

Bald Eagle Banding in Alaska

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Bird banding is important for research and management of wildlife. Modern bird banding originated in Denmark in 1890 (USDI Fish and Wildlife Service 1986) and subsequently, banding activities spread across Europe and the United States. Since 1920, the banding of migratory birds in the United States and Canada has been under the joint direction of the U.S. Fish and Wildlife Service (USFWS; formerly the Bureau of Biological Survey) and the Canadian Wildlife Service. The USFWS Bird Banding Laboratory (BBL) manages banding data on about 1.1 million birds and receives about 50,000 encounters annually (D. Bystrak, pers. comm.).

Bird banding is most effective when used for specific management goals or research objectives. Often bird banding contributes to descriptions of movements, migration patterns, philopatry and longevity. Banding is also an important method for estimating survival and harvest rates (e.g. Anderson 1975, Nichols and Hines 1987) and banding and colormarking of breeding pairs provide data about demography and mating behavior (e.g., Woolfenden and Fitzpatrick 1984). Studies such as these have specific banding protocols as part of their design. In addition much banding has been done to achieve other objectives that require handling birds (e.g., studies of nestling development or molt, wildlife rehabilitation) or in conjunction with education or recreation. Information from these banding efforts is seldom analyzed (J. Tautin, pers. comm.). Bald Eagle banding often occurs in this context, where the actual banding and results from banding usually have been incidental to the overall study objectives. Nevertheless, examination of long-term patterns associated with the encounters from banded Bald Eagles has provided some important natural history information (Gerrard and Bortolotti 1988). We review information that was obtained from banding Bald Eagles in Alaska and relate it to topics such as movements and longevity.

Methods

Three terms are commonly used in reference to bird banding data. An encounter is a report about a previously banded bird. Encounters include recaptures of banded birds, recoveries and sightings. A recovery is a banded bird found dead and reported to the BBL. Thus, a recovery relates only to a dead bird and is a terminal record. Sighting is the process of reading and reporting a band number on a live bird without actually capturing the bird. Sightings include the reading of a band, usually with a telescope and observations of color-marked birds. Colored leg bands or patagial markers, often labeled with large numbers and letters, provide a unique identification for individual birds or cohorts.

We obtained Bald Eagle data from the BBL banding and encounter files. Information about continent-wide Bald Eagle bandings and encounters was available from a listing for 1955 through 1985. We used this as a basis for comparison to some of the Alaska information. Alaska banding and encounters were obtained for 1956-1990. BBL banding summary files contain the following information: bird species (using American Ornithologists Union codes, e.g., 352.0 for Bald Eagle), date, sex (for Bald Eagles the sex is usually unknown), location (in 10 minute latitude/longitude blocks), permit number (agency or individual who did the banding) and status codes (e.g., normal wild bird, rehabilitation bird, color banded, radio transmitter attached). The recovery/encounter file may also contain information on how, when and where the encounter was obtained.



U.S. Fish and Wildlife Service band on the leg of an adult Bald Eagle. Photo by Mike Jacobson.

Results and Discussion

Bald Eagles Banded

In Alaska 1,185 Bald Eagles were banded and 73% of these occurred since 1980 (Figure 1). Throughout North America, 12,441 Bald Eagle banding records were processed from

1955 through August of 1985. During this period the largest numbers were banded in Wisconsin (2,254), Michigan (1,105), Ontario (911), Minnesota (734), Alaska (720), Nova Scotia (512) and Saskatchewan (495). Nestlings banded in Michigan, Minnesota and Wisconsin accounted for 33% of the total number of banded Bald Eagles in North America.

The status codes assigned to each banded bird indicated that many Bald Eagles were not handled solely for banding. Activities that alter the "normal wild bird" status included attaching a radio transmitter, obtaining a blood sample, holding and transporting a bird prior to release, using a color marking technique and rehabilitation. These activities can limit the uses of banding data because some analyses require that only normal wild banded birds can be included (Brownie et al. 1985). This restriction is based on the assumption that some activities alter the probability of a future encounter.

Only 39% of the Bald Eagles banded in Alaska were banded as "normal wild" birds, while continent-wide 61.5% of all Bald Eagles were banded as normal wild birds. Forty-eight percent of Alaskan Bald Eagles were banded in the month of July because banding of nestlings generally occurs during this period. The proportion of nestlings banded was 59% of all Alaskan eagles banded and continent-wide, 86% of all Bald Eagles were banded as nestlings. There has been more emphasis on the capture and hence banding of free-flying Bald Eagles in Alaska than elsewhere (Robards 1967, Cain and Hodges 1989). The number of Bald Eagles banded as adults (the ATY-after third year category) in Alaska was 25%, while continent-wide adults made up only 4%.

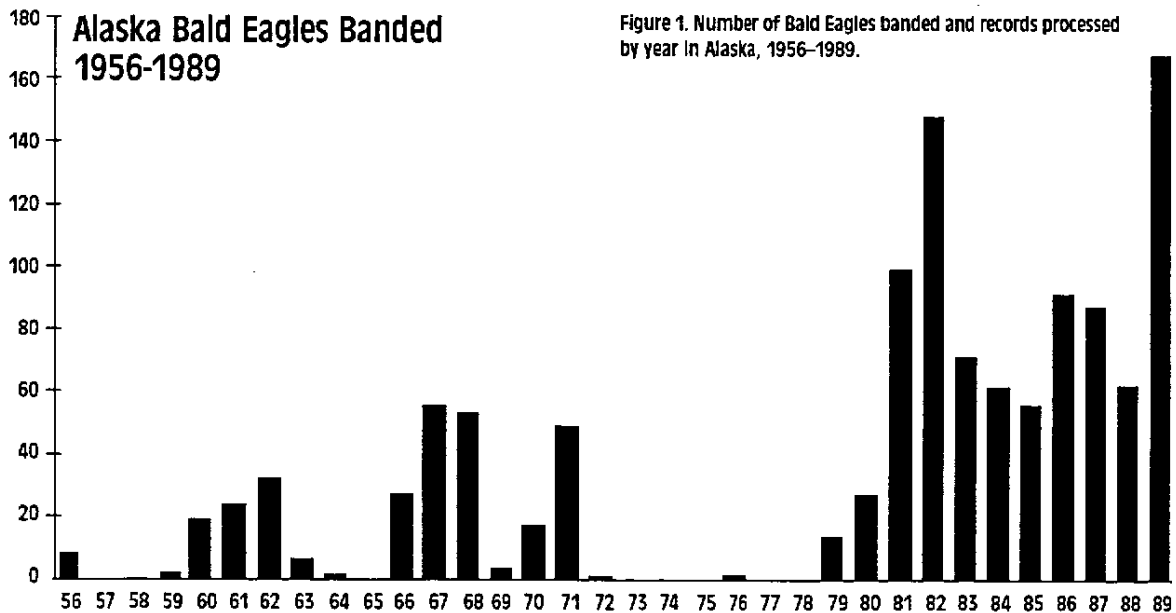


Figure 1. Number of Bald Eagles banded and records processed by year in Alaska, 1956-1989.

Several USFWS studies accounted for 83% of the Alaska Bald Eagle banding. The objectives of these studies often do not rely on banding Bald Eagles as the main marking method. For example, T. N. Bailey captured, banded and radio-marked 22 Bald Eagles wintering along the upper Kenai River to document movements. Staff of the Alaska Maritime National Wildlife Refuge color-marked and banded about 197 Bald Eagles on

Adak Island to learn about their association with a garbage dump and about inter- and intra-island movements. Hansen et al. (1984) captured, radio-tagged and banded 31 Bald Eagles in the Chilkat Valley to understand the movements of these eagles in the Chilkat Valley and throughout Southeast Alaska. D. Zwiefelhofer of Kodiak National Wildlife Refuge banded 239 Bald Eagles (20% of the Alaska bandings). USFWS staff from the Juneau Office of Migratory Bird Management and Raptor Management Studies have banded 544 (64% of Alaska Bald Eagle bandings), mostly when they were handled for primary purposes other than banding. Data from encounters of birds banded in this manner usually provide supplemental data for the objectives and sometimes anecdotal information about the cause of death, longevity or movements.

Bald Eagle Encounters and Movements

Few Bald Eagle encounters occur in Alaska compared with continent-wide encounters. Across North America, 12.5% of 12,441 Bald Eagles banded were encountered, but only 3.5% of 1,185 Bald Eagles banded in Alaska have been processed by the BBL. Encounters by the public (vs. special efforts of biologists) likely are closely related to human densities in areas where eagles occur. We expect a low encounter rate in Alaska owing to the low human density and the poor chance of the public encountering a banded bird in a remote location.

Most sightings of color-marked Bald Eagles are not reported to the BBL, yet biologists can benefit from specific color-marking and banding of Bald Eagles. For example, McCollough (1986, 1989) designed a mark-resight study that provided information on postfledging survival rates, molting sequence and aging of Bald Eagles in Maine, with his resight data then becoming part of the continent-wide data base. Sightings provided data on many released birds, for example, Bald Eagles that were translocated from one area to another and where young, captive-bred birds are released (Sherrod et al. 1989, Nye 1998, Wood et al. 1990). Sightings also provide very useful information from programs in which wild birds are banded to study movements and use of local resources such as food or roost sites (Helander 1985, McCollough 1986). In Alaska, sightings could provide many data at concentrations of birds feeding on salmon runs and along shorelines where nests are common.

Information about the circumstance of encounters is available for some banded birds.

Encounter information from Alaska includes:

29 "found dead"

1 skeleton with band

2 shot

2 caught due to injury

1 caught in a trap (not a bird trap)

1 caught due to a car

3 caught due to striking wires/towers

1 caught and released by bander and

1 only the band number was available.

The "found dead" category includes a variety of causes, but often information is insufficient for an explanation for a cause of death.

An Alaskan encounter is a longevity record for the Bald Eagle (Cain 1986, Klimkiewicz and Futcher 1989). The individual eagle was banded on the Chilkat River in November 1965 when it was judged to be at least 3 years old. Subsequently, the bird was captured and released on the north end of Admiralty Island in 1984 and Cain (1986) estimated it to be at least 21 years, 11 months of age.

Of the 41 encounters of Bald Eagles banded in Alaska, 36 were in Alaska. A nestling banded in Saskatchewan and recovered dead south of Juneau four years later was the only Bald Eagle banded outside Alaska and encountered in the state. Five Bald Eagles banded in Alaska were recovered to the south (Table 1). Three of these were banded and radio-tagged in association with the Chilkat River studies (Hansen et al. 1984, Hodges et al. 1987) and were later recovered in southern coastal areas. Two Bald Eagles banded in interior Alaska were recovered to the south: R. Ambrose banded a nestling on the Tanana River that was recovered in northwest Washington and T. Swem banded a nestling on the Kandik River that was recovered in south-central British Columbia. Banding (Figure 2) and telemetry studies (Hodges et al. 1987) indicate movements of Bald Eagles between Alaska and British Columbia (Campbell et al. 1990). Additional study could confirm the idea that interior Alaska Bald Eagles use different migration routes and wintering areas than coastal Bald Eagles (Ritchie and Ambrose, 2008).

Table 1. Dates and locations of five Bald Eagles banded in Alaska and encountered outside the state at a later date.

Age	Date banded	Date encountered	Lat-long banded ¹	Lat-long encountered ¹	Location encountered
HY ²	10/20/81	1/25/82	59°20'-135°50'	46°20'-123°50'	Washington state
HY	10/20/81	10/17/82	59°20'-135°50'	49°10'-125°50'	British Columbia
ATY ³	10/21/81	1/12/82	59°20'-135°50'	50°30'-127°30'	British Columbia
L ⁴	6/24/84	3/6/85	64°10'-146°40'	48°50'-122°20'	Washington state
L	7/25/84	9/2/88	65°30'-141°20'	51°30'-122°20'	British Columbia

¹ The latitude and longitude, to the nearest 10' of the original banding and subsequent encounter.

² HY = A bird capable of sustained flight and known to have been hatched during the calendar year in which it was banded.

³ ATY = A bird now in at least its fourth calendar year of life.

⁴ L = Local; a young bird incapable of sustained flight; a nestling.

There were 12 encounters (two recently provided by J. Williams) from the 197 Bald Eagles banded on Adak Island: 11 encounters were on Adak Island and one was on Atka Island, about 140 km to the east. These encounters indicate that Bald Eagles from the Aleutian Islands do not migrate, but occasionally make inter-island movements to local food sources (Sherrod et al. 1977).

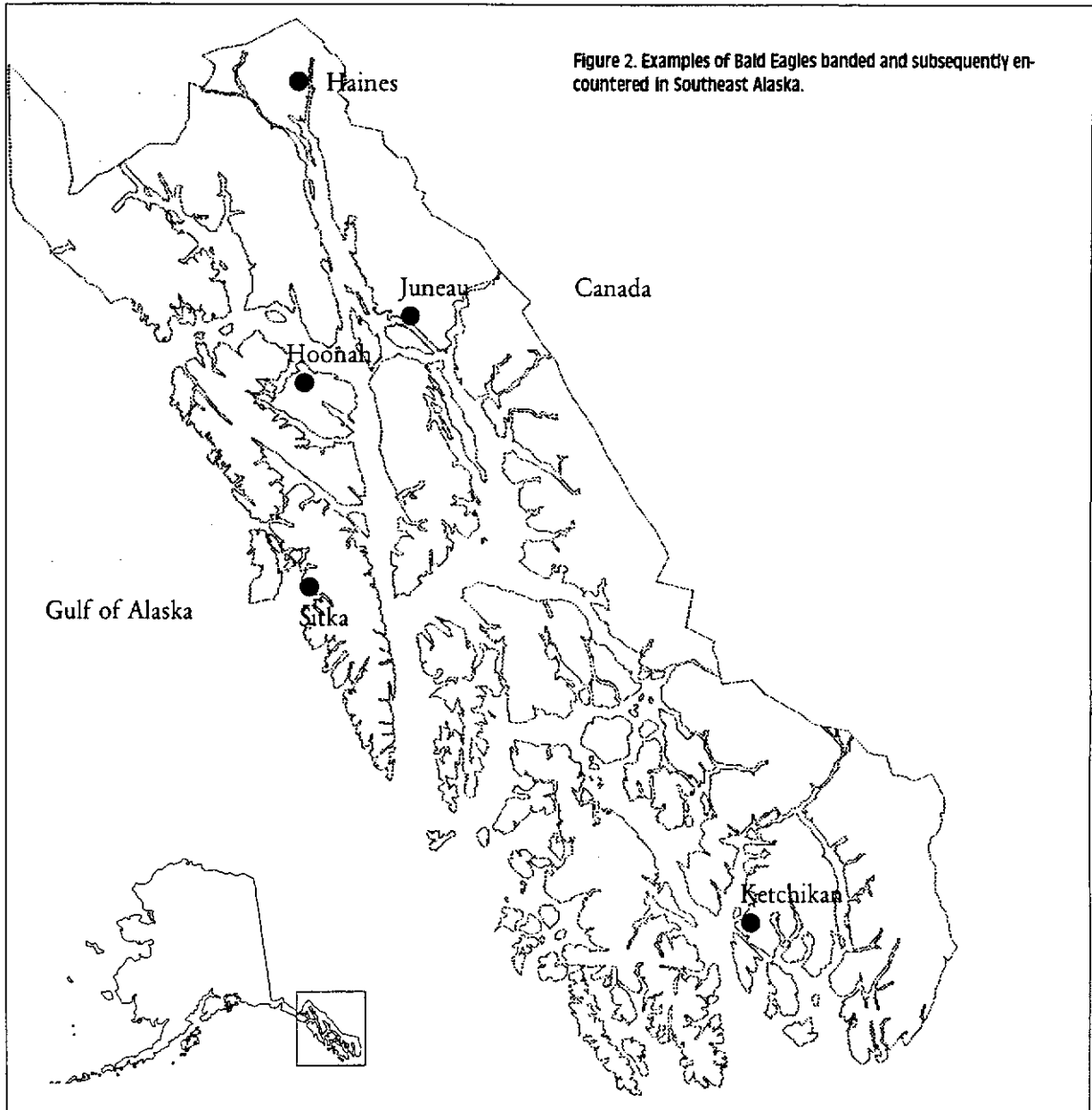
Some bandings and encounters of Bald Eagles banded in Prince William Sound after the *Exxon Valdez* oil spill in 1989 are included in the Alaska banding data. However, these data are incomplete and none of the encounters are of normal wild birds.

Conclusions

Historically, banding provided the only regular information about the movements and survival of Bald Eagles (Broley 1947). Today, especially in Alaska where enormous efforts usually are required to capture and handle these birds, banding supplements color- or radio-marking. Consequently, Bald Eagle banding usually provides supplemental and

anecdotal information of the kind we summarized. Currently, many options for designing and analyzing data obtained from banding and color marking animals are available.

Nichols (1992) presents a general review of the models and types of information commonly acquired from marked animals (e.g., population size and survival estimates) and Lebreton et al. (1992) give detailed explanations of new "capture-mark-recapture" procedures. Also, Bald Eagle data are used in an example of another new procedure to estimate population size (Arnason et al. 1991). Use of these methods can increase the information available from future bandings of Bald Eagles.



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Editors' Note: A second eagle from those banded on the Chilkat River has been encountered and established a new Bald Eagle longevity record of 28 years, 0 months of age (Schempf, P. R, 1997 Bald eagle longevity record from Southeastern Alaska, J Field Ornithol. 68(1): 150-151.)

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