater tolerance to the activity (or similar activity) has been demonstrated by the eagles in the nesting area. This recommendation applies to the use of fireworks classified by the Federal Department of Transportation as Class B explosives, which includes the larger fireworks that are intended for licensed public display.

RECOMMENDATIONS FOR AVOIDING DISTURBANCE AT FORAGING AREAS AND COMMUNAL ROOST SITES

1. Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.

2. Locate long-term and permanent water-dependent facilities, such as boat ramps and marinas, away from important eagle foraging areas.

3. Avoid recreational and commercial boating and fishing near critical eagle foraging areas during peak feeding times (usually early to mid-morning and late afternoon), except where eagles have demonstrated tolerance to such activity.

4. Do not use explosives within ½ mile (or within 1 mile in open areas) of communal roosts when eagles are congregating, without prior coordination with the U.S. Fish and Wildlife Service and your state wildlife agency.

5. Locate aircraft corridors no closer than 1,000 feet vertical or horizontal distance from communal roost sites.

ADDITIONAL RECOMMENDATIONS TO BENEFIT BALD EAGLES

The following are additional management practices that landowners and planners can exercise for added benefit to bald eagles.

1. Protect and preserve potential roost and nest sites by retaining mature trees and old growth stands, particularly within ½ mile from water.

2. Where nests are blown from trees during storms or are otherwise destroyed by the elements, continue to protect the site in the absence of the nest for up to three (3) complete breeding seasons. Many eagles will rebuild the nest and reoccupy the site.

3. To avoid collisions, site wind turbines, communication towers, and high voltage transmission power lines away from nests, foraging areas, and communal roost sites.

4. Employ industry-accepted best management practices to prevent birds from colliding with or being electrocuted by utility lines, towers, and poles. If possible, bury utility lines in important eagle areas.

5. Where bald eagles are likely to nest in human-made structures (e.g., cell phone towers) and such use could impede operation or maintenance of the structures or jeopardize the safety of the eagles, equip the structures with either (1) devices engineered to discourage bald eagles from building nests, or (2) nesting platforms that will safely accommodate bald eagle nests without interfering with structure performance.

6. Immediately cover carcasses of euthanized animals at landfills to protect eagles from being poisoned.

7. Do not intentionally feed bald eagles. Artificially feeding bald eagles can disrupt their essential behavioral patterns and put them at increased risk from power lines, collision with windows and cars, and other mortality factors.

8. Use pesticides, herbicides, fertilizers, and other chemicals only in accordance with Federal and state laws.

9. Monitor and minimize dispersal of contaminants associated with hazardous waste sites (legal or illegal), permitted releases, and runoff from agricultural areas, especially within watersheds where eagles have shown poor reproduction or where bioaccumulating contaminants have been documented. These factors present a risk of contamination to eagles and their food sources.

CONTACTS

The following U.S. Fish and Wildlife Service Field Offices provide technical assistance on bald eagle management:

Alabama	Daphne	(251) 441-5181
Alaska	Anchorage	(907) 271-2888
	Fairbanks	(907) 456-0203
	Juneau	(907) 780-1160
Arizona	Phoenix	(602) 242-0210
Arkansas	Conway	(501) 513-4470
California	Arcata	(707) 822-7201
	Barstow	(760) 255-8852
	Carlsbad	(760) 431-9440
	Red Bluff	(530) 527-3043
	Sacramento	(916) 414-6000
	Stockton	(209) 946-6400
	Ventura	(805) 644-1766
	Yreka	(530) 842-5763
Colorado	Lakewood	(303) 275-2370
	Grand Junction	(970) 243-2778
Connecticut	(See New Hampshire)	
Delaware	(See Maryland)	
Florida	Panama City	(850) 769-0552
	Vero Beach	(772) 562-3909
	Jacksonville	(904) 232-2580
Georgia	Athens	(706) 613-9493
	Brunswick	(912) 265-9336
	Columbus	(706) 544-6428
Idaho	Boise	(208) 378-5243
	Chubbuck	(208) 237-6975
Illinois/Iowa	Rock Island	(309) 757-5800
Indiana	Bloomington	(812) 334-4261
Kansas	Manhattan	(785) 539-3474
Kentucky	Frankfort	(502) 695-0468
Louisiana	Lafayette	(337) 291-3100
Maine	Old Town	(207) 827-5938
Maryland	Annapolis	(410) 573-4573
Massachusetts	(See New Hampshire)	
Michigan	East Lansing	(517) 351-2555
Minnesota	Bloomington	(612) 725-3548
Mississippi	Jackson	(601) 965-4900
Missouri	Columbia	(573) 234-2132
Montana	Helena	(405) 449-5225
Nebraska	Grand Island	(308) 382-6468
Nevada	Las Vegas	(702) 515-5230
	Reno	(775) 861-6300
New Hampshire	Concord	(603) 223-2541
New Jersey	Pleasantville	(609) 646-9310
New Mexico	Albuquerque	(505) 346-2525
New York	Cortland	(607) 753-9334
	Long Island	(631) 776-1401
North Carolina	Raleigh	(919) 856-4520
	Asheville	(828) 258-3939
North Dakota	Bismarck	(701) 250-4481
Ohio	Reynoldsburg	(614) 469-6923
Oklahoma	Tulsa	(918) 581-7458
Oregon	Bend	(541) 383-7146
	Klamath Falls	(541) 885-8481
	La Grande	(541) 962-8584
	Newport	(541) 867-4558
	Portland	(503) 231-6179
	Roseburg	(541) 957-3474
Pennsylvania	State College	(814) 234-4090
Rhode Island	(See New Hampshire)	
South Carolina	Charleston	(843) 727-4707
South Dakota	Pierre	(605) 224-8693
Tennessee	Cookeville	(931) 528-6481
Texas	Clear Lake	(281) 286-8282
Utah	West Valley City	(801) 975-3330
Vermont	(See New Hampshire)	
Virginia	Gloucester	(804) 693-6694
Washington	Lacey	(306) 753-9440
	Spokane	(509) 891-6839
	Wenatchee	(509) 665-3508
West Virginia	Elkins	(304) 636-6586
Wisconsin	New Franken	(920) 866-1725
Wyoming	Cheyenne	(307) 772-2374
	Cody	(307) 578-5939

National Office
U.S. Fish and Wildlife Service
Division of Migratory Bird Management
4401 North Fairfax Drive, MBSP-4107
Arlington, VA 22203-1610
(703) 358-1714
http://www.fws.gov/migratorybirds

State Agencies

To contact a state wildlife agency, visit the Association of Fish & Wildlife Agencies' website at http://www.fishwildlife.org/where_us.html

GLOSSARY

The definitions below apply to these National Bald Eagle Management Guidelines:

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

Disturb – To agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

In addition to immediate impacts, this definition also covers impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle=s return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

Fledge – To leave the nest and begin flying. For bald eagles, this normally occurs at 10-12 weeks of age.

Fledgling – A juvenile bald eagle that has taken the first flight from the nest but is not yet independent.

Foraging area – An area where eagles feed, typically near open water such as rivers, lakes, reservoirs, and bays where fish and waterfowl are abundant, or in areas with little or no water (i.e., rangelands, barren land, tundra, suburban areas, etc.) where other prey species (e.g., rabbit, rodents) or carrion (such as at landfills) are abundant.

Landscape buffer – A natural or human-made landscape feature that screens eagles from human activity (e.g., strip of trees, hill, cliff, berm, sound wall).

Nest – A structure built, maintained, or used by bald eagles for the purpose of reproduction. An **active** nest is a nest that is attended (built, maintained or used) by a pair of bald eagles during a given breeding season, whether or not eggs are laid. An **alternate** nest is a nest that is not used for breeding by eagles during a given breeding season.

Nest abandonment – Nest abandonment occurs when adult eagles desert or stop attending a nest and do not subsequently return and successfully raise young in that nest for the duration of a breeding season. Nest abandonment can be caused by altering habitat near a nest, even if the alteration occurs prior to the breeding season. Whether the eagles migrate during the non-breeding season, or remain in the area throughout the non-breeding season, nest abandonment can occur at any point between the time the eagles return to the nesting site for the breeding season and the time when all progeny from the breeding season have

dispersed.

Project footprint – The area of land (and water) that will be permanently altered for a development project, including access roads.

Similar scope – In the vicinity of a bald eagle nest, an existing activity is of similar scope to a new activity where the types of impacts to bald eagles are similar in nature, and the impacts of the existing activity are of the same or greater magnitude than the impacts of the potential new activity. Examples: (1) An existing single-story home 200 feet from a nest is similar in scope to an additional single-story home 200 feet from the nest; (2) An existing multi-story, multi-family dwelling 150 feet from a nest has impacts of a greater magnitude than a potential new single-family home 200 feet from the nest; (3) One existing single-family home 200 feet from the nest has impacts of a lesser magnitude than three single-family homes 200 feet from the nest; (4) an existing single-family home 200 feet from a communal roost has impacts of a lesser magnitude than a single-family home 300 feet from the roost but 40 feet from the eagles' foraging area. The existing activities in examples (1) and (2) are of similar scope, while the existing activities in example (3) and (4) are not.

Vegetative buffer – An area surrounding a bald eagle nest that is wholly or largely covered by forest, vegetation, or other natural ecological characteristics, and separates the nest from human activities.

RELATED LITERATURE

Andrew, J.M. and J.A. Mosher. 1981. Bald eagle nest site selection and nesting habitat in Maryland. Journal of Wildlife Management 46:382-390.

Anonymous. 1977. Bald Eagle Habitat Management Guidelines, Forest Service – California Region. U.S Forest Service, San Francisco, CA.

Anthony, R.G. 2001. Low productivity of bald eagles on Prince of Wales Island, southeast Alaska. Journal of Raptor Research 35:1-8.

Anthony, R.G., R.W. Frenzel, F.B. Isaacs, and M.G. Garrett. 1994. Probable causes of nesting failures in Oregon's bald eagle population. Wildlife Society Bulletin 22:576-582.

Anthony, R.G. and F.B. Isaacs. 1989. Characteristics of bald eagle nest sites in Oregon. Journal of Wildlife Management 53:148-158.

Arizona Game and Fish Department. 1999. Bald Eagle Conservation Assessment and Strategy (draft).

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute, Raptor Research Foundation, Washington, D.C.

Bangs, E.E., T.N. Bailey and V.D. Berns. Ecology of nesting bald eagles on the Kenai National Wildlife Refuge, Alaska. (USFWS staff)

Becker, J.M. 2002. Response of wintering bald eagles to industrial construction in southeastern Washington. Wildlife Society Bulletin 30:875-878.

Brauning, D.W. and J.D. Hassinger. 2000. Pennsylvania Recovery and Management Plan for the Bald Eagle (draft). Pennsylvania Game Commission. Harrisburg, PA.

Brown, B.T., G.S. Mills, C. Powels, W.A. Russell, G.D. Therres and J.J. Pottie. 1999. The influence of weapons-testing noise on bald eagle behavior. Journal of Raptor Research 33:227-232.

Brown, B.T. and L.E. Stevens. 1997. Winter bald eagle distribution is inversely correlated with human activity along the Colorado River, Arizona. Journal of Raptor Research31:7-10.

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*). *In* The Birds of North America, No. 506 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Buehler, D.A., T.J. Mersmann, J.D. Fraser, and J.K.D. Seegar. 1991. Effects of human activity on bald eagle distribution on the northern Chesapeake Bay. Journal of Wildlife Management 55:282-290.

Buehler, D.A., T.J. Mersmann, J.D. Fraser, and J.K.D. Seegar. 1991. Nonbreeding bald eagle communal and solitary roosting behavior and roost habitat on the northern Chesapeake Bay. Journal of Wildlife Management 55:273-281.

Chandler, SK., J.D. Fraser, D.A. Buehler and J.K.D. Seegar. 1995. Perch trees and shoreline development as predictors of bald eagle distribution on the Chesapeake Bay. Journal of Wildlife Management 59:325-332.

Cline, K. 1985. Bald Eagles in the Chesapeake: A Management Guide for Landowners. National Wildlife Federation. Washington, D.C.

Dell, D.D. and P.J. Zwank. 1986. Impact of a high-voltage transmission line on a nesting pair of southern bald eagles in southeast Louisiana. Journal of Raptor Research 20(3/4):117-119.

Dunwiddie, P.W. and R.C. Kuntz. 2001. Long-term trends of bald eagles in winter on the Skagit River, Washington. Journal of Wildlife Management 65(2):290-299.

Fletcher, R.J. et. al. 1999. Effects of recreational trails on wintering diurnal raptors along riparian corridors in a Colorado grassland. Journal of Raptor Research 33(3):233-239.

Fraser, J.D. 1981. The breeding biology and status of the bald eagle on the Chippewa National Forest. PhD. Dissertation, University of Minnesota.

Fraser, J.D., LD. Frenzel and J.E. Mathisen. 1985. The impact of human activities on breeding bald eagles in north-central Minnesota. Journal of Wildlife Management 49(3):585-592.

Garrett, M.G., J.W. Watson, and R.G. Anthony. 1993. Bald eagle home range and habitat use in the Columbia River Estuary. Journal of Wildlife Management 57(1):19-27.

Gerrard J.M. and G.R. Bortolotti. 1988. The Bald Eagle: Haunts and Habits of a Wilderness Monarch. Smithsonian Institution Press. Washington, D.C.

Grier, J.W. 1969. Bald eagle behavior and productivity responses to climbing to nests. Journal of Wildlife Management 33:961-966.

Grier, J.W. and J.E. Guinn. 2003. Bald eagle habitats and responses to human disturbance in Minnesota. Report to the Minnesota Department of Natural Resources.

Grubb, T.G. 1976. Survey and analysis of bald eagle nesting in western Washington. M.S. thesis, Univ. of Washington, Seattle.

Grubb, T.G. and R.M. King. 1991. Assessing human disturbance of breeding bald eagles with classification tree models. Journal of Wildlife Management 55:500-511.

Grubb, T.G., W.L. Robinson and W.W. Bowerman. 2002. Effects of watercraft on bald eagles nesting in Voyagers National Park, Minnesota. Wildlife Society Bulletin 30:156-161.

Grubb, T.G. and W.W. Bowerman. 1997. Variations in breeding bald eagle response to jets, light planes and helicopters. Journal of Raptor Research 31:213-222.

Grubb, T.G., W.W. Bowerman, A.J. Bath, J.P. Giesy, D.V.C. Weseloh. 2003. Evaluating Great Lakes bald eagle nesting habitat with Bayesian inference. RMRS-RP-45. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO, 10 pp.

Hansen, J.A. 1977. Population dynamics and night roost requirements of bald eagles wintering in the Nooksack River Valley, WA. Huxley College of Environmental Studies, Western Washington State College, Bellingham, WA. (Problem Series)

Hansen, J.A., M.V. Stalmaster and J.R. Newman. 1980. Habitat characteristics, function, and destruction of bald eagle communal roosts in western Washington. Huxley college of Environmental Studies, Western Washington University.

Hunt, W.G., D.E. Driscoll, E.W. Bianchi, and R.E. Jackman. 1992. Ecology of bald eagles in Arizona. Report to U.S. Bureau of Reclamation, Contract 6-CS-30-04470. BioSystems Analysis Inc., Santa Cruz, California.

Isaacs, F.B and R.G. Anthony. 1987. Abundance, foraging, and roosting of bald eagles wintering in the Harney Basin, Oregon. Northwest Science 61(2), pp. 114-121.

Juenemann, B.G. 1973. Habitat evaluations of selected bald eagle nest sites on the Chippewa National Forest. M.S. thesis, University of Minnesota, Minneapolis.

Keister, G.P., R.G. Anthony and E.J. O'Neill. 1987. Use of communal roosts and foraging area by bald eagles wintering in the Klamath Basin. Journal of Wildlife Management 51(2):415-420.

Knight, R. and S.K. Knight. 1984. Responses of wintering bald eagles to boating activity. Journal of Wildlife Management 48:999-1004.

Linscombe, J.T., T.J. Hess, Jr., and V.L. Wright. 1999. Effects of seismic operations on Louisiana's nesting bald eagles. Proceedings of the Southeastern Association of Fish and Wildlife Agencies. 54:235-242.

Maine (State of) Inland Fisheries and Wildlife Rules. Chapter 8.05 Essential Habitat for Species Listed as Threatened or Endangered.

Mathisen, J.E. 1968. Effects of human disturbance on nesting bald eagles. Journal of Wildlife Management 32(1): 1-6.

McGarigal, K., R.G. Anthony and F.B. Isaacs. 1991. Interactions of humans and bald eagles on the Columbia River estuary. Wildlife Monographs 115:1-47.

McKay, K.J., J.W. Stravers, B.R. Conklin, U. Konig, S. Hawks, C.J. Kohrt, J.S. Lundh and G.V. Swenson. 2001. Potential human impacts on bald eagle reproductive success along the Upper Mississippi River.

McKewan, L.C. and D.H. Hirth. 1979. Southern bald eagle productivity and nest site selection. Journal of Wildlife Management 43:585-594.

Millsap, B.A. Status of wintering bald eagles in the conterminous 48 States. 1986. Wildlife Society Bulletin 14:433-440.

Millsap, B.A, T. Breen, E. McConnell, T. Steffer, L. Phillips, N. Douglass, and S. Taylor. In Press. Comparative fecundity and survival of bald eagles fledged from suburban and rural natal areas in Florida. Journal of Wildlife Management 68(4).

Montana Bald Eagle Working Group. 1986. Montana Bald Eagle Management Plan. Department of the Interior, Bureau of Land Management. Billings, MT.

Nesbitt, S.A., M.J. Folk and D.A. Wood. 1993. Effectiveness of bald eagle habitat protection guidelines in Florida. Proceedings of the Annual Conference of the Southeast Association of Fish and Wildlife Agencies.

Newman, J.R., W.H. Brennan and L.M. Smith. 1977. Twelve-year changes in nesting patterns of bald eagles on San Juan Island, Washington. The Murrelet 58(2)37-39.

Postapulsky, S. 1974. Raptor reproductive success: some problems with methods, criteria, and terminology. Pages 21-31 *in* F.N. Hammerstrom, Jr., B.E. Harrell, and R.R. Olendorff, eds. Management of raptors. Raptor Res. Found., Vermillion, S.D.

Rodgers, J.A. and Schwikert, S.T. 2003. Buffer zone distances to protect foraging and loafing waterbirds from disturbance by airboats in Florida. Waterbirds 26(4): 437-443.

Russell, D. 1980. Occurrence and human disturbance sensitivity of wintering bald eagles on the Sauk and Suiattle Rivers, Washington. In R.L. Knight, G.T. Allen, M.V. Stalmaster and C.W. Servheen [eds.]. Proceedings of the Washington Bald Eagle Symposium. Nature Conservancy, Seattle, Washington, pp. 165-174.

Shapiro, A.E., F. Montalbano, and D. Mager. 1982. Implications of construction of a flood control project upon bald eagle nesting activity. Wilson Bulletin 94(1), pp. 55-63.

Skagen, S.K. 1980. Behavioral responses of wintering bald eagles to human activity on the Skagit River, Washington. In R.L.Knight, G.T. Allen, M.V. Stalmaster and C.W. Servheen [eds.]. Proceedings of the Washington Bald Eagle Symposium. Nature Conservancy, Seattle, Washington, pp. 231-241.

Skagen, S.K., R.L. Knight and G.J.H. Orians. 1991. Human disturbance of an avian scavenging guild. Ecological Applications 1:215-225. (Internet)

Stalmaster, M.V. 1976 Winter ecology and effects of human activity on bald eagles in the Nooksack River Valley, Washington. MS Thesis, Western Washington State College, Bellingham.

Stalmaster, M.V. 1980. Management strategies for wintering bald eagles in the Pacific Northwest. Proceedings of the Washington Bald Eagle Symposium, pp 49-67.

Stalmaster, M.V. and J.L. Kaiser. 1998. Effects of recreational activity on wintering bald eagles. Wildlife Monographs 137:1-46.

Stalmaster, M.V. and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61:1307-1313.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

Steenhof, K. 1978. Management of Wintering Bald Eagles. FWS/OBS-78/79. U.S. Fish and Wildlife Service, Department of the Interior, Washington D.C.

Steidl, R.J. and R.G. Anthony. 2000. Experimental Effects of Human Activity on Breeding Bald Eagles. Ecological Applications 10(1), pp. 258-268.

Therres, G.D., M.A. Byrd and D.S. Bradshaw. 1993. Effects of development on nesting bald eagles: case studies from Chesapeake Bay. Transactions of the North American Wildlife and Natural Resources Conference 58:62-69.

U.S. Fish and Wildlife Service. 1979. Bald Eagle Management Guidelines: Oregon – Washington. Portland. OR.

U.S. Fish and Wildlife Service. 1983. Northern States bald eagle recovery plan. Appendices E, F, and G. U.S. Fish and Wildlife Service, Region 6, Denver, CO.

U.S. Fish and Wildlife Service. 1987. Habitat Management Guidelines for the Bald Eagle in the Southeast Region. U.S Fish and Wildlife Service, Region 4. Atlanta, GA.

U.S. Fish and Wildlife Service. 1993. Bald Eagle Basics. Anchorage, AK.

U.S. Fish and Wildlife Service. 1993. Habitat Management Guidelines for Bald Eagles in Texas. Austin, TX.

U.S. Fish and Wildlife Service and Virginia Department of Game and Inland Fisheries. 2001. Bald Eagle Protection Guidelines for Virginia. Gloucester and Richmond, VA.

Watson, J.W. 1993. Responses of nesting bald eagles to helicopter surveys. Wildlife Society Bulletin 21:171-178.

Watson, J.W. 2004. Responses of nesting bald eagles to experimental pedestrian activity. Journal of Raptor Research 38:295-305.

Wood, P.B. 1999. Bald eagle response to boating activity in northcentral Florida. Journal of Raptor Research 33:97-101.

Wood, P.B., T.C. Edwards Jr. and M.W. Collopy. 1989. Characteristics of bald eagle nesting habitat in Florida. Journal of Wildlife Management 53(2):441-449.

Young, L.S. 1980. A quantitative evaluation of human disturbance impacts on breeding eagle ecology of bald eagles in the San Juan Islands, Washington. Washington Department of Game, Olympia.

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS FOR COLORADO RAPTORS

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

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

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

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

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

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS

BALD EAGLE

Nest Site:

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

Winter Night Roost:

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

Hunting Perch:

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

GOLDEN EAGLE

Nest Site:

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

OSPREY

Nest Site:

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

FERRUGINOUS HAWK

Nest Site:

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

RED-TAILED HAWK

Nest Site:

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

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

SWAINSON'S HAWK

Nest Site:

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

PEREGRINE FALCON

Nest Site:

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

PRAIRIE FALCON

Nest Site:

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

NORTHERN GOSHAWK

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

BURROWING OWL

Nest Site:

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

Recommended Buffer Zones and Seasonal Restrictions Around Raptor Use Sites

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

DEFINITIONS

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

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

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

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

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

CONTACT

For further information contact:

David Klute
Bird Conservation Coordinator
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216
Phone: 303-291-7320
Email: david.klute@state.co.us

REFERENCES

Bechard, M.J., and J.K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/172

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/506

Call, M. 1979. Habitat management guides for birds of prey. Technical Note No.338, U.S. Bureau of Land Management, Denver Service Center, Denver, CO. 69pp.

Energy Research and Development Administration (ERDA). 1977. EIA for CUI Venture application for geothermal loan guarantee (Beryl and Lund, Utah). EIA/GE/77-8. Washington, D.C. 109pp.

England, A.S., M.J. Bechard, and C.S. Houston. 1997. Swainson's Hawk (*Buteo swainsoni*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/265

Greater Yellowstone Bald Eagle Working Group. 1996. Greater Yellowstone bald eagle management plan: 1995 update. Greater Yellowstone Bald Eagle Working Group, Wyoming Game & Fish Dept., Lander WY 82520. 47p

Grier, J.W., F.J. Gramlich, J. Mattisson, J.E. Mathisen, J.V. Kussman, J.B. Elder, and N.F. Green. 1983. The bald eagle in the northern United States. Bird Cons. 144-66.

Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Athene cunicularia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/061

Holmes, Tamara L. 1993. Behavioral responses of grassland raptors to human disturbance. MS Thesis. Colo. State Univ., Fort Collins. 62pp.

Holthuijzen, A.M.A., W.G. Eastland, A.R. Ansell, M.N. Kochert, R.D. Williams, and L.S. Young. 1990. Effects of blasting on behavior and productivity of nesting prairie falcons. Wildl. Soc. Bull. 18:270-281.

Kochert, M. N., K. Steenhof, C. L. Mcintyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/684

Martin, D.J. 1973. Selected aspects of burrowing owl ecology and behavior. Condor 75:446-456.

Northern States Bald Eagle Recovery Team. 1983. Northern States Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service. 75pp.

Olendorff, R. R., and W.D. Zeedyk. 1978. Land management for the conservation of endangered birds. Pages 419-428 in S.A. Temple, ed. *Endangered birds*. University of Wisconsin Press, Madison, Wisconsin.

Poole, A.F., R.O. Bierregaard, and M.S. Martell. 2002. Osprey (*Pandion haliaetus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/683

Preston, C.R., and R.D. Beane. 1993. Red-tailed Hawk (*Buteo jamaicensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/052

Reynolds, R., R.T. Graham, H.M. Reiser. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Fort Collins, CO. U.S. Dept of Agri., Forest Service, Rocky Mountain Forest and Range Experiment Station. 90pp.

Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildl. Soc. Bull. 25(3):634-638.

Rocky Mountain/Southwest Peregrine Falcon Recovery Team. 1984. American peregrine falcon Rocky Mountain/Southwest population recovery plan. U.S. Fish and Wildlife Serv. 105pp.

Squires, J.R., S.H. Anderson, and R. Oakleaf. 1993. Home range size and habitat-use patterns of nesting prairie falcons near oil developments in northeastern Wyoming. J. Field Ornithol. 64:1-10.

Steenhof, Karen. 1998. Prairie Falcon (*Falco mexicanus*), The Birds of North America Online Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/346

Squires, J.R., and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/298

Suter, G.W. and J.L. Joness. 1981. Criteria for Golden Eagle, Ferruginous Hawk, and Prairie Falcon nest site protection. J. Raptor Res. 15(1):12-18.

Swenson, J.E. 1979. Factors affecting status and reproduction of ospreys in Yellowstone National Park. J. Wildl. Manage. 43:595-601.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.

U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

White, C.M., N.J. Clum, T.J. Cade, and W.G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/660

Revised 02/2008

STATE OF COLORADO

Bill Ritter, Jr., Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

Thomas E. Remington, Director
151 E. 16th Street
Durango, CO 81301
Telephone: (970) 247-0855
wildlife.state.co.us

For Wildlife-
For People

Mr. Rick Bellis, Director of County Development
Archuleta County Development Services
P.O. Box 1507
Pagosa Springs, CO 81147

11 November 2009

Dear Mr. Bellis:

The Colorado Division of Wildlife (CDOW) reviewed the surface location for the proposed **Fosset Gulch Pipeline Company's Piedra River Pipeline Project**. According to the map provided by Finney Land Company, the proposed pipeline project is broken into three segments labeled "southern, middle, and northern" portions. The proposed pipeline will begin in Section 29, T33N, R5W and end in Section 9U, T34N, R5W Archuleta County, Colorado. It is approximately 10 miles in length. Current land use near the proposed pipeline includes some existing oil and gas facilities, agricultural lands along the riparian areas and relatively little residential development.

Piñon-juniper forest dominates the steeper slopes located to the east and west along most of the proposed pipeline alignment. A mixed ponderosa pine forest dominates the higher elevations in the proposed pipeline's northern portion in Fosset Gulch. The southern and middle portions also contain a mosaic of agricultural and range lands. Extensive cottonwood galleries with an understory of willows dominate the riparian areas and wetlands associated with the Piedra River as it flows north-south through the project area.

Habitat Use and Concerns in Forested and Upland Areas:

The entire proposed pipeline alignment falls within an area mapped as mule deer critical winter range and elk winter concentration area. Intermixed forested rangelands consisting of piñon-juniper forest with an understory of sage, Gambel oak, antelope bitterbrush, Indian rice grass, blue grama grass, sand drop-seed, and various native forbs provides security and thermal cover for deer and elk, while adjacent agricultural lands in the valley bottoms provide feeding areas.

The CDOW has documented year round use of the area by mule deer and elk and very high deer and elk densities during the winter months, due to an influx of migratory animals. As snow accumulates at higher elevations this area is increasingly important to big game. Mule deer and elk typically display high site fidelity to winter range, preferring to use the same areas year after year. Recent studies show that mule deer and elk avoid construction activities and may shift their distribution on winter range in response to development activities (Hebblewhite 2008, Sawyer 2009).

Some elk production, i.e., calving, occurs within a significant portion of the proposed pipeline. Elk in this area typically produce calves May 15 through June 30.

Habitat Use and Concerns In-Stream, Riparian and Wetland Areas:

Intact, functioning riparian areas and wetlands provide critical ecological functions such as nutrient cycling, sediment filtering, stream bank stabilization and flood abatement during discharge events associated with

spring runoff and major storms. Wetlands and riparian areas also provide valuable habitat for a variety of wildlife species, including small mammals, river otters, beavers, coyotes, raptors, and songbirds. Leopard frogs, a State of Colorado Species of Special Concern (SC), inhabit wet meadows and the banks and shallows of marshes, ponds, lakes, reservoirs, streams, and irrigation ditches in Archuleta County. Leopard frogs have been documented in the general vicinity and are likely to occur within the proposed pipeline corridor. The riparian areas also provide suitable nesting habitat for Southwestern Willow Flycatcher, a Federal Endangered Species (FE) and State Endangered Species (SE) and Yellow-billed Cuckoo a Federal Candidate Species (FC) and (SC).

Native fish species, e.g., roundtail chub (SC), bluehead and flannelmouth suckers are likely present in the Piedra River within the proposed project area. These fish generally spawn between April 1 and July 15. Acute water quality changes due to excessive sedimentation from poor stormwater management, repeated stream crossing and dewatering activities can suffocate fish eggs developing in the gravelly river bottom substrate. The removal of upland and riparian vegetation may exacerbate or contribute to changes in water quality and can degrade habitat structure required by native fish, leading to higher predation rates and lower survival or recruitment rates.

Rainbow and brown trout also occupy the Piedra River in the proposed project area. Rainbow trout spawn between March 15 and April 15, while brown trout generally spawn between October 1 and November 1. Stream crossings and dewatering activities can damage trout spawning habitats as excessive discharges of fine sediments can deprive incubating fish eggs of the dissolved oxygen.

The New Mexico Meadow Jumping Mouse (FC) occupies streamside habitats in northern New Mexico, and may occur in Archuleta County. While little is known about this species' biology and distribution maintaining the integrity of the riparian corridor also reduces potential impacts to this species.

The CDOW has documented high concentrations of wintering bald eagles along the portion of the Piedra River located within the project area and has mapped the area as a bald eagle winter concentration area. Bald eagle use is at its highest during the winter months, prior to the Piedra River and Navajo Reservoir icing up. The cottonwood galleries along the Piedra provide high quality winter roosting habitat and the CDOW has documented a winter night roost within 1200 feet of the southern end of the proposed pipeline. More roost sites are likely within cottonwood galleries, but have yet to be mapped. Canopy densities of the cottonwoods, limited observation points and lack of roost survey efforts make documenting these important sites difficult.

Impact Avoidance, Minimization, and Mitigation Recommendations:

The proposed pipeline route crosses high quality wildlife habitat occupied by a diverse array of wildlife species. Based on our evaluation of the proposed pipeline location the CDOW encourages Archuleta County and the operator to implement the following measures to minimize adverse impacts to wildlife resources:

- Because the project area includes high habitat values for wintering big game, the CDOW recommends avoiding construction and reclamation activities between December 1 and April 15 to minimize displacing wintering mule deer and elk in the project area;
- The CDOW recommends scheduling **in-stream construction activities** in the Piedra River between August 1 and October 1 to minimize impacts on native and non-native fish species, i.e., avoiding spawning times for native fish (April 1-July 15), for rainbow trout (March 15-April 15) and brown trout (October 1–November 1).
- Due to the high density of wintering bald eagles within the project area CDOW recommends surveying for bald eagle winter night roosts sites between November 15 and March 15 and prior to construction. If night roosts are located during the survey the CDOW is happy to provide best management practices to minimize impacts to wintering bald eagles;
- During pipeline construction install trench plugs, earthen ramps or other means of escape in open pipeline trenches to prevent wildlife entrapment and to ensure that pipes strings do not impair

wildlife movements. Escape ramps should be constructed at a minimum of ¼ mile intervals where the trench parallels or bisects well defined game trails;

- Gate access roads to this facility and limit public access if acceptable to the surface owner(s) and/or surface management agency;
- Use only wildlife-appropriate fencing if acceptable to the surface owner(s). A good resource for wildlife appropriate fencing, *Montana Fish and Wildlife and Parks: A Landowner's Guide to Wildlife Friendly Fences: How to Build a Fence with Wildlife in Mind*, can be found on the web at: http://fwp.mt.gov/content/getItem.aspx?id=34461
- Do not place staging, refueling or chemical storage areas within riparian zones and floodplains;
- Mow or brushhog the right-of-way (ROW) in lieu of clearing and grubbing to hasten the reestablishment of native vegetation and minimize the potential for noxious weed infestations;
- Design the project to minimize the total number of stream crossings and cross streams and associated wetland complexes at right angles;
- The proposed pipeline will cross the Piedra three times. The CDOW encourages the operator to minimize impacts to wetlands and riparian resources by boring rather than trenching the pipeline at stream and wetland crossing locations. Boring will not require dewatering sections of the Piedra River. The operator may further reduce direct impacts to a wide variety of species and costly wetland mitigation requirements by starting and ending bore locations outside of wetlands.
- The CDOW recommends that the proposed pipeline ROW be consolidated with existing ROWs associated with roads, pipelines, and other infrastructure to minimize habitat fragmentation;.
- Riparian areas are characterized by cottonwoods, willows, and/or alders. The CDOW recommends limiting the vegetation removal within or adjacent to riparian areas or streams to a maximum width of 25'. The maximum 25'width is inclusive of existing roads or other ROW disturbance. If the Operator determines they cannot reasonably conduct construction operations within a 25' cleared area, please contact CDOW for other possible measures to minimize impacts within or adjacent to riparian areas or streams.
- Control erosion and sedimentation;
- Avoid removing riparian canopy or stream bank vegetation; Avoid cutting cottonwoods and willows, and replace cottonwoods and willows at a 3:1 ratio
- If dewatering occurs, do not discharge water directly into to the stream;
- Filter sediment using best management practices;
- Avoid direct discharge of hydrostatic test water into any wetland or stream;
- Disinfect heavy equipment, hand tools, boots and other items previously used in another river, stream, lake, pond, or wetland prior to using within the Piedra to avoid spreading aquatic nuisance species or undesirable disease pathogens and/or parasites;

We appreciate this opportunity to comment. The best time for construction activities to occur, i.e., that minimize impacts to the species and habitats discussed in this letter, is from mid August to mid October. We are happy to identify possible alternative best management practices (BMPs) and/or mitigation for these species if the Operator must construct outside of this time period. Please feel free to have the Operator contact us directly as appropriate. Or, if you have questions or wish to schedule a site visit, feel free to contact Brian Magee at (970) 375-6707. We look forward to working with you to benefit wildlife.

Sincerely,

Patt Dorsey
Area Wildlife Manager, Durango

CDOW-Field Ops, Spezze, Holst, Magee, Titus, Schuler, Archuleta, Area File

RAPTORS - Rule1202.b.(1)A., Rule 1208.a.(13) & Rule 1209.b.(6)-(13)

I. BACKGROUND – Jon Holst, Energy Liaison, Southwest Region

A. What is your educational background and professional experience?

Education

- B.S. in Biology, Colorado State University, 1988, Fort Collins, CO
- M.S. in Wildlife Biology, Colorado State University, 1994, Fort Collins, CO
- J.D. in Law, University of Colorado, 1991, Boulder, CO

Professional Experience

- Consulting Wildlife Biologist/Attorney, 1994 -1997, Ft. Collins CO
- Counsel and Environmental Manger for Inland Production Company, 1997-2001, Denver CO
- Consulting Wildlife Biologist/Attorney for Oil and Gas Industry, 2001-2007, Ft. Collins CO
- Wildlife Biologist/NEPA Project Manager for Colo. Dep. of Trans., 2004-2007, Durango, CO
- CDOW Energy Liaison, 2007 – current , Durango CO

B. What aspects of your experience bear upon the rules you are addressing? From 1997 through 2007, I monitored raptor nesting activity in a rapidly developing oil and gas field in the Uintah Basin of northeastern Utah. I monitored nest activity and productivity annually at 84 historic nest locations spread across approximately 120,000 acres of sagebrush, desert shrub, pinyon-juniper and canyon habitats. I monitored the effectiveness of protective buffer zones around raptor nests, and observed changes over time in raptor nesting activity and the distribution of successful nests in relationship to the proximity of oil and gas development activities. Over a ten year period, the local population of nesting ferruginous hawks was extirpated, and nesting activities by golden eagles declined and shifted away from development activities. I also was a member of the Raptor Science Team established in 1999 by the Bureau of Land Management (BLM)'s Utah State Office to develop best management practices for raptors and their associated habitats. These best management practices were expanded and eventually adopted by BLM's Utah State Office in 2006 (BLM 2006).

C. Describe, generally, your work on the draft rules. I provided background information the on current management practices being used by BLM in Colorado and Utah for raptor nest site protection, and the proposed management guidelines for raptor nest site protection being developed by the United States Fish and Wildlife Service (USFWS) for all western states (Whittington pers. com. 2008, Whittington and Allen 2008 (unpublished draft)).

II. BACKGROUND – David Klute, Bird Conservation Coordinator

A. What is your educational background and professional experience?

Education

- B.S. in Fisheries and Wildlife, University of Missouri, 1992, Columbia, MO
- M.S. in Biology, Kansas State University, 1994, Manhattan, KS
- Ph.D. in Wildlife and Fisheries Science, The Pennsylvania State University, 1999, State College, PA

Professional Experience

- Assistant Nongame Migratory Bird Coordinator, U.S. Fish and Wildlife Service, Region 6, 2000-2003
- Bird Conservation Coordinator, Colorado Division of Wildlife, 2003-current

B. What aspects of your experience bear upon the rules you are addressing? From 2000-2003 I served as Assistant Nongame Migratory Bird Coordinator for U.S. Fish and Wildlife Service. Duties included evaluation of population status and conservation needs for nongame birds, including raptors, throughout Great Plains, central Rockies and part of the Intermountain West. I served as the regional lead for issues relating to impacts of transmission lines, wind power development, and communication towers on raptors. I developed and was lead author for a status assessment and conservation plan for Burrowing Owls in the western United States. Since 2003 I have served as Bird Conservation Coordinator for Colorado Division of Wildlife. I have contributed technical information about bird population status and trends to multiple evaluations of conservation status. I coordinate multi-species bird monitoring efforts. I review and provide input for CDOW on issues relating to Bald Eagle delisting, post-delisting monitoring, federal raptor management guidelines, and changes to the Bald and Golden Eagle Protection Act. I coordinate survey efforts for Bald Eagles and Peregrine Falcons. I serve as the CDOW contact for issues relating to Mexican Spotted Owl protection and recovery. I revised CDOW recommendations for Burrowing Owl surveys protocols and raptor buffers/seasonal restrictions and provide technical assistant with related issues.

C. Describe, generally, your work on the draft rules. I provided background information on raptor conservation status and population trends. I provided input on statutory protections for raptors and anticipated changes to federal regulations for Bald and Golden Eagles. I provided input on basic raptor ecology.

III. 1200 SERIES

A. Rule1202.b.(1)A., Rule 1208.a.(13) & Rule 1209.b.(6)-(13)

1. What is the problem that the proposed rule is intended to address

The nine species of raptors addressed in Rule1202.b.(1)A., Rule 1208.a.(13) and Rule 1209.b.(6)-(13) are all species from Colorado's Wildlife Action Plan that were determined to be in greatest need of conservation by Colorado's scientific community due to the current population trends, status, and the condition of key habitats for those species (CDOW 2005). Table 1 provides the statutory and non-statutory conservation status for these species. Note that three of the nine species are State-listed as Threatened (bald eagle, burrowing owl, and Mexican spotted owl), and one is State-listed as a species of Special Concern (ferruginous hawk) (CDOW 2007). The Mexican spotted owl is also Federally-listed as Threatened, and the golden eagle, ferruginous hawk, burrowing owl, peregrine falcon, and prairie falcon are all listed by USFWS as Birds of Conservation Concern in larger defined conservation regions that include Colorado (USFWS 2002).

Table 1 - Statutory and non-statutory raptor conservation status designations

	State of Colorado		U.S. Fish & Wildlife Service		USFS, Reg. 2	Bur. of Land Mgmt.
Species	T&E; SC[a]	SGNC[b]	ESA[c]	Bird of Conservation Concern[d]	Sens. Species[e]	Sens. Species[f]
Bald Eagle	T	Tier 1			X	
Golden Eagle		Tier 1		BCR 10, BCR 16, Reg. 6		
Ferruginous Hawk	SC	Tier 1		BCR 10, BCR 16, BCR 18, Reg. 6, Nat'l	X	X
Burrowing Owl	T	Tier 1		BCR 16, BCR 18, Reg. 6, Nat'l	X	X
Mex. Spotted Owl	T	Tier 1	T			
Northern Goshawk		Tier 1			X	X
Osprey		Tier 2				
Peregrine Falcon		Tier 1		BCR 10, BCR 16, BCR 18, Reg. 6, Nat'l	X	
Prairie Falcon		Tier 1		BCR 10, BCR 16, BCR 18, Reg. 6, Nat'l		

a - Threatened (T), Endangered (E), and Special Concern (SC) species designations in Colorado (CDOW 2007)

b - Species in Greatest Need of Conservation (SGCN - Tier 1 and Tier 2) designations from the Colorado Wildlife Action Plan

c - Threatened (T) species designations, Endangered Species Act

d - Birds of Conservation Concern 2002, for geographic areas affecting Colorado at multiple spatial scales; Bird Conservation Regions (BCR) 10 (Northern Rockies), 16 (Southern Rockies/Colorado Plateau), 18 (Shortgrass Prairie); USFWS Region 6 (Mountains and Prairies) and National (Nat'l) (USFWS 2002)

e - U.S. Forest Service Region 2 Sensitive Species (USDA Forest Service 2007)

f - Bureau of Land Management, Colorado Sensitive Species (BLM 2000)

IMPACTS TO RAPTORS FROM OIL AND GAS ACTIVITIES

Human activities associated with oil and gas development can adversely impact the breeding success of raptors in Colorado and ultimately impact the status of their populations throughout the state. The raptor species covered in the proposed 1200 series rules have high year-to-year nest site and nest territory fidelity (they return to the same nest location year-after-year), which makes the annual breeding success for these species sensitive to direct and inadvertent human disturbance and habitat alteration at existing nest sites (Olendorff 1973, Howard 1975, Jones 1979, Newton 1979, Craighead and Mindell 1981, Gilmer and Stewart 1983, Gaines 1985, Scott 1985, Millsap et al. 1987, Harlow and Bloom 1989, Bechard et al. 1990, Dalton et. Al. 1990, Leslie 1992, Hansen 1994, White 1994, Harmata 2001, Megown et al. 2007). This is particularly true during active reproductive periods (courtship, nest site selection, egg-laying, incubation, and nestling phase) (Call 1979, Gilmer and Stewart 1983, White and Thurow 1985, Bechard et al. 1990,; Richardson and Miller 1997; Romin and Muck 1999, BLM 2006). Protecting existing nest sites and the reproductive activities at those sites is critical for managing long-term raptor population trends in Colorado because the breeding success at these sites determines the number of juveniles entering the population each year. There currently is no regulatory mechanism that promotes the identification and protection of raptor nest sites on state and private lands during oil and gas exploration and development activities. As a result, disturbance to nest sites resulting in negative consequences to raptor populations can occur inadvertently during normal oil and gas operations on state and private lands.

Disturbance of raptor nest sites during the courtship, nest site selection, or egg-laying reproductive periods**:** Several studies have suggested that human activities, if allowed to encroach on raptor nest sites, may cause raptors to abandon nest sites during courtship, nest site-selection or egg-laying reproductive periods (Weston 1968, Snow 1972, Fitzner et al. 1977, Call 1979, Olsen and Olsen 1980, Gilmer and Stewart 1983, White and Thurow

1985, Knight and Skagen 1988, Richardson and Miller 1997 Romin and Muck 1999, BLM 2006). Nest site abandonment resulting from human activities may be more likely in years of low prey abundance (White and Thurow 1985). Nest site abandonment due to direct disturbance or habitat alteration may cause local or regional population declines where suitable nest sites are limited due to lack of nesting substrate or limited abundance of prey species (Swenson 1979, Craighead and Mindell 1981, Whitcomb et al. 1981, Cline 1988, Newton 1989, Watson and Langslow 1989, White 1994, Romin and Muck 1999, BLM 2006).

Disturbance of raptor nest sites during the incubation or nestling phase: Repeated human-caused disturbance in close proximity to a raptor nest site during the incubation or nestling phase increases the probability of nest failure due to increased adult flushing frequency and time away the nest, which increases the probability of egg incubation failure and predation on the eggs or nestlings (Fyfe and Olendorff 1976, Call 1979, Sutter and Jones 1981, Bortolotti et al. 1984; White and Thurow 1985; Knight and Skagen 1988; Richardson and Miller 1997, Romin and Muck 1999). Even if the nest does not completely fail, studies have suggested that human activities and habitat alteration that encroach upon active raptor nest sites, including those associated with oil and gas activities, change raptor behavior and reduce nest productivity (i.e. numbers of chicks fledged), potentially resulting in local or regional population declines (Olendorff 1973, Gaines 1985, White and Thurow 1985, Knight and Skagen 1988, Harmata 1991, Holmes et al. 1993, Olendorff 1993, White 1994, Romin and Muck 1999).

Disturbance of unoccupied raptor nest sites: Not all raptor pairs breed every year, and individual nests left unused for a number of years are frequently reoccupied (Scott 1985, Megown et al. 2007, Whittington and Allen 2008). Bald and golden eagle nests may be reoccupied after a 17 to 20 year period of inactivity (Whittington and Allen 2008). More commonly, raptor nests may be unoccupied for several years during cyclic lows in small mammal prey abundance (Keith 1963, White and Thurow 1985). Habitat alteration in the form of newly-established continuous or nearly continuous human activity in close proximity to currently unoccupied but otherwise suitable raptor nest sites may cause these nests sites to become permanently abandoned even after prey populations rebound (Weston 1968, Snow 1972, Fitzner et al. 1977, Olsen and Olsen 1980, Gilmer and Stewart 1983, White and Thurow 1985, Olendorff 1993, Richardson and Miller 1997). Incremental habitat loss of unoccupied suitable nest sites may have an adverse impact on raptor populations where suitable nest locations are a limiting factor (Swenson 1979, Craighead and Mindell 1981, Whitcomb et al. 1981, Cline 1988, Watson and Langslow 1989, White 1994, Romin and Muck 1999).

Disturbance of bald eagle winter roost sites: While Colorado provides nesting habitat for over 90 pairs of bald eagles, it also provides winter roosting and winter foraging habitat for approximately 1000 bald eagles. Bald eagles congregate and rely on established winter roost sites because of their proximity to sufficient food sources and capacity to provide shelter from wind and weather. Disruptive activities in close proximity to bald eagle winter roost sites can interfere with foraging, reducing chances of adult survival, and potentially reducing nest productivity (USFWS 2007). Where a human activity agitates or bothers roosting or foraging eagles to the degree that substantially interferes with breeding, feeding, or sheltering behavior and may cause a loss of productivity or nest abandonment, the conduct of the activity violates the Bald and Golden Eagle Protection Act's prohibition against disturbing eagles (USFWS 2007).

2. **How would the proposed rule help solve or address the problem(s**)?
Rule1202.b.(1)A **:** This rule would require the operator to survey for and identify raptor nests within 0.5 mile of their proposed operations, so that oil and gas development activities would not inadvertently harm sensitive species of raptors. There is a considerable amount of variability in the susceptibility of nest disturbance both between and within individual species of raptors (Holmes et al. 1993, Richardson and Miller 1997). Studies suggest that a 0.5 mile disturbance-free buffer around active nests is the minimum adequate to protecting breeding activities at the nest site for the most sensitive species of raptors (Holmes et al. 1993, Richardson and Miller 1997, Romin and Muck 1999, BLM 2006, Whittington and Allen 2008 (unpublished draft)). Thus, a 0.5 mile survey for nest sites was determined to be the minimum survey distance adequate to indentify and protect the most sensitive raptor nest sites.

Rule 1208.a.(13) & Rule 1209.b.(6)-(13): These rules provide temporal (timing limitation areas) and spatial (restricted surface occupancy areas) development-free buffer zones around sensitive raptor nest sites and bald eagle winter night roosts. Spatial and temporal buffers around raptor nest sites and roosts have been demonstrated as an effective management tool for resource managers to protect raptor breeding activities and to balance the reproductive needs of raptors with human development activities (LeFranc and Millsap 1984, Millsap et al. 1987, Postovit and Postovit 1987, Cline 1988, Knight and Skagen 1988, Harlow and Bloom 1989, Olendorff et al. 1989, Dalton et al. 1990, Musclow and Dalton 1990, Olendorff and Kochert 1992, Holmes et al. 1993, Olendorff 1993, Parrish et al. 1994, Cal. Burr. Owl Cons. 1997, Richardson and Miller 1997, Hays and Dobler 2004, Richardson et al. 2004, Demarchi and Bentley 2005). In Utah, the United States Fish and Wildlife Service (USFWS) has established guidelines for raptor protection from human and land use disturbances that include spatial and temporal buffers around occupied and unoccupied nest sites (Romin and Muck 1999). The BLM in Utah has also adopted guidelines for raptor protection that includes spatial and temporal buffers around nest sites (BLM 2006). These guidelines included an instructional memorandum for all BLM Field Offices in Utah to incorporate the guidelines and buffer zones into ongoing resource management plan revisions.

CDOW developed its own recommended buffer zones and seasonal restrictions for Colorado Raptors in 2002 (CDOW 2002,2008). The USFS and BLM have implemented spatial and temporal buffers for raptor nest sites on Federal lands in Colorado on a site-specific basis, and have also incorporated CDOW's guidelines into recent resource management plan revisions (USFS/BLM San Juan Public Lands Center 2008). CDOW's guidelines were revised in 2008 and a portion of CDOW's revised guidelines have been incorporated into Rule 1208.a.(13) & Rule 1209.b.(6)-(13). Note that not all species covered under CDOW's guidelines were incorporated into Rule 1208.a.(13) & Rule 1209.b.(6)-(13) due to a desire to focus the development restrictions in the rules to those species at most risk from oil and gas development activities and to balance the need for energy development with the conservation of raptors.

3. How will this proposed rule result in greater protections for public health, safety, and welfare, including the environment and wildlife resources? Rule1202.b.(1)A., Rule 1208.a.(13) & Rule 1209.b.(6)-(13) will require the identification of sensitive raptor nests on state and private lands and expand the use of protective buffers to these lands. This will

result in greater awareness of the presence of these species while planning oil and gas development activities and provide significantly greater protection to these resources than currently exists on state and private lands. As a result, inadvertent disturbance to nest sites during normal oil and gas operations that result in negative consequences to raptor populations would no longer occur.

4. **How will this proposed rule affect industry's ability to develop the resource efficiently?**
   The USFWS and BLM have successfully implemented similar spatial and temporal buffer development restrictions to protect raptor nesting activities in Utah without adversely affecting the permitting of new oil and gas facilities or production from existing facilities on Federal lands (BLM 2008a). The BLM in Colorado and Wyoming currently utilize both seasonal and year-round buffer zones (No Surface Occupancy areas) around raptor nests on Federal lands and include buffer zone requirements on lease notices without adversely affecting development or production activities (BLM 2008b). Implementing the use of protective buffer zones on state and private lands in Colorado would provide consistent protection or raptor nests across Federal, state, and private lands.

5. **Will this rule effectively balance development of oil and gas resources with protection of public health, safety, and welfare, including protection of the environment and wildlife resources?**

[COGCC to answer]

6. **How does the proposed rule relate to other state or federal requirements, where applicable?**
   A comparison of the raptor nest buffers proposed for Rule 1208.a.(13) and Rule 1209.b.(6)-13) with CDOW's recommended buffer zones and those currently published and in use by USFWS and BLM is provided in Table 2. ***Note that the nest buffers proposed for Rule 1208.a.(13) and Rule 1209.b.(6)-13) are generally less comprehensive and less restrictive than those currently in use by USFWS and BLM***. USFWS is in the process of expanding its guidelines for raptor protection from human and land use disturbances to incorporate all western states including Colorado (Whittington pers. comm. 2008, Whittington and Allen 2008 (unpublished draft)). As mentioned above, BLM in Colorado is in the process of incorporating CDOW's recommended buffer zones and seasonal restrictions for raptors into the resource management plan revisions as lease stipulations and performance standards on Federal lands. Adopting Rule 1208.a.(13) and Rule 1209.b.(6)-(13) would provide consistent protection or raptor nests across Federal, state, and private lands in Colorado.

   Note that any development activities that result in the loss of an active migratory bird nest, including a raptor nest, are currently prohibited under the Migratory Bird Treaty Act (16 U.S.C .A. §§ 703-712). In addition, activities that disruptive bald or golden eagles to the degree that substantially interferes with breeding, feeding, or sheltering behavior and may cause a loss of productivity or nest abandonment is prohibited by the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d). Implementation of the raptor nest and bald eagle roost buffers recommended in Rule 1208.a.(13) and Rule 1209.b.(6)-(13) should establish compliance with these statutes for the species addressed.

TABLE 2 - USFWS, BLM, CDOW, and COGCC RECOMMENDED BUFFERS FOR RAPTORS

Table 2 - USFWS (Utah), BLM (Utah), CDOW, and COGCC recommended buffers for raptor nests and bald eagle winter night roosts

Raptor Nest Site	**USFWS/BLM Spatial No Surface Occupancy Buffer (miles)**	**USFWS/BLM Seasonal Activity Buffer (miles)**	**CDOW Spatial No Surface Occupancy Buffer (miles)**	**CDOW Seasonal Activity Buffer (miles)**	**COGCC Rule 1209.b.(6)-(13) Restricted Surface Occupancy Areas (miles)**	**COGCC Rule 1208.a.(13) Timing Limitation Areas (miles)**
Bald eagle	1.0	1.0	0.25	0.5	0.25	0.5
Golden eagle	0.5	0.5	0.25	0.5	0.25	0.5
N. Goshawk	0.5	0.5	0.5	0.5	0.5	0.5
N. Harrier	0.5	0.5	Not addressed	Not addressed	Not addressed	Not addressed
Cooper's hawk	0.5	0.5	Not addressed	Not addressed	Not addressed	Not addressed
Ferruginous hawk	0.5	0.5	0.5	0.5	0.5	0.5
Red-tailed hawk	0.5	0.5	0.33	0.33	Not addressed	Not addressed
Sharp-shinned hawk	0.5	0.5	Not addressed	Not addressed	Not addressed	Not addressed
Swainson's hawk	0.5	0.5	0.25	0.25	Not addressed	Not addressed
Turkey vulture	0.5	0.5	Not addressed	Not addressed	Not addressed	Not addressed
California condor	1.0	1.0	Not applicable	Not applicable	Not applicable	Not applicable
Peregrine falcon	1.0	1.0	0.5	0.5	0.5	0.5
Prairie falcon	0.25	0.25	0.5	0.5	0.5	0.5
Merlin	0.5	0.5	Not addressed	Not addressed	Not addressed	Not addressed
American kestrel	0	0	Not addressed	Not addressed	Not addressed	Not addressed
Osprey	0.5	0.5	0.25	0.25	0.25	0.25
Boreal owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Burrowing owl	0.25	0.25	150 feet	150 feet	0	150 feet
Flammulated owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Great horned owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Long-eared owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
N. saw-whet owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Short-eared owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Mex. Spotted owl	0.5	0.5	Not addressed due to existing USFWS regulation	Not addressed due to existing USFWS regulation	Areas within Protected Activity Centers (50 CFR § 17.95(b))	Areas within Protected Activity Centers (50 CFR § 17.95(b))
N. Pygmy owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
W. Screech owl	0.25	0.25	Not addressed	Not addressed	Not addressed	Not addressed
Common Barn-owl	0	0	Not addressed	Not addressed	Not addressed	Not addressed
Bald Eagle Winter Night Roost	0	0.5	0	0.5	0	0.5

Supporting Literature

Bechard, M. J., R. L. Knight, D. G. Smith, and R. E. Fitzner. 1990. Nest sites and habitats of sympatric hawks (*Buteo* spp.) in Washington. Journal of Field Ornithology 61:159-170.

Bortolotti, G.R., J.M. Gerrard, P.N. Gerrard, and D.W.A. Whitefield. 1984. Minimizing investigator induced disturbance to nesting bald eagles. Pages 85-103 *in* J.M. Gerrard and T.M. Ingram, eds. The bald eagle in Canada. Proc. Bald Eagle Days, Winnepeg.

Botelho, E.S. and P.C. Arrowood. 1996. Nesting success of western burrowing owls in natural and human-altered environments. Pages 61-68 *in* Bird, D.M., D.E. Varland, and J.J. Negro, eds. Raptors in human landscapes. Academic Press, New York.

California Burrowing Owl Consortium. 1997. Burrowing Owl Survey Protocol and Mitigation Guidelines. J. Raptor Res. Rep. 9:171-177.

Call, M. 1979. Habitat management guides for birds of prey. U.S. Dep. Inter. Bur. Land Manage. Tech. Note 338. Denver, CO. 70pp.

Cline, K.W. 1988. Raptor nest and roost site management in the southeast. Pages 175-188 *in* Proc. of the southeast raptor management symposium and workshop, Virginia Polytechnic Inst. and State Univ., Blacksburg, 14-16 September, 1988.

Colorado Division of Wildlife. 2002, 2008. Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors. Denver, Colorado. 7 pp.

Colorado Division of Wildlife. 2005. Colorado's Comprehensive Wildlife Conservation Strategy and Wildlife Action Plans. http://wildlife.state.co.us/WildlifeSpecies/ColoradoWildlifeActionPlan/

Colorado Division of Wildlife. 2007. Threatened and Endangered Species. http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm

Craighead, F.C., and D.P. Mindell. 1981. Nesting Raptors in Western Wyoming, 1947 and 1975. J. Wildl. Manage. 45:865-872.

Dalton, L.B., J.S. Price, and L.A. Romin. 1990. Fauna of Southeastern Utah and life requisites regarding their ecosystems. Utah Dep. Nat. Res. Pub. No. 90-11. Utah Div. Wildl. Res., Salt Lake City. 326pp.

Demarchi, M.W. and M.D. Bentley. 2005. Best management practices for raptor conservation during urban and rural land development in British Columbia. (Revisions by L. Soppuck)

Dubois, K. 1984. Rocky Mountain Front Raptor Survey, Dec. 1982 - Nov. 1983. Contract No. FWS-6-81-112. Montana Dep. Fish, Wildl., Parks, Bozeman. 62pp.

Esmoil, B.J. and S.H. Anderson. 1995 Wildlife mortality associated with oil pits in Wyoming. The Prairie Natur. 27:81-88.

Fitzner, R. E., D. Berry, L. L. Boyd, and C. A. Reick. 1977. Nesting of Ferruginous Hawks (*Buteo regalis*) in Washington, 1974-75. Condor 79:245-249.

Franson, J.C., L. Sileo, and N.J. Thomas. 2002. Causes of eagle deaths. National Biological Survey, National Wildlife Health center, Madison, WI.

Fyfe , R.W., and R.R. Olendorff. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. Can. Wildl. Serv. Occas. Pap. 23. 17pp.

Gaines, R. C. 1985. Nest site selection, habitat utilization, and breeding biology of the Ferruginous Hawk in central North Dakota. M.S. thesis. North Dakota State University, Fargo, North Dakota. 32 pages.

Gilmer, D. S., and R. E. Stewart. 1983. Ferruginous Hawk populations and habitat use in North Dakota. Journal of Wildlife Management 47:146-157.

Hansen, R. W. 1994. Raptor use of the Idaho National Engineering Laboratory. M.S. thesis. South Dakota State University, Brookings, South Dakota. 141 pages.

Harlow, D.L., and P.H. Bloom. 1989. Buteos and the Golden Eagle. Pp. 102-110 in B.G. Pendleton, ed. Proceedings of the western raptor management symposium and workshop. Natl. Wildl. Fed. Scien. Tech. Ser. No. 12.

Harmata, A.R. 1991. Impacts of oil and gas development on raptors associated with Kevin Rim, Montana. Kevin Rim Raptor Study Group. Montana State Univ. Bozeman. Prepared for U.S. Dep. Inter. Bur. Land Mgmt., Great Falls Res. Area, Montana. 37pp.

Harmata, A.R., M. Restani, G.J. Montopoli, J.R. Zelenak, J.T. Ensign, and P.J. Harmata. 2001. Movements and mortality of ferruginous hawks banded in Montana. J. Field Ornithol. 72:389-398.

Harness, R.E. and K.R. Wilson. 2001. Electric-utility structures associated with raptor electrocutions in rural areas. Wildl. Soc. Bull. 29:621-623

Hays, D. W. and F.C. Dobler. 2004. Prairie falcon (*Falco mexicanus*). *In* E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available http://wdfw.wa.gov/hab/phs/vol4/prairflc.htm

Holmes, T.L., R.L. Knight, L. Stegall and G.R. Craig. 1993. Behavioral responses of grassland raptors to human disturbance. Wildl. Soc. Bull. 21:461-468.

Howard, R.P. 1975. Breeding ecology of the ferruginous hawk in northern Utah and southern Idaho. M.S. Thesis. Utah State Univ., Logan. 60pp.

Jones, S. 1979. Habitat management series for unique or endangered species: The accipiters: goshawk, Cooper's hawk, and sharp-shinned hawk. U.S. Dep. Inter. Bur. Land Manage. Tech. Note 335. 55pp.

Keith, L.B. 1963. Wildlife's ten-year cycle. Univ. Wisconsin Press, Oxford. 201pp.

Kennedy, P.L. 1980. Raptor baseline studies in energy development. Wildl. Soc. Bull. 8:129-135.

Keran, D. 1981. The incidence of man-caused and natural mortalities to raptors. Raptor Res. 15: 108–112.

Knight, R.L., and S.K. Skagen. 1988. Effects of recreational disturbance on birds of prey: a review. Pages 355-359 *in* R.L. Glinski, B.G. Pendleton, M.B. Moss, M.N. LeFranc, B.A. Millsap, and S.W. Hoffman, eds. Proc. of southwest raptor management symposium and workshop. Natl. Wildl. Fed., Washington, D.C.

LeFranc, M.M., Jr. and B.A. Millsap. 1984. A summary of state and federal agency raptor management programs. Wildl. Soc. Bull. 12:274-282.

Lehman, R.N. 2001. Raptor electrocution on power lines: current issues and outlook. Wildl. Soc. Bull. 29: 804-813.

Leslie, D. G. 1992. Population status, habitat and nest-site characteristics of a raptor community in eastern Colorado. M.S. thesis. Colorado State University, Fort Collins, Colorado. 45 pages.

Manville, A.M., II. 2005. Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science – next steps toward mitigation. Bird Conservation Implementation in the Americas: Proceedings 3rd International Partners in Flight Conference 2002, C.J. Ralph and T. D. Rich, Editors. U.S.D.A. Forest Service General Technical Report PSW-GTR-191, Pacific Southwest Research Station, Albany, CA: 1051-1064

Megown, R.A., L.A. Romin, K. Steenhof, M.N. Kochert. Raptor nest reuse. Unpublished Report, version date July 2007. Salt Lake City, Utah. U.S. Fish and Wildlife Service Utah Ecological Services.

Millsap, B.A., K.W. Cline, and B.A. Giron Pendleton. 1987. Habitat management. Pages 215-237. *in* B.A. Giron Pendleton, B.A. Millsap, K.W. Cline, and D.M. Bird, eds. Raptor management techniques manual. Natl. Wildl. Fed., Washington, D.C. 420pp.

Musclow, H.J. and L.B. Dalton. 1990. Wildlife mitigation technologies for man-made impacts. Utah Dep. Nat. Resour. Pub. No. 90-3. Utah Div. Wildl. Res., Salt Lake City. 141pp.

Newton, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, South Dakota. 399pp.

Newton, I. 1989. Keynote address: population limitation in raptors. Pages 3-12, Proceedings of the northeast raptor management symposium and workshop. Natl. Wildl. Fed. Sci. Tech. Ser. 13., Natl. Wildl. Fed., Washington, D.C.

Olendorff, R.R., D.D. Bibles, M.T. Dean, J.R. Haugh, and M.N. Kochert. 1989. Raptor habitat management under the U.S. Bureau of Land Management multiple-use mandate. Raptor Res. Reports No. 8. 80 pp.

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

Olendorff, R. R. 1973. The ecology of the nesting birds of prey of northeastern Colorado. U.S. International Biological Program, Grassland Biome Technical Report 211. Colorado State University, Fort Collins, Colorado. 233 pages.

Olendorff, R.R., 1993. Status and biology of ferruginous hawks: A Review. United States Department of the Interior BLM, Raptor Research and Technical Assistance Center, Boise, Idaho. 84 pp.

Olsen, J., and P. Olsen. 1980. Alleviating the impact of human disturbance on the breeding peregrine falcon II. Public and recreational lands. Corella 4:54-57.

Parrish, T.L., S.H. Anderson, A.W. Anderson, and S. Platt. 1994. Raptor mitigation handbook. Wyoming Coop. Fish. and Wildl. Res. Unit, Laramie. 92pp.

Postovit, H.R. and B.C. Postovit. 1987. Impacts and mitigation techniques. Pages 183-2134 *in* B.A. Giron Pendleton, B.A. Millsap, K.W. Cline, and D.M. Bird, eds. Raptor management techniques manual. Natl. Wildl. Fed., Washington, D.C. 420pp.

Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildl. Soc. Bull. 25:634-638.

Richardson, S., M. Whalen, D. Demers, and R. Milner. 2004. Ferruginous hawk (*Buteo regalis*). *In* E. M. Larsen, J. M. Azerrad, and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds [Online]. Available http://wdfw.wa.gov/hab/phs/vol4/feruge.htm

Romin, L.A., and J.A. Muck. 1999. Utah field office guidelines for raptor protection from human and land use disturbances. USDI Fish and Wildlife Service, Utah Field Office. Salt Lake City , Utah, 42pp.

Sauer, J.R., J.E. Hines, and J. Fallon. 2007. The North American Breeding Bird Survey, Results and Analysis 1966-2006. Version 10.13.2007. USGS Patuxent Wildlife Research Center, Laurel, MD

Scott, T.A. 1985. Human impacts on the golden eagle population of San Diego County from 1928-1981. M.S. Thesis. San Diego State Univ. 101pp.

Sergio, F., L. Marchesi, P. Pedrini, M. Ferrer, and V. Penteriani. 2004. Electrocution alters the distribution and density of a top predator, the eagle owl *Bubo bubo*. J. Applied Ecol. 41:836-845.

Snow, C. 1972. Habitat management series for endangered species. Rep. No. 1. American peregrine falcon. USDI Bureau of Land Management. 45pp.

Sutter, G.W. II, and J.L. Jones. 1981 Criteria for golden eagle, ferruginous hawk, and prairie falcon nest site protection. Raptor Res. 15:12-18.

Swenson, J.E. 1979. Factors affecting status and reproduction of ospreys in Yellowstone National Park. J. Wildl. Manage. 43:595-601

USDA Forest Service. 2007. Regional Forester's Sensitive Species. http://www.fs.fed.us/r2/projects/scp/sensitivespecies/index.shtml

USDI Bureau of Land Management. 1996. Modification of production equipment to prevent bird and bat losses. Notice to Lessee/operators (NTL 96-01 TDO), Tulsa District Office, Kansas, Oklahoma, and Texas.

USDI Bureau of Land Management. 2000. Colorado BLM State Director's Sensitive Species List, June, 2000. http://www.blm.gov/co/st/en/BLM_Programs/botany/Sensitive_Species_List_.html

USDI Bureau of Land Management. 2004 Modification of production equipment to prevent bird and bat losses. Notice to Lessee/operators (NTL FFO/AUFO-2004-01), Farmington and Albuquerque Field Offices, New Mexico.

USDI Bureau of Land Management. 2004. Best management practices for oil and gas. Minerals, Realty, and Resource Protection Directorate,Division of Fluid Minerals, Washington, DC. Accessed on June 1, 2007 (http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html)

USDI Bureau of Land Management. 2006. Best management practices for raptors and their associated habitats in Utah. Instruction Memorandum No. UT 2006-096. Utah State Office, Salt Lake City, UT 16 pp.

USDI Bureau of Land Management. 2008a. (http://www.blm.gov/ut/st/en/prog/energy/oil_and_gas/oil_and_gas_exploration.html)

USDI Bureau of Land Management. 2008b. Section 365 of the Energy Policy Act of 2005 - Year Two Report for the Pilot Project to Improve Federal Permit Coordination, BLM-WO-GI-08-007-3109, Washington, D.C.

USDI Fish and Wildlife Service. 1995. Recovery plan for the Mexican spotted owl: Vol. I. U.S. Dep. Inter. Fish and Wildl. Serv., Albuquerque, New Mexico. 172pp.

USDI Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest population). U.S. Dep. Inter. Fish and Wildl. Serv., Denver, CO. 105pp.

USDI Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. [Online version available at http://migratorybirds.fws.gov/reports/bcc2002.pdf]

USDI Fish and Wildlife Service. 2003b. United States Fish and Wildlife Service Region 6 Environmental Contaminants Program. Contaminant issues: oil field waste pits. Available from: http://www.r6.fws.gov/contaminants/contaminants1c.html (Accessed May 2007.

USDI Fish and Wildlife Service. 2007. National bald and golden eagle management guidelines. USFWS Division of Migratory Bird Management, Washington D.C. 23pp.

USFS/BLM San Juan Public Lands Center. 2008. Draft Land Management Plan – Draft Environmental Impact Statement for San Juan Plan Revision. San Juan Public Lands Center, Durango CO (3 Volumes).

Watson, J. and D.R. Langslow. 1989. Can food supply explain variation in nesting density and breeding success amongst golden eagles *Aquila chrysaetos*? Pages 181-186 *in* Meyburg, B.U. and R.D. Chancellor, eds. Raptors in the modern world. Proc. of the III world conference on birds of prey and owls. 22-27 March 1987.

Weston, J. B. 1968. Nesting ecology of the Ferruginous Hawk, *Buteo regalis*. Brigham Young University Science Bulletin 10:25-36.

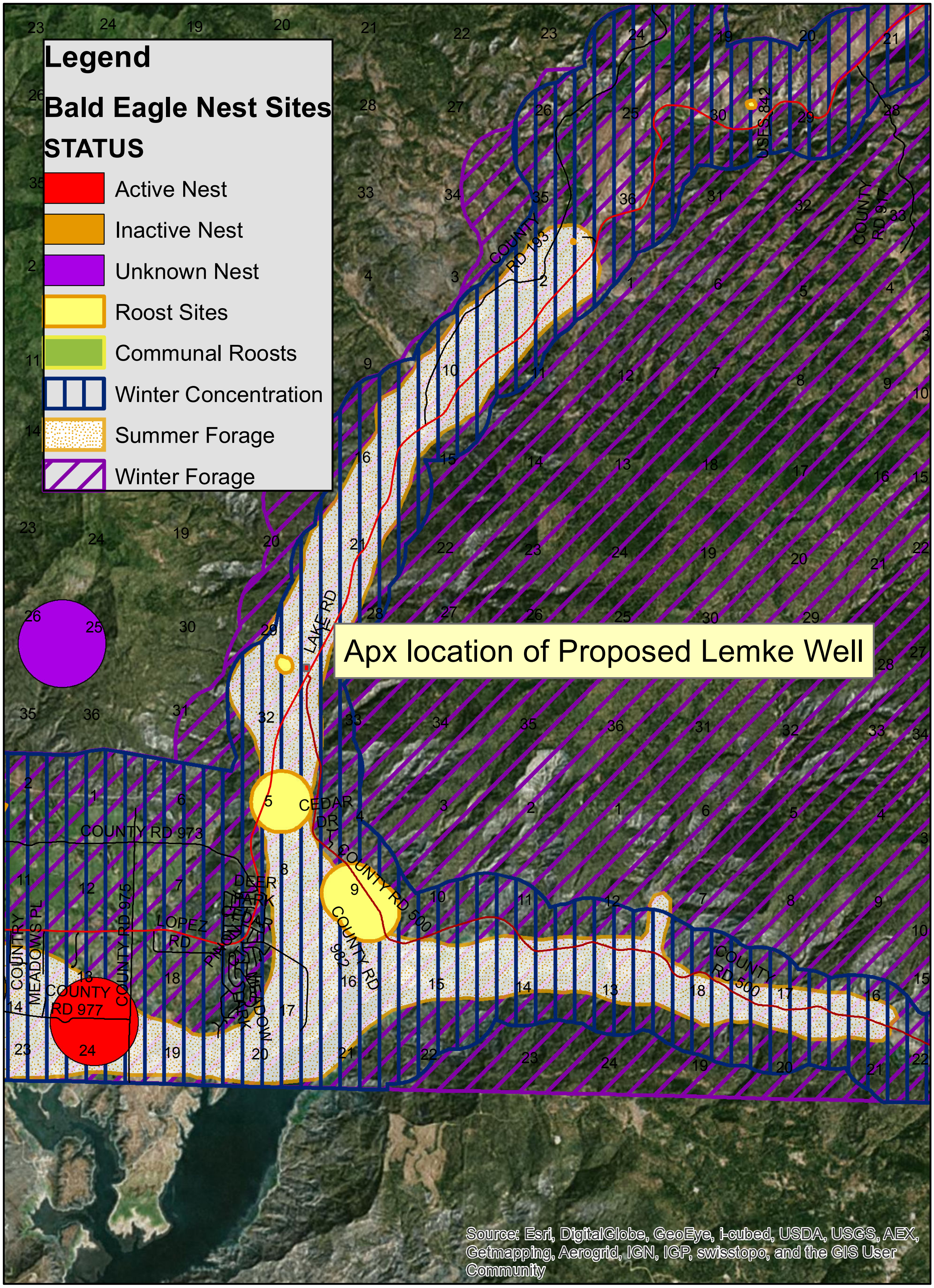
Whitcomb, R. F., C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Kimkiewkz, and D. Bystrak. 1981. Effects of forest fragmentation on avifauna of the eastern deciduous forest. Pages 125-205 *in* R.L. Burgess and D.M. Sharpe, eds. Forest island dynamics in man-dominated landscapes. Springer Verlag, New York. 310 pp.

White, C.M. 1994. Population trends and current status of selected western raptors. Studies in Avian Biology 15:161-172.

White, C.M. and T.L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. Condor 87:14-22.

Whittington, D.M. 2008. Personal communication with Jon Holst regarding status of USFWS guidance for raptor conservation in the western United States.

Whittington, D.M. and G.T. Allen. 2008 (Draft). Guidelines for raptor conservation in the western United States. U.S. Fish and Wildlife Service, Region 9, Division of Migratory Bird Management, Washington D.C. 140pp.



Legend
Bald Eagle Nest Sites
STATUS
Active Nest
Inactive Nest
Unknown Nest
Roost Sites
Communal Roosts
Winter Concentration
Summer Forage
Winter Forage
Apx location of Proposed Lemke Well
LAKE RD
COUNTY RD 103
COUNTY RD 917
USFS 842
CEDAR DR
COUNTY RD 500
COUNTY RD 973
COUNTY RD 975
COUNTY RD 977
COUNTY RD 962
LOPEZ RD
DEER PARK
COUNTRY MEADOWS PL
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community