

Bald Eagle

(*Haliaeetus leucocephalus alascanus*)

Iain J. Stenhouse

The bald eagle is the second largest bird of prey in North America (surpassed only by the California condor [*Gymnogyps californianus*]), and is generally associated with areas of significant wilderness (Fig 1). It is widely distributed in coastal areas of North America, particularly along mature forested shorelines, but ranges farther inland during breeding (Buehler 2000). Alaska is widely recognized as the major breeding and wintering stronghold of the bald eagle.

For most Americans, bald eagles are highly prized for their esthetic value, but the species was not always esteemed. In Alaska, a bounty (to reduce eagles because they were considered a predator on salmon) was offered for much of the first half of the 1900s, and records show that approximately 80% of the bald eagles for which bounties were paid came from Southeastern Alaska (Southeast; Robards and King 1966). The bounty system was eventually eliminated, by federal legislation to protect bald eagles, in 1952 (Robards and King 1966).

Bald eagle populations across the entire United States suffered drastically from persecution, pollution, and habitat loss in the mid- to late 1900s (Buehler 2000). Populations of the species have rebounded since then, and have generally increased throughout much of North America since the 1980s. At that time, Alaska had the highest breeding density on record for bald eagles in North America (Hodges and Robards 1982), and individuals from Alaska were transplanted to various areas of the contiguous United States (such as New York State) in reintroduction projects (Nye 1986). Interestingly, Southeast also boasted the oldest wild bald eagle on record, at 28 years old, in 1997 (Schempf 1997).



FIG 1. Adult bald eagles are commonly observed throughout much of southeastern Alaska and the Tongass National Forest. (John Schoen)

STATUS IN SOUTHEASTERN ALASKA

Distribution

Bald eagles are a truly North America species, found nowhere else in the world. They range across most of the continent, but are especially common in regions where there are large expanses of undisturbed aquatic habitat with forested shorelines, cliffs, or both. Limited breeding takes place in more arid regions of the continent, such as the Southwest United States and Mexico (Buehler 2000).

The historical breeding distribution of the bald eagle changed substantially during the last 250 years, especially in regions with extensive development of shoreline property. Throughout much of the United States, the breeding range for this species contracted considerably during the 20th century, resulting from the combined effects of habitat loss, persecution, and pesticides, such as DDT, on top predators (U.S. Fish and Wildlife Service [USFWS] 1986). In much of the

Southeast and Midwest regions of the United States, bald eagles were completely extirpated as a breeding species. Although the bald eagle population in the contiguous United States has rebounded dramatically since the 1980s, it remains well below levels that preceded European settlement (Buehler 2000).

Despite considerable persecution during the first half of the 20th century, Alaska, particularly Southeast, has remained a stronghold for the bald eagle (USFWS 2001). The favorable conditions in Alaska are largely due to (1) the remote nature of most of the state; (2) a bountiful supply of salmon and other fishes, a major food source for bald eagles; and (3) the extent of relatively undisturbed breeding and wintering habitat (Sidle et al. 1986).

The breeding bald eagle population is dense but widely distributed across coastal Southeast (Gabrielsen and Lincoln 1959). At other times of the year, however, the birds congregate, often in very large numbers, at specific locations in Southeast where there is an abundance of food (Buehler 2000). The Chilkat Valley, north of the city of Haines, for example, supports the largest concentrations of bald eagles on record (more than 3,500 individuals at times). The birds are attracted by a large late-spawning run of chum salmon (*Oncorhynchus keta*; Hansen et al. 1984).

Abundance

Before the European settlement of North America, the bald eagle population may have exceeded half a million individuals (American Bald Eagle Information 2004). The species was described as “common” by early explorers and naturalists, and, in the early 1700s, its population was estimated to be close to half a million (Bald Eagle Fest 2004a). Only 80 years later, however, when this species was adopted as the national symbol of the United States, the breeding population was thought to be around 100,000 nesting pairs (Bald Eagle Fest 2004b).

Southeast supports the largest breeding population of bald eagles in North America (Jacobson and Hodges 1999), with the majority of breeding birds remaining resident year-round (M. Jacobson, USFWS, Juneau, AK, personal communications 2005). Bald eagles have been systematically surveyed in Southeast, first in 1967, again in 1977, then about every 5 years since 1982 (USFWS 2001). These surveys, conducted by the USFWS, indicate that the bald eagle population in Southeast has increased considerably during the time of the study, but appears to have stabilized at around

25,000 individuals (Jacobson and Hodges 1999). The 25,000 count represents more than half of the bald eagle population in Alaska, which has been estimated at around 44,000 individuals (Stalmaster 1987).

The abundance of bald eagles in Southeast, however, has been shown to be highly variable among habitats. Clusters of islands or broken shorelines show higher densities than do continuous shorelines, and the lowest densities are found along steep, unforested fiords that terminate in glaciers (King et al. 1972). Considerably lower densities are indicated on islands south of Sumner Strait than for more optimal island habitats, such as on Admiralty Island (King et al. 1972).

A large proportion of the breeding population of bald eagles in Southeast failed to breed in the 1970s. Hansen and Hodges (1985) suggested that this interruption in breeding frequency is probably typical of bald eagles in the region, however, and likely a result of naturally ephemeral food supplies. Breeding bald eagles are also highly territorial, and in marginal food years, it appears that only birds accessing optimal habitat attempt to breed (Hansen 1987). In the 1980s, the reproductive productivity of bald eagles in Southeast was also found to be highly variable and generally declining (Hodges 1982a, Hansen 1987).

Special Taxonomic Considerations

Two subspecies of bald eagles have been tentatively recognized, based on size differences (American Ornithologists' Union 1957). The larger subspecies (*H. l. alascanus*) is generally thought to breed north of 40° N, although individuals may wander south into the breeding range of the smaller subspecies (*H. l. leucocephalus*), and vice versa, outside the breeding season (Buehler 2000). The geographic ranges of these potential subspecies have never been clearly defined, however, and it has been suggested that the variation may simply be clinal (i.e., morphological change along an environmental gradient) in nature (Palmer et al. 1988).

Significance to the Region and Tongass National Forest

Bald eagles are the national emblem of the United States, and Southeast encompasses the largest breeding density of bald eagles in the nation and the world. Therefore, Southeast and the Tongass National Forest—the nation's largest national forest—play a significant role in the conservation network for the bald eagle in North America (Fig 2).



FIG 2. (above) Bald eagles are year-round residents of southeastern Alaska and can be observed along marine shorelines and perched in old-growth trees. (John Hyde)



FIG 3. (upper right) The lower Chilkat River north of Haines in Upper Lynn Canal. The Alaska Chilkat Bald Eagle Preserve is located along the Chilkat River and its tributaries. (John Schoen)



FIG 4. (lower right) The Chilkat River supports a late run of chum salmon that attracts thousands of eagles to the river during late fall. (Bob Armstrong) (inset) An adult bald eagle feeding on a spawned out chum salmon. (John Hyde)

Seymour Canal Bald Eagle Management Area: In recognition of an unusually high density of nesting bald eagles, the Seymour Canal Bald Eagle Management Area, on the east side of Admiralty Island, was established in 1972, when the area was originally slated for large-scale logging. The management area included Swan, Tiedeman, Bug, Faust, and Dorn islands, as well as a few smaller islets, and constituted more than 10,000 acres (4,047 ha) and 56 mi (90 km) of saltwater shoreline (Hodges 1982a). In 1980, however, with the introduction of the Alaska National Interest Lands Conservation Act legislation, the area was absorbed into the larger Kootznoowoo Wilderness, which makes up most of the Admiralty Island National Monument. Since then, the USFS, which manages Admiralty Island National Monument, has considered specific protective measures for bald eagles in this area unnecessary (J. Neary, USFS, Juneau, AK, personal communication 2005).

Alaska Chilkat Bald Eagle Preserve: The Alaska Chilkat Bald Eagle Preserve was established by the Alaska State Legislature in 1982, and is currently

managed by the Alaska Department of Natural Resources (ADNR), Division of Parks and Outdoor Recreation, guided by an advisory council. The site consists of more than 49,000 acres (19,830 hectares) of river bottom land of the Chilkat, Klehini, Tsirku, and Kelsall rivers (ADNR 2004; Fig 3). Bald eagles are attracted to the area by an abundance of post-spawning salmon, and significant congregations of eagles (more than 3,500) can build up at this site (Hansen et al. 1984) (Fig 4).

The Chilkat Bald Eagle Preserve Management Plan, first adopted in 1985, was updated in 2002 (ADNR 2002). The plan contains strict management guidelines and permitting requirements for a variety of land uses. The permitting system is specifically designed to limit access by commercial operators during the most critical times for bald eagles (ADNR 2002).

It is estimated that the Chilkat Preserve receives 8,000–9,000 visitors between October and January each year exclusively for the purpose of viewing bald eagles (J. Telford, State Park Ranger, Haines, AK, personal communication 12-05). Since 1994, an annual Bald Eagle Festival has been held in the nearby town

of Haines. In the last few years, the festival has attracted more than 300 visitors to the area, during a 3-day period (American Bald Eagle Foundation 2004), attracting business to the community during the tourism off-season.

Special Management or Conservation Designations

The bald eagle is protected under extremely comprehensive statutory and regulatory legislation by both federal and state authorities. Under the Lacey Act of 1900 (Title 16, U.S. Code [USC], Sections 3371–3378), it is unlawful to export, import, transport, sell, receive, acquire, or purchase a bald eagle taken or possessed in violation of any U.S., tribal, or foreign law. Furthermore, the Migratory Bird Treaty Act of 1918 (16 USC 703–711; Volume 40, U.S. Statutes at Large [Stat.], page 755) prohibits the possession, transport, or take of any migratory bird, including the bald eagle, or its nests or eggs, without specific authorization (Department of the Interior [DOI] 1994). The bald eagle was specifically protected in the United States under the Bald Eagle Protection Act of 1940 (16 USC 668–668d, 54 Stat. 250), which prohibited killing, harassment, or possession of eagles or parts thereof. The State of Alaska was initially exempted from the Bald Eagle Protection Act, but was finally included in 1952, after studies showed that foraging by bald eagles did not affect salmon numbers (DOI 1995).

In 1973, with the introduction of the Endangered Species Act (Public Law 93-205), the bald eagle was designated endangered in most of the contiguous United States (except in Washington, Oregon, Minnesota, Wisconsin, and Michigan, where it was considered threatened). In 1995, the bald eagle was down-listed to threatened across the contiguous United States (DOI 1995). In Alaska, however, bald eagles were never listed under the Endangered Species Act (Bowman 1999). Despite heavy persecution in the area throughout the first half of the 20th century, bald eagle populations have remained relatively healthy in Southeast (Buehler 2000).

Currently, the bald eagle has no specific federal protection in Canada, other than the Migratory Bird Treaty Act (Canadian Wildlife Service 2003). Local populations in Canada, however, are protected in a number of provinces, such as British Columbia (Davies 1985) and Ontario (Ranta 1985). The bald eagle is also listed in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (27 UST 108), and the southern race (*H. l.*

leucocephalus) is listed as endangered in the International Union for Conservation of Nature and Natural Resources Red Data Book.

The bald eagle has been recognized as a Management Indicator Species for inclusion in land management planning on the Tongass National Forest in Southeast (U.S. Forest Service [USFS] 1997a). Given the global significance of this regional population, the bald eagle should certainly be considered a critical element of the ecological integrity of the Tongass National Forest.

HABITAT RELATIONSHIPS

Bald eagles are generally associated with large tracts of undeveloped coastal wilderness (coastal areas with little human activity). Bald eagles nest close to shore, with the average distance of nests from water only 121 ft (37 m; Robards and Hodges 1976). To support their large heavy nests, bald eagles require tall, live old-growth trees with stout supporting branches. Of almost 3,000 bald eagle nests observed in Southeast between 1969 and 1976, 96% were in live trees, most between 49 and 151 ft (15 and 46 m) tall (mean = 98 ft [30 m]); 84% were in old-growth stands, where trees had an average diameter in excess of 3 ft (1 m); and none were recorded in a second-growth tree (Robards and Hodges 1976).

Bald eagle nests are usually built just below the crown of a large tree, in a central fork close to the trunk (Sidle et al. 1986). In Southeast, the average nest is built at a height of around 98 ft (30 m; Corr 1974). The average age of trees bearing bald eagle nests is 400–500 years old ($n = 2,760$; Robards and Hodges 1976).

Habitat loss (physical alteration of the environment) and disturbance associated with human activities are widely recognized as the greatest threats to bald eagle populations and many other birds of prey (LeFranc and Millsap 1984). There is little doubt that bald eagle habitat has been reduced in Southeast from timber harvest, road-building, and other development activities (USFWS 2001).

IMPLICATIONS FOR CONSERVATION

Because of their broad distribution, relative abundance, and specific habitat requirements, all of which make population monitoring relatively straightforward, bald eagles are considered a good indicator of ecosystem health (Sidle and Suring 1986). Since the bald eagle was proposed as a useful



FIG 5. The most common nest sites for bald eagles in southeastern Alaska is in large old-growth spruce and hemlock adjacent to the shoreline. (John Schoen)

Management Indicator Species for all forest lands in Alaska in 1986 (Sidle et al. 1986), it does not appear to have been heavily used in this role.

Habitat loss has long been considered the most significant long-term threat to bald eagle populations across North America (USFWS 1986). The removal of large, old-growth trees in Southeast, particularly near saltwater shores, has clearly reduced nesting opportunities for bald eagles in the region. Although, to date, there has been no attempt to quantify the degree of habitat loss, the proximity of clearcuts is known to adversely affect the density of bald eagle nesting throughout the Tongass National Forest (Gende et al. 1998). Industrial forestry potentially has multiple influences on bald eagles including reducing nesting habitat and perch sites, affecting salmon spawning streams, and increasing disturbance (Buehler 2000). Bald eagles are especially sensitive to disturbance early in the breeding season, and activities associated with resource extraction, development, and recreation can result in reproductive failure or cause bald eagles to abandon their nests completely (Fraser et al. 1985).

According to an Interagency Agreement between the USFS and USFWS, the USFS attempts to regulate human disturbance within identified bald eagle use areas of the Tongass National Forest. The Forest-wide Standards and Guidelines of the Tongass Land Management Plan prohibit timber harvest within 330 ft (100 m) of a bald eagle nest tree (USFS 1997b). It is not known, however, whether this buffer is adequate to provide sufficient space to prevent disruption of breeding activities and maintain nesting densities (Gende et al. 1998). If small buffer stands are left isolated, they are subject to greater windthrow, reducing their effectiveness, and do not necessarily

include alternative nest or perch trees (Hodges 1982b). In fact, buffer zones of 656 ft (200 m) around trees with bald eagle nests have been recommended for areas scheduled for logging (Corr 1974), and one study suggested that buffers of at least 984 ft (300 m) are required to maintain bald eagle nesting densities in Southeast (Gende et al. 1998). In other regions of the country, buffer zones of 1,312–2,624 ft (400–800 m) have been recommended to better protect bald eagle nests from disturbance (see Gende et al. 1998).

In 1997, the USFS adopted a regulation to maintain a 984-ft (300-m) fringe of “mostly undisturbed” forest around beach and estuary habitat in the Tongass National Forest (USFS 1997b). This measure, which was designed to provide habitat for a range of wildlife species and human uses, resulted in improved protection for bald eagle nest and perch sites, as well as buffering for their marine foraging areas (P. Schempf, USFWS, Juneau, AK, personal communication 2005).

Like many avian species, particularly predators and scavengers that forage at the top of the food chain, bald eagles are highly susceptible to organochlorine pesticides and other environmental contaminants. Such contaminants are known to disrupt reproduction of bald eagles and drastically reduce their productivity (Buehler 2000). Pesticides are not known to be a major problem in bald eagles in Alaska (Wiemeyer et al. 1972, Sprunt et al. 1973), and heavy metals may represent a greater threat in Alaska (USFWS 2001). For example, lethal concentrations of lead have been found in dozens of bald eagle carcasses in Alaska, and mercury (in sublethal doses) is commonly found in tissue samples of bald eagles from Alaska (USFWS 2001).

Bald eagles are long-lived birds with a relatively low reproductive potential, a strategy common to most large birds of prey (Newton 1977). Because of a considerable lag time in the effect, even a major decline in productivity would take some time to appear at the population level (USFWS 2001). Currently, it is not clear whether bald eagle productivity in Southeast is high enough to maintain current population numbers in the region.

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