

APPENDIX IV

Town of West Point Comprehensive Plan 2030

Other Maps & Documents

MAP - WP Badger Ammo Plant Connection - Connection between West Point and Badger Plant/Devils Lake property (October 2006).

MAP - WP Environmental Corridor Lake Grant - Primary, Secondary and Isolated Environmental Corridors identified in Lake Grant Study (August 2005).

MAP - WP Eagle Census - Eagle radio tracking data; Ferry Bluff Eagle Council (2001-2003).

MAP - WP Critical Eagle Habitat - Critical eagle habitat and foraging areas; Ferry Bluff Eagle Council (March 2007)

MAP - WP Leopold Census Locations - Census locations for Aldo Leopold's wildlife study in West Point, his only career long term wildlife study. (1936-1944)

MAP - WP Leopold Census - Chickadee and Nuthatch Distributions (1936-1944).

MAP - WP Leopold Census - Crow and Blue Jay Distributions (1936-1944).

MAP - WP Leopold Census - Fringillid Distributions (1936-1944).

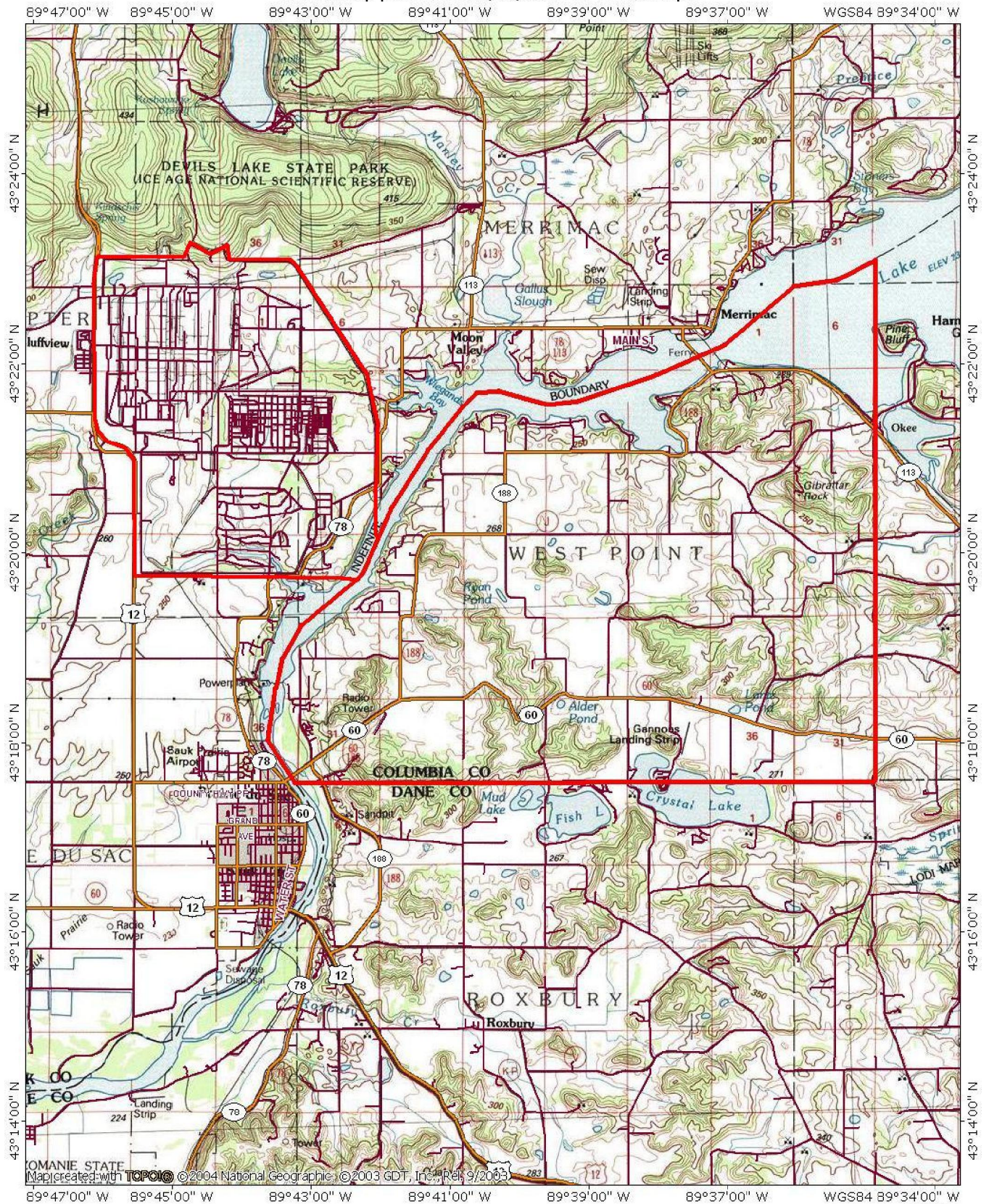
MAP - WP Leopold Census - Grouse Distributions (1936-1944).

MAP - WP Leopold Census - White Quail Distributions (1936-1944).

MAP - WP Leopold Census - Woodpecker Distributions (1936-1944).

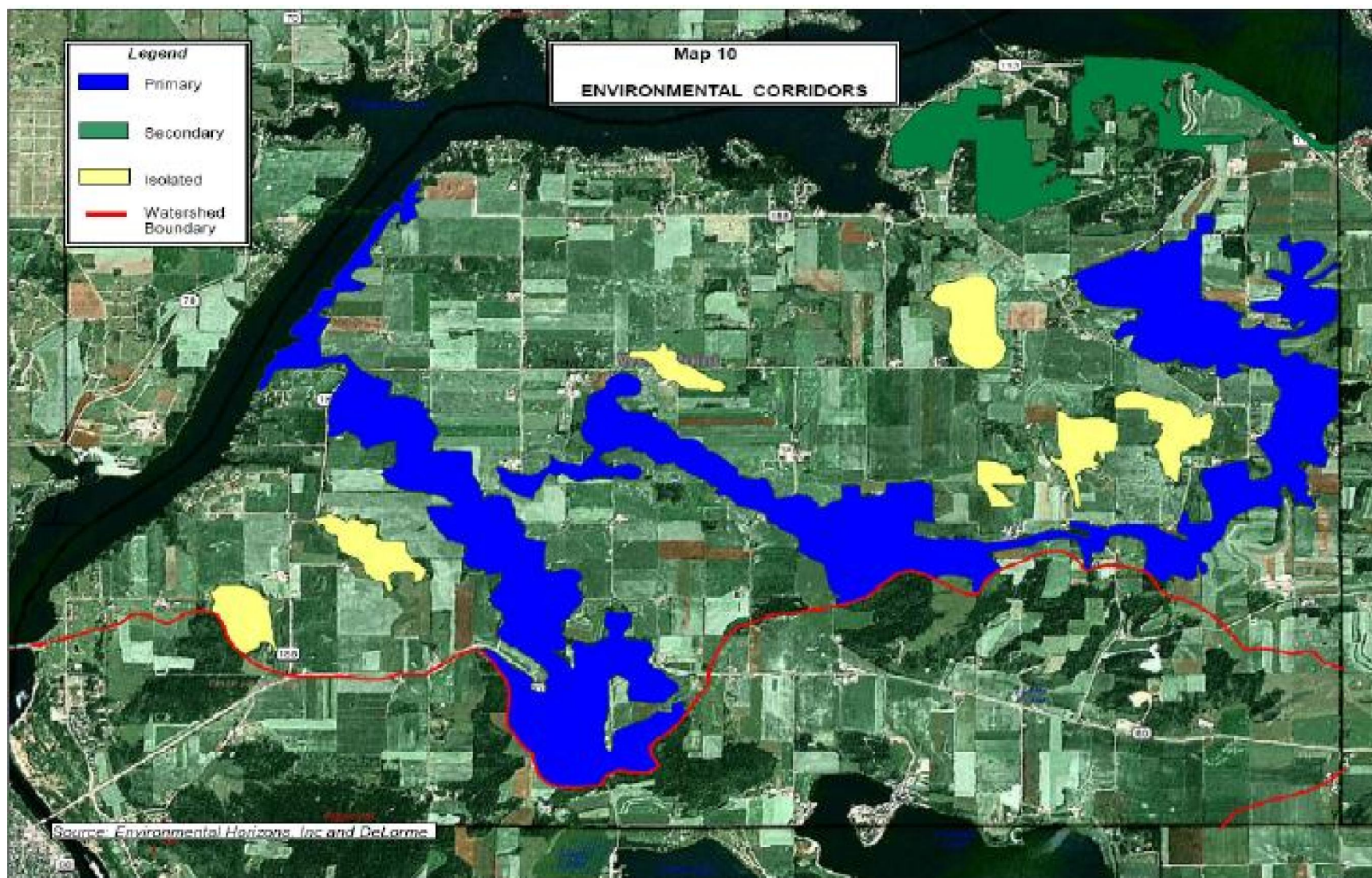
DOCUMENT - National Bald Eagle Management Guidelines (February 2006).

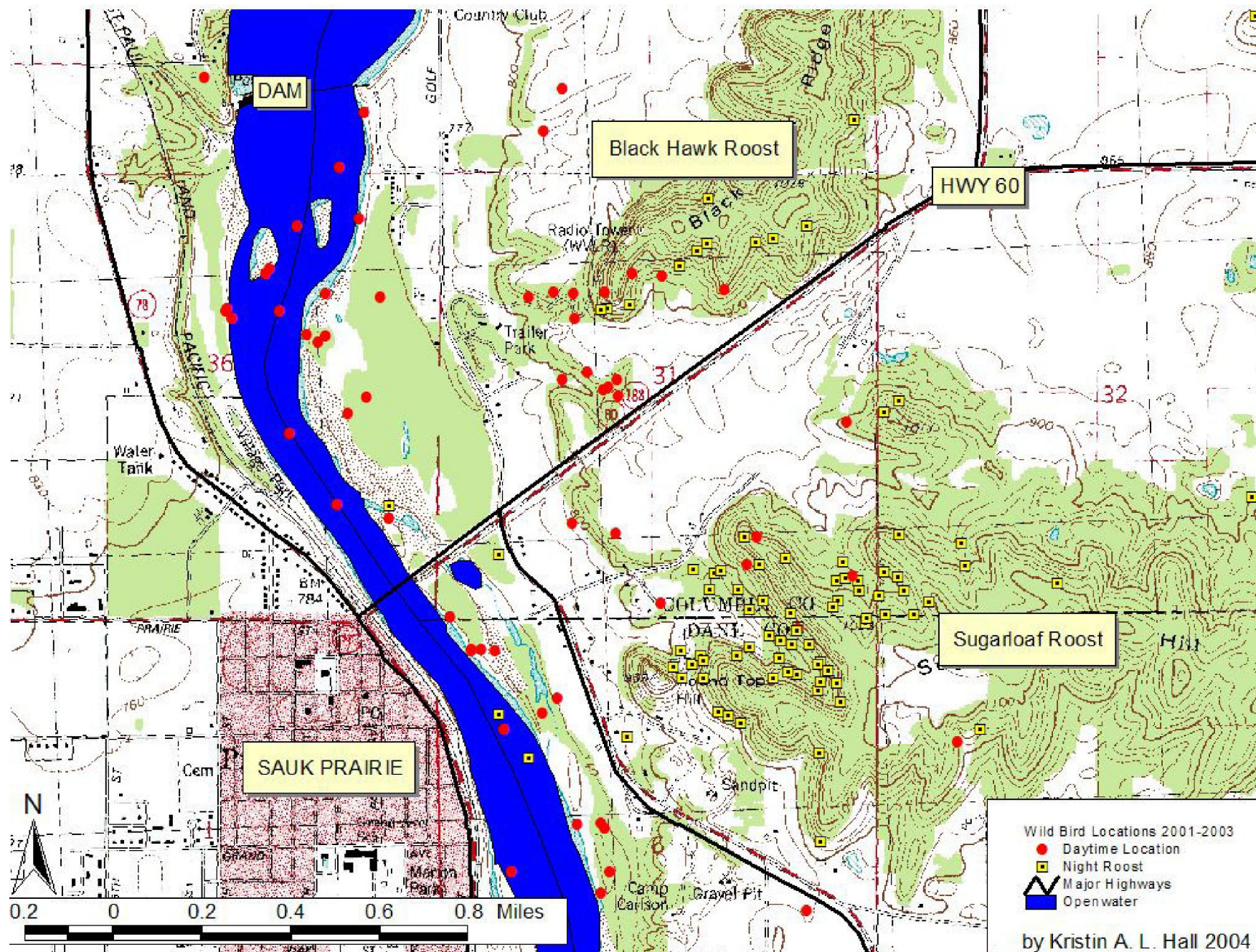
TOPO! map printed on 01/27/06 from "Untitled.tpo"



0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 miles
0 1 2 3 4 5 km

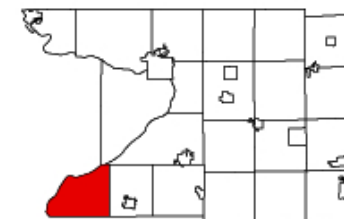
1 1/2°
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Critical Bald Eagle Habitat
provided by Ferry Bluff Eagle Council
March 2007

Town of West Point
Columbia County,
Wisconsin



Surface Water
Environmental Corridor

Floodplains¹
Wetlands²
35 foot Buffers on all water³
Public Open Space
Slopes 12% and greater⁴
Shallow Soils⁵
Woodlots 20 Acres or greater⁶

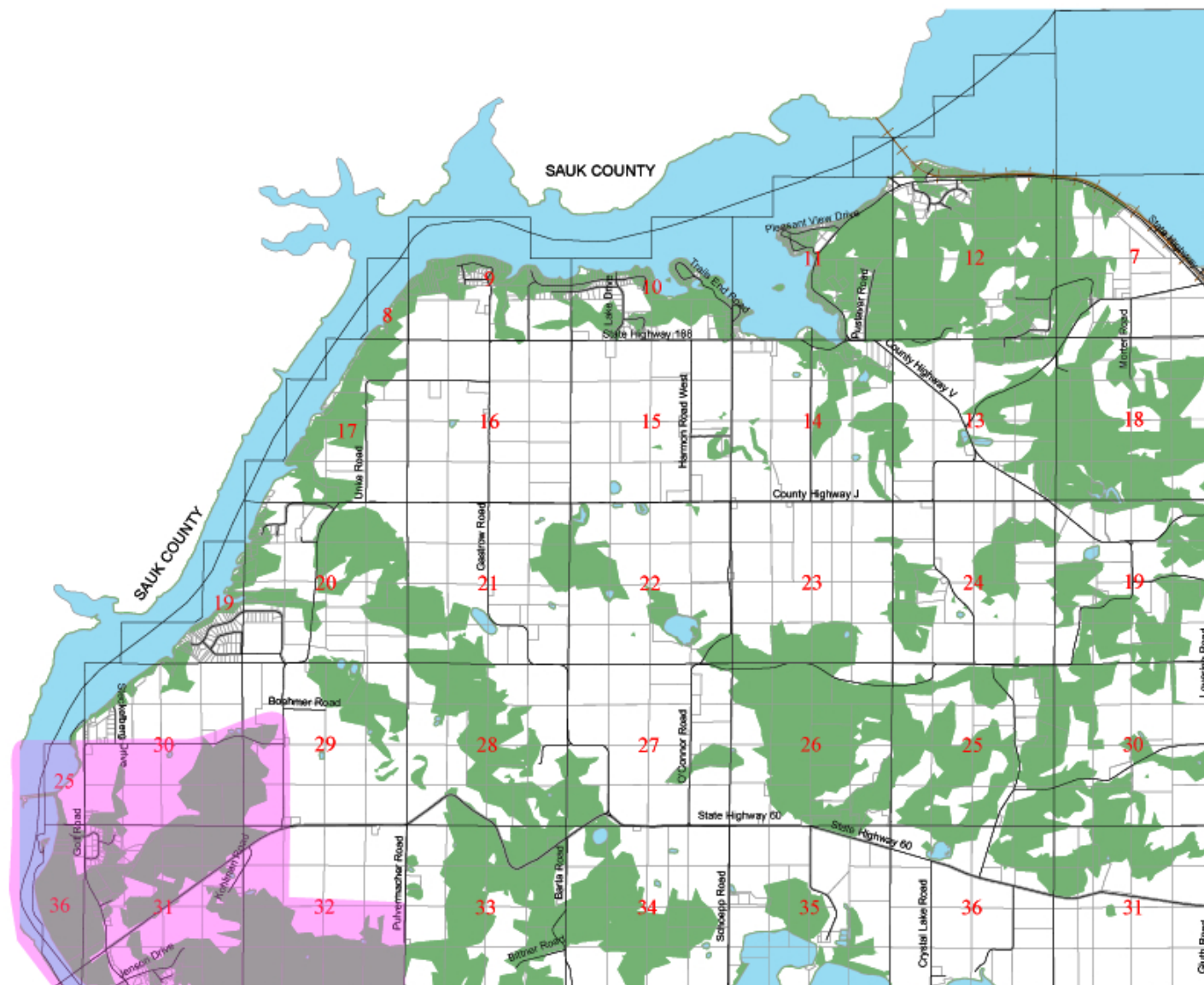
1. Floodplains (100 year) extracted from FEMA Flood Insurance Rating Maps. Floodplain delineations are for flood insurance purposes only. All areas subject of flooding in the community are not necessarily shown.
2. Wetlands extracted from WDNR's Wisconsin Wetlands Inventory, which includes mapped wetlands at least 5 acres in size derived mainly from air photo interpretation. All wetlands subject to state or federal regulations may not be shown.
3. County shoreland zoning regulations require 75 foot building setbacks on all navigable waterways. A vegetative buffer of 35 feet is suggested on all waterways.
4. Slopes extracted from USGS 7.5' digital elevation models.
5. Shallow soils extracted from USDA NRCS-SSURGO data. Shallow soils included are approximately 4 feet or less from the surface. Depth to Restriction such as bedrock, cemented pan, or abrupt textural change, that is nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly reduce the movement of water.
6. Forested areas extracted from WDNR's landcover dataset. Landcover data set is a raster representation of vegetation/land cover for the State.

Source: Columbia County Planning, LIO,
FEMA, NRCS, & Wisconsin DNR

0 1000 2000 3000 4000 5000 Feet



Data provided by the
Ferry Bluff Eagle Council
PO Box 532
Sauk City, WI 53560



Critical Bald Eagle Roosting and Perching Habitat
Bald Eagle roosting habitat in West Point is in the steep wooded bluffs near the Wisconsin River. Bald Eagle perching habitat in West Point is along the Wisconsin River in large shoreline trees.

The Prairie du Sac Area

WISCONSIN RIVER

Legend

- Bottomland Timber
- Encroachment Timber
- Second Growth Timber
- Depressed and Red Juniper
- Isolated Trees
- Hedgerow and Brushy Cover
- "Goat Prairie"
- Grazed Hills
- Sand Flood Plain

Scale 0 1 2 miles

Location of Census Observations
excepting predators, quail, grouse,
pheasant, Horned Lark

Location of Census Observations
excepting predators, quail, grouse,
pheasant, Horned Lark

The Prairie du Sac Area



The Prairie du Sac Area

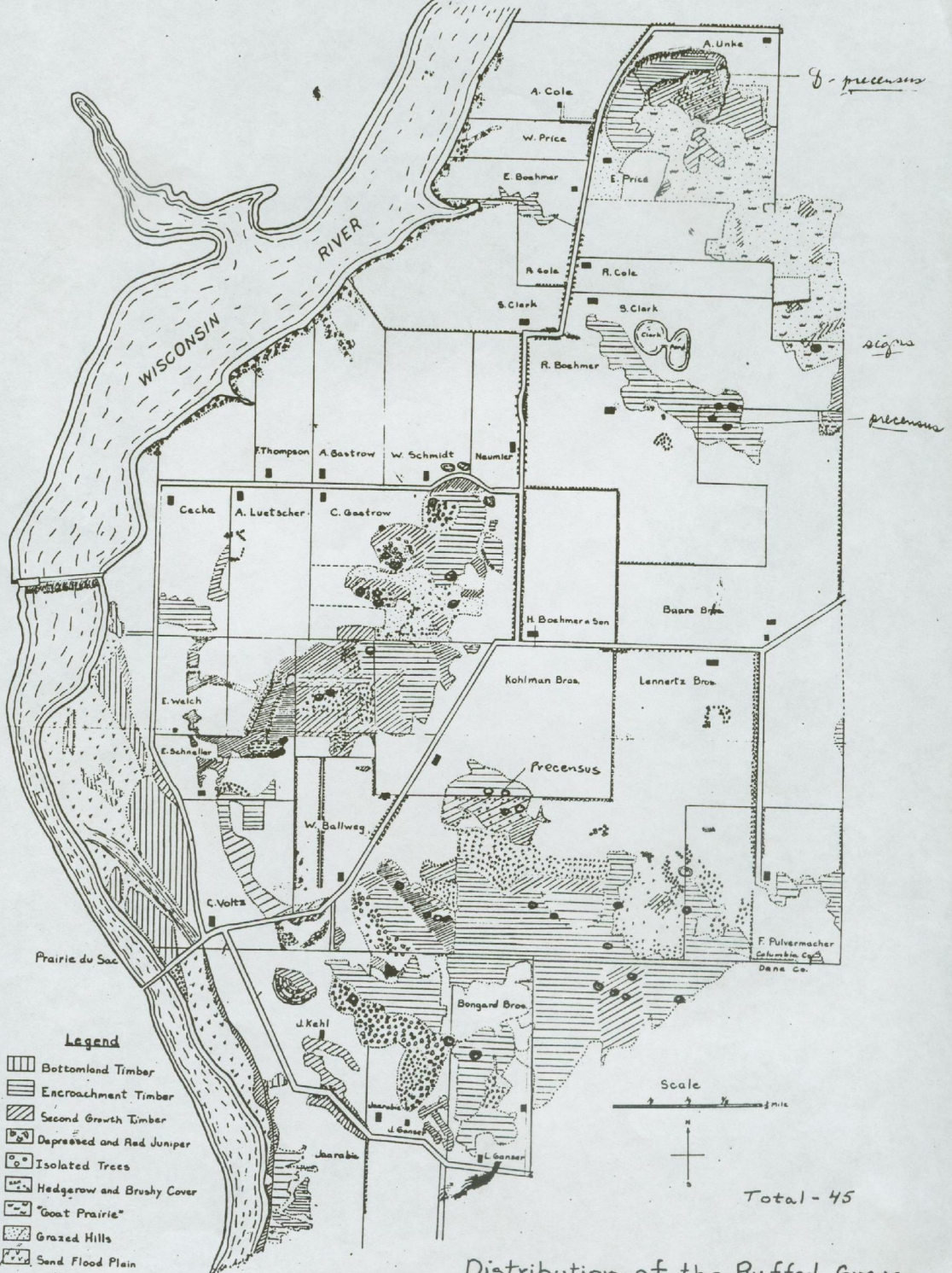


The Prairie du Sac Area



85
18
10

The Prairie du Sac Area



Distribution of the Ruffed Grouse

Census - Feb. 14 + previous censuses

2-kills known

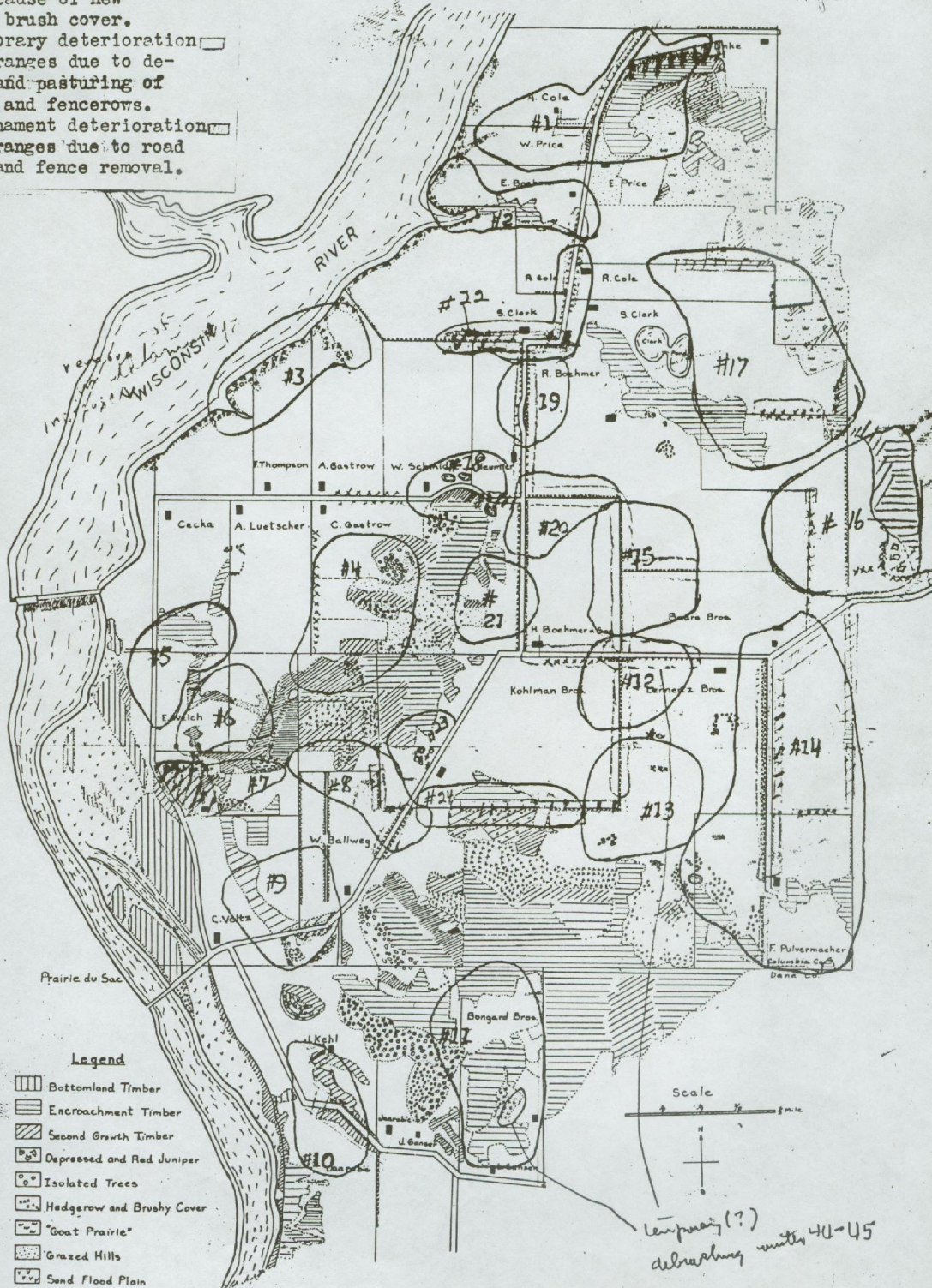
Improvements in covey
because of new
of brush cover.
Temporary deterioration
by ranges due to de-
ing and pasturing of
les and fencerows.
Permanent deterioration
by ranges due to road
ing and fence removal.

The Prairie du Sac Area

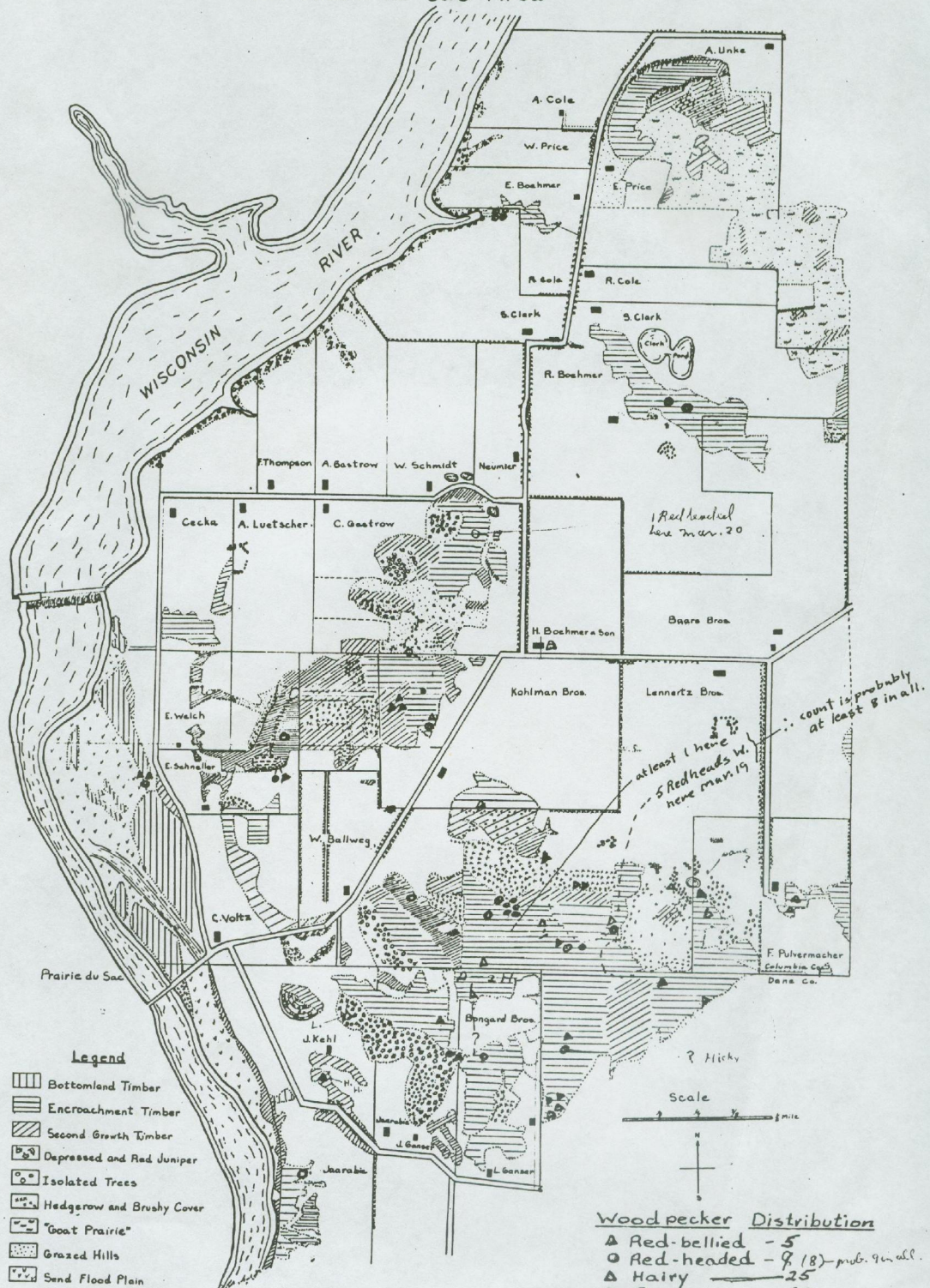
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2 copies



The Prairie du Sac Area



DRAFT NATIONAL BALD EAGLE MANAGEMENT GUIDELINES

U.S. Fish and Wildlife Service

February 2006

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INTRODUCTION

These National Bald Eagle Management Guidelines (the Guidelines) apply to bald eagles (*Haliaeetus leucocephalus*) in the event the species is no longer listed as threatened under the Federal Endangered Species Act (ESA). If delisted under ESA, bald eagles remain protected by the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Therefore, certain human-caused impacts to bald eagles are still prohibited by law. Commercial and residential development, forestry practices, outdoor recreation, natural resource recovery operations, and other human activities can potentially interfere with bald eagles or permanently degrade or destroy bald eagle nesting, roosting, and foraging areas. In some cases, such impacts amount to violations of the provisions of the BGEPA and/or MBTA that protect bald eagles.

The U.S. Fish and Wildlife Service (Service) developed the 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 BGEPA may apply to them. The Guidelines will promote the continued conservation of the bald eagle following its removal from the Federal List of Endangered and Threatened Wildlife and Plants (protection under the ESA).

The Guidelines are intended to:

- (1) Publicize the provisions of the BGEPA 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 land management practices that benefit bald eagles and their habitat.

We wish to emphasize that these Guidelines are not intended to serve as a national management plan for bald eagles or as habitat management guidelines. While the Guidelines include general recommendations for land management practices that will benefit bald eagles, the document is primarily a tool for land owners and planners who seek information and recommendations regarding how to avoid disturbing bald eagles. Many States have developed state-specific management plans, regulations, and/or guidance for land owners 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 potential 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.

Although it is not possible under the BGEPA or the MBTA to absolve from liability individuals or entities who follow the Guidelines, 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 undertaking the measures recommended by the Guidelines.

The Guidelines are applicable throughout the United States, including Alaska. Prior to their development, the Service relied on various State and regional guidelines when providing technical assistance to landowners and project proponents. For purposes of compliance with Federal law, the Guidelines herein will supersede the Service's reliance on pre-existing State and regional guidelines. However, the public needs to be aware that 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, most States have additional laws and regulations protecting bald eagles, and in some cases those State laws may be more protective (restrictive) than these Federal guidelines. If you are planning activities that may affect bald eagles, we recommend that you contact both your nearest U.S. Fish and Wildlife Service Field Office (see the contact information on p. 15) and your State wildlife agency for assistance.

LEGAL PROTECTIONS FOR THE BALD EAGLE

The Bald and Golden Eagle Protection Act

The BGEPA (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 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."

For purposes of these guidelines, "disturb" means: "*To agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment.*" 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 interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

A violation of the Act can result in a 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 BGEPA 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 1870's and the 1970's, bald eagles have rebounded and re-established breeding territories in each of the lower 48 States except Vermont. 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.

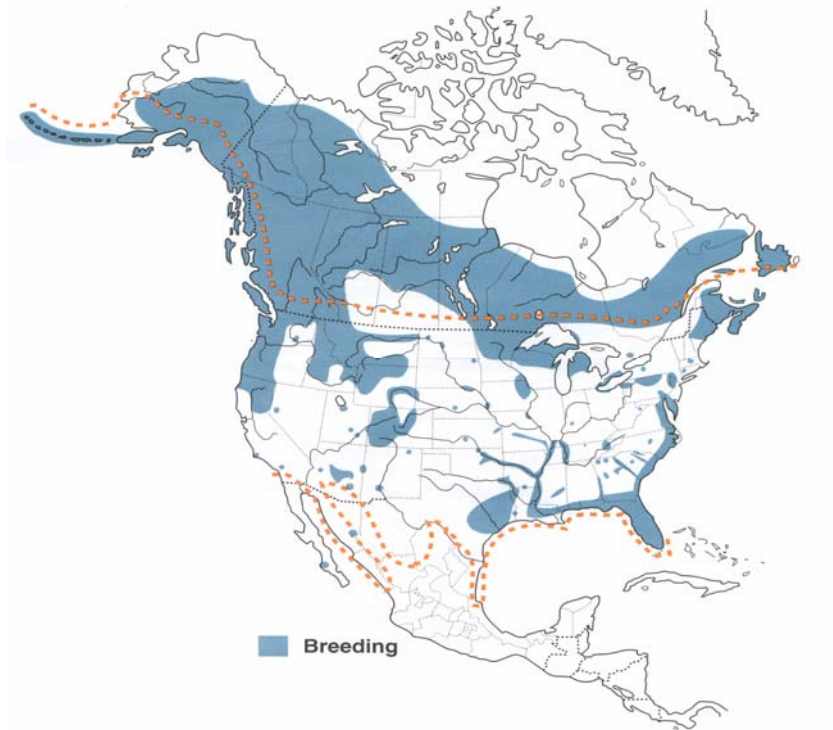
Juvenile bald eagles have mottled brown and white plumage, gradually acquiring their dark brown body and distinctive white head and tail as they mature. Bald eagles generally attain adult plumage by 5 years of age. Most are capable of breeding at 4 or 5 years of age, but in healthy populations they may 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 5½ 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 BGEPA 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 continuously 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.



Copyright *Birds of North America*, 2000

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 45 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 nesting season tends to be longer in the southern U.S., and re-nesting following nest failure is more common there as well. The following table shows the timing of bald eagle nesting 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 can vary within a given region, you should contact the nearest U.S. Fish and Wildlife Service Field Office (see page 15) 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.

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.
SOUTHEASTERN U.S. (FL, GA, SC, NC, AL, MS, LA, TN, KY, AR, eastern ½ of TX)											
Nest Building → → → → → → → → → → → → → →											
		Egg Laying/Incubation → → → → → → → → → → → →									
			Hatching/Rearing Young → → → → → → → → → → → →								
					Fledging Young → → → → → → → →						
CHESAPEAKE BAY REGION (VA, MD, DE, southern ½ of NJ, eastern ½ of PA, panhandle of WV)											
		Nest Building → →									
				Egg Laying/Incubation → → →							
					Hatching/Rearing Young → → → → →						
								Fledging Young			
NORTHERN U.S. (ME, NH, MA, RI, CT, NY, northern ½ of NJ, western ½ of PA, OH, WV exc. panhandle, IN, IL, MI, WI, MN, IA, MO, ND, SD, NB, KS, CO, UT)											
			Nest Building → →								
					Egg Laying/Incubation → →						
						Hatching/Rearing Young → →					
									Fledging Young → → → →		
PACIFIC REGION (WA, OR, CA, ID, MT, WY, NV)											
				Nest Building → →							
					Egg Laying/Incubation → →						
						Hatching/Rearing Young → →					
									Fledging Young → → → →		
SOUTHWESTERN U.S. (AZ, NM, OK panhandle, western ½ of TX)											
		Nest Building → → → → →									
				Egg Laying/Incubation → →							
					Hatching/Rearing Young →						
								Fledging Young →			
ALASKA											
					Nest Building → → → → → → →						
							Egg Laying/Incubation				
→								Hatching/Rearing Young → → →			
Ing Young											Fledg-
Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.

How many chicks do bald eagles raise?

The number of eagle eggs laid will vary from 1-4, 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 amounts to 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 (often along roads or at landfills). 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' penchant for feeding on roadkill and euthanized animal carcasses at landfills and feedlots can be deadly: collision with cars and secondary poisoning by ingestion of sodium pentobarbital are both significant causes of eagle mortalities.

During the nesting 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 nesting 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 nesting season.
III	Incubation and hatching	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	Moderately sensitive period	Likelihood of nest abandonment and vulnerability of the nestlings to elements gradually decreases. However, nestlings may miss feedings, which may affect their survival, or may prematurely leave the nest due to disruption, resulting in their death.

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 juveniles 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, 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.

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. Nesting bald eagles may inadequately feed their young if the adults are prevented or discouraged from feeding at preferred sites. Migrating and wintering bald eagles 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. Disruptive activities in the flight path between nesting and roosting sites and important foraging areas can interfere with feeding. Activities that permanently alter eagle habitat 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 interferes with or interrupts breeding, feeding, or sheltering behavior, causing injury, death, or nest abandonment, the conduct of the activity constitutes a violation of the BGEPA'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 15) for advice and recommendations for how to avoid such disturbance.

RECOMMENDATIONS FOR AVOIDING BALD EAGLE 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 liberalized. This data will be used to make future adjustments to the Guidelines.

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

The size and shape of effective buffers varies depending on the topography and other ecological characteristics surrounding the nest site. In open areas where there are little or no natural forested buffers, such as in many western States, the distance alone will serve as a buffer. Consequently, the buffers in open areas may need to be larger than for areas with denser vegetation or other natural screening.

In addition to the physical features of the landscape, appropriate buffer size 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.

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 nesting 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 15).

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 a county fair, even though the county fair 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 incorporated the recommendations for some activities into tables (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. If the nest is visible from where the activity will be conducted, then your activity will be visible from the nest. If the nest is not visible from where your activity will be conducted, the activity will not be visible from the 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.

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. Over most of the United States, after 5 years of disuse, the probability of an alternate bald eagle nest becoming active is considered remote enough that protection from disturbance is no longer necessary. However, in the southwestern U.S., suitable nest sites are in short supply, and the probability of reuse remains high for up to 10 years of disuse.

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 for the preceding 5 years (10 years in Arizona, New Mexico, and west of the 100th meridian in Texas), 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 BGEPA, however, and may not be destroyed.

If special circumstances exist that make it unlikely an inactive nest will be reused before 5 years (10 years in the southwestern States noted above) 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.

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 nesting 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 nesting 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 restricted. 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.

Contact information for our Field Offices is on page 15.

Category A:

Building construction, 1 or 2 story, where the project footprint is ½ acre or less.

Construction of roads, trails, canals, power lines, and other linear utilities.

Agriculture – new or expanded operations.

Alteration of shorelines or wetlands.

Installation of docks or moorings.

Water impoundment.

Aquaculture.

<u>Category A</u>	<i>If there is no similar activity within 1 mile of the nest</i>	<i>If there is similar activity closer than 1 mile from the nest</i>
<i>If the activity will be visible from the nest</i>	660 feet. Clearing, external construction and landscaping should be done outside nesting season. Landscaping buffers are recommended.	660 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping should be done outside nesting season. Landscaping buffers are recommended.
<i>If the activity will not be visible from the nest</i>	330 feet. Clearing, external construction and landscaping should be done outside nesting season.	330 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping should be done outside nesting season.

Category B:

Building construction, 3 or more stories.

Building construction where the project footprint is larger than ½ acre.

Mining.

Oil and natural gas drilling and refining.

<u>Category B</u>	<i>If there is no similar activity within 1 mile of the nest</i>	<i>If there is similar activity closer than 1 mile from the nest</i>
<i>If the activity will be visible from the nest</i>	660 feet. Clearing, blasting, external construction and landscaping should be done outside the nesting season. Landscaping buffers are recommended.	660 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping should be done outside the nesting season. Landscaping buffers are recommended.
<i>If the activity will not be visible from the nest</i>	660 feet. Clearing, external construction and landscaping should be done outside the nesting season.	330 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping should be done outside the nesting season.

C. Timber Operations and Forestry Practices

- Avoid clear cutting within 330 feet of the nest at any time.
- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the nesting season within 660 feet of the nest.
- 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 nesting 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 nesting season would be beneficial, preferred, or safer for the birds, 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 nesting 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 nesting season.
- Avoid construction of log transfer facilities and in-water log storage areas within 330 feet of the nest.

D. Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the nesting season. During the nesting 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.

E. Motorized Watercraft use (including jet skis/personal watercraft). No buffer is necessary around nest sites outside the nesting season. During the nesting 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.

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

G. Helicopters and fixed-wing aircraft.

Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1000 feet of the nest during the nesting season, except where eagles have demonstrated tolerance for such activity.

H. Blasting and other loud, intermittent noises.

Avoid blasting and other activities that produce extremely loud noises within 1/2 mile of active nests (or within 1 mile in open areas), 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.

ADDITIONAL RECOMMENDATIONS FOR PROTECTING BALD EAGLES

The following are additional management practices that land owners and planners can exercise to benefit bald eagles. Many of these recommendations are designed to protect and preserve bald eagle habitat. In some cases, these practices can be critical to ensure against illegal take under the BGEPA.

1. Protect and preserve communal roost sites, potential nest sites, and important foraging areas. Retain mature trees and old growth stands wherever possible, particularly within ½ mile from water.
2. Avoid potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.
3. Locate long-term and permanent water-dependent facilities away from important eagle foraging areas.
4. Avoid recreational and commercial boating and fishing near eagle foraging areas during peak feeding times (usually early to mid morning and late afternoon), except where eagles have demonstrated tolerance to such activity.
5. 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.
6. Locate aircraft corridors no closer than 1,000 feet vertical or horizontal distance from communal roost sites.
7. Use pesticides, herbicides, fertilizers, and other chemicals only in accordance with Federal and State laws and labeled instructions for their use.
8. Identify and monitor 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.
9. 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.
10. Site wind turbines and high voltage transmission power lines away from bald eagle communal roost sites to avoid collisions, where feasible. Bury utility lines along forested shorelines and roadways in new development projects.

11. Employ industry-accepted measures to prevent birds from being electrocuted on towers and poles.
12. 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.
13. Immediately cover carcasses of euthanized animals at landfills to protect eagles from being poisoned.
14. 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.
15. Avoid excessive groundwater pumping and river diversion that can lead to destruction of nest trees, roosts, and foraging areas.
16. Use an approved non-toxic shot when hunting waterfowl. Eagles can be poisoned by elevated levels of lead after feeding on fish and waterfowl that have ingested lead shot or carrion killed with lead shot.

CONTACTS

We encourage you to contact your nearest U.S. Fish and Wildlife Service Field Office regarding any activity that might affect bald eagles. The following U.S. Fish and Wildlife Service Field Offices provide technical assistance on bald eagle management:

<u>Alabama</u>	Daphne	(251) 441-5181	<u>New York</u>	Cortland	(607) 753-9334
<u>Alaska</u>	Anchorage	(907) 271-2888		Islip	(631) 581-2941
	Fairbanks	(907) 456-0203	<u>North Carolina</u>	Raleigh	(919) 856-4520
	Juneau	(907) 586-7240		Asheville	(828) 258-3939
<u>Arizona</u>	Phoenix	(602) 242-0210	<u>North Dakota</u>	Bismarck	(701) 250-4481
<u>Arkansas</u>	Conway	(501) 513-4470	<u>Ohio</u>	Reynoldsburg	(614) 469-6923
<u>California</u>	Arcata	(707) 822-7201	<u>Oklahoma</u>	Tulsa	(918) 581-7458
	Barstow	(760) 255-8852	<u>Oregon</u>	Bend	(541) 383-7146
	Carlsbad	(760) 431-9440		Klamath Falls	(541) 885-8481
	Red Bluff	(530) 527-3043		La Grande	(541) 962-8584
	Sacramento	(916) 414-6000		Newport	(541) 867-4558
	Stockton	(209) 946-6400		Portland	(503) 231-6179
	Ventura	(805) 644-1766		Roseburg	(541) 957-3474
	Yreka	(530) 842-5763	<u>Pennsylvania</u>	State College	(814) 234-4090
<u>Colorado</u>	Lakewood	(303) 275-2370	<u>South Carolina</u>	Charleston	(843) 727-4707
	Grand Junction	(970) 243-2778	<u>South Dakota</u>	Pierre	(605) 224-8693
<u>Florida</u>	Panama City	(850) 769-0552	<u>Tennessee</u>	Cookeville	(931) 528-6481
	Vero Beach	(772) 562-3909	<u>Texas</u>	Clear Lake	(281) 286-8282
	Jacksonville	(904) 232-2580	<u>Utah</u>	West Valley City	(801) 975-3331
<u>Georgia</u>	Athens	(912) 265-9336	<u>Virginia</u>	Abingdon	(276) 623-1233
<u>Idaho</u>	Boise	(208) 378-5243		Gloucester	(804) 693-6694
	Chubbuck	(208) 237-6975	<u>Washington</u>	Lacey	(306) 753-9440
<u>Illinois/Iowa</u>	Rock Island	(309) 793-5800		Spokane	(509) 891-6839
<u>Indiana</u>	Bloomington	(812) 334-4261		Wenatchee	(509) 665-3508
<u>Kansas</u>	Manhattan	(785) 539-3474	<u>West Virginia</u>	Elkins	(304) 636-6586
<u>Kentucky</u>	Frankfort	(502) 695-0468	<u>Wisconsin</u>	New Franken	(920) 866-1725
<u>Louisiana</u>	Lafayette	(337) 291-3100	<u>Wyoming</u>	Cheyenne	(307) 772-2374
<u>Maine</u>	Old Town	(207) 827-5938		Cody	(307) 578-5939
<u>Maryland</u>	Annapolis	(410) 573-4573			
<u>Michigan</u>	East Lansing	(517) 351-2555			
<u>Minnesota</u>	Bloomington	(612) 725-3548			
<u>Mississippi</u>	Jackson	(601) 965-4900			
<u>Missouri</u>	Columbia	(573) 234-2132			
<u>Montana</u>	Helena	(405) 449-5225			
<u>Nebraska</u>	Grand Island	(308) 382-6468			
<u>Nevada</u>	Las Vegas	(702) 515-5230			
	Reno	(775) 861-6300			
<u>New Jersey</u>	Pleasantville	(609) 646-0310			
<u>New Hampshire</u>	Concord	(603) 225-1411			
<u>New Mexico</u>	Albuquerque	(505) 346-2525			

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>

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 between eagles. Many roost sites are used year after year.

Disturbance – In the context of BGEPA, to agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment. 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 interferes with or interrupts normal breeding, feeding, or sheltering habits, and cause injury, death 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, deer) 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 nesting season, whether or not eggs are laid. An **alternate** nest is a nest that is not used for breeding by eagles during a given nesting season.

Nest abandonment – Nest abandonment occurs when adult eagles desert or stop attending to a nest and do not subsequently return and successfully raise young in that nest for the duration of a breeding season. A nest can be abandoned due to alterations around the site that occurred prior to the nesting season, if such alterations agitate or bother the eagle to a degree that causes the eagles to either (1) not use the nest for breeding purposes, or (2) not occupy the nest at all that season. For eagles that migrate during the non-nesting 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. If the eagles remain in the area throughout the non-breeding season, nest abandonment can occur at any point after the eagles initiate behaviors that indicate they will use the nest for breeding purposes until such time that all progeny of 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 potential 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. The existing activities in examples (1) and (2) are of similar scope, while the existing activity in example (3) is 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 Research* 31:7-10.
- 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 Voyageurs 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.

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. 1993. Bald Eagle Basics. Anchorage, AK.
- U.S. Fish and Wildlife Service. 1979. Bald Eagle Management Guidelines: Oregon – Washington. Portland. OR.
- U.S. Fish and Wildlife Service. 1993. Habitat Management Guidelines for Bald Eagles in Texas. Austin, TX.
- 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. 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 and Virginia Department of Game and Inland Fisheries. 2000. 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.
- 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.