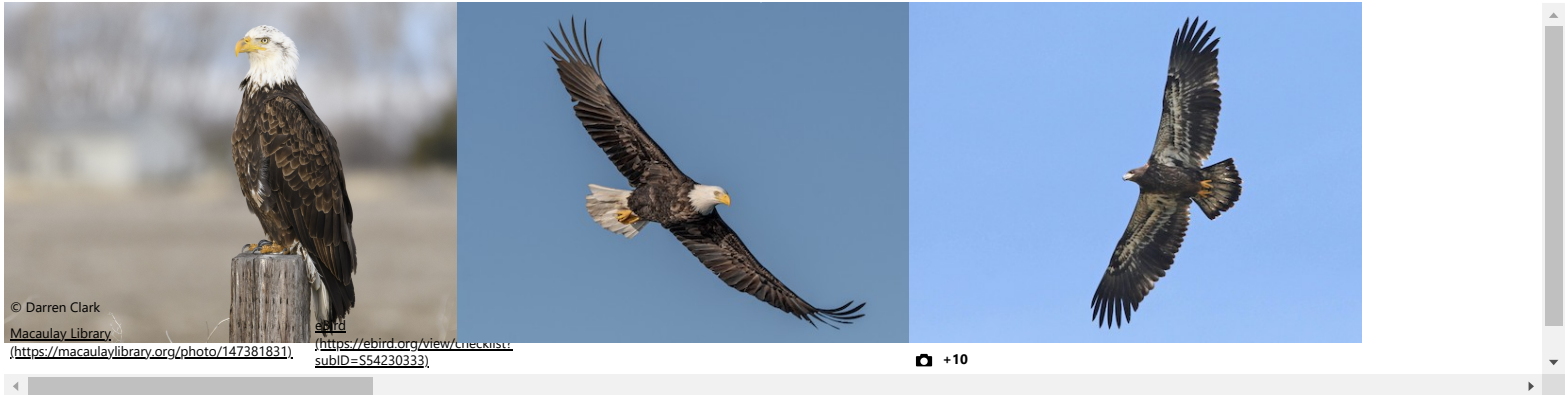


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[\(/bow/species/surprise-me\)](/bow/species/surprise-me)

[\(/bow/species/brakit1/cur/introduction\)](/bow/species/brakit1/cur/introduction)

[\(/bow/species/whteag/cur/introduction\)](/bow/species/whteag/cur/introduction)



Bald Eagle

Haliaeetus leucocephalus

LC Least Concern [Names \(24\)](#) [Subspecies \(2\) \(/bow/species/baleag/cur/systematics#subsp\)](/bow/species/baleag/cur/systematics#subsp)

David A. Buehler

Version: 1.0 — Published March 4, 2020

Text last updated January 1, 2000



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ORIGINALLY APPEARED IN

The  **Cornell Lab** of Ornithology
Birds of North America
(</bow/historic/bna/baleag/2.0/introduction>).

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(<https://americanornithology.org/>).

This species account is dedicated in honor of Eric Jolly, member of the Cornell Lab of Ornithology's Administrative Board.

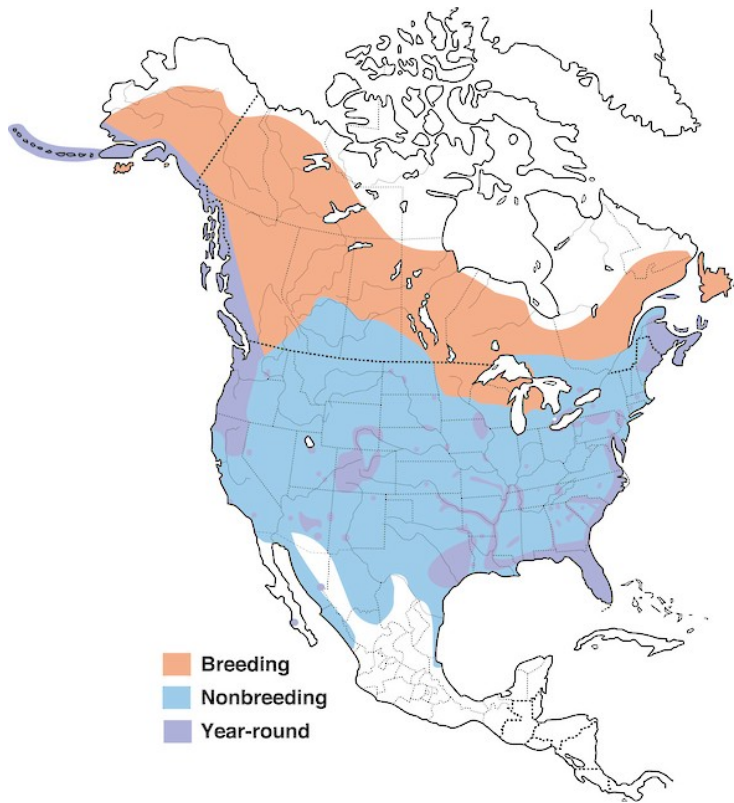
Selected as the national emblem of the United States in 1782 by Congress, in spite of Benjamin Franklin's arguments that the Wild Turkey (*Meleagris gallopavo*) would serve better in that capacity, the Bald Eagle has long been a key symbol in the human cultures of the Americas; feathers and body parts of this species have shown up regularly in archaeological investigations of Native Americans ([1 \(/bow/species/baleag/cur/references#REF24044\)](/bow/species/baleag/cur/references#REF24044)). More recently, the species has served as a symbol of freedom associated with democracy in the United States and, in recent years, with wilderness and the environmental ethic.

The Bald Eagle is a large bird of prey with broad wings for a flapping-soaring flight and a characteristic white head and white tail in adult birds. The species is an opportunistic forager that eats a variety of mammalian, avian, and reptilian prey, but generally prefers fish over other food types. It often scavenges prey items when available, pirates food from other species when it can, and captures its own prey only as a last resort.

The Bald Eagle has undergone dramatic population fluctuations over the past two centuries. Often reported as abundant by early explorers of North America, the species was especially common in areas with large expanses of aquatic habitat, including Florida, Chesapeake Bay, Maine, and the Maritime Provinces of Canada, the Great Lakes and lake regions of Ontario, Manitoba, and Saskatchewan, the Pacific Northwest, including northern California, Oregon, Washington, and coastal British Columbia and Alaska. It was so abundant in Alaska that a 50¢ bounty was established in 1917, increasing to \$2 in 1949 before the bounty was overruled by federal regulation in 1952. Over 128,000 bounties were paid out between 1917 and 1952 ([2 \(/bow/species/baleag/cur/references#REF50887\)](/bow/species/baleag/cur/references#REF50887)). The bird became rare in the mid- to late 1900s in the contiguous United States as persecution by humans greatly reduced survival and pesticides, primarily DDT, significantly lowered reproduction. The species was listed for protection under the Bald Eagle Protection Act in 1940 and the southern subspecies was listed as Endangered in 1966 under protection of the Endangered Species Preservation Act. The entire Bald Eagle population in the contiguous United States was listed for protection in 1978 under the Endangered Species Act of 1973. Populations have increased dramatically since 1980 as DDT levels dropped and breeding productivity returned to pre-DDT levels across many parts of the range, and as human persecution decreased with increasing environmental awareness. This recovery represents one of the continent's most successful conservation stories. Bald Eagles in the late 1990s had breeding populations in all Canadian provinces and all but 2 of the contiguous U.S. states (Rhode Island and Vermont), and a limited breeding population in Mexico.

This is one of the most studied North American birds, with well over 2,000 individual articles on various aspects of its biology and management. Significant research includes works by Herrick (3 (</bow/species/baleag/cur/references#REF24017>), 4 (</bow/species/baleag/cur/references#REF24018>), 5 (</bow/species/baleag/cur/references#REF50863>), 6 (</bow/species/baleag/cur/references#REF24019>)), on nesting habits; Bent (7 (</bow/species/baleag/cur/references#REF23961>)) detailed basics on life history; Broley (8 (</bow/species/baleag/cur/references#REF23973>), 9 (</bow/species/baleag/cur/references#REF50830>)) documented population declines in Florida; Anderson and Hickey (10 (</bow/species/baleag/cur/references#REF46340>)) linked population declines to eggshell thinning from DDT; and Grier (11 (</bow/species/baleag/cur/references#REF50858>)) documented population recovery post-DDT. Two excellent contemporary books on the species by Stalmaster (12 (</bow/species/baleag/cur/references#REF24062>)) and Gerrard and Bortolotti (13 (</bow/species/baleag/cur/references#REF23998>)) provide many details on the life history of the Bald Eagle.

[Appearance \(/bow/species/baleag/cur/appearance\)](/bow/species/baleag/cur/appearance) >




(<https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831>).

+ [Enlarge \(https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831\)](https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831)

Figure 1. Distribution of the Bald Eagle.


Distribution of the Bald Eagle. The wintering range includes estuaries, rivers, lakes, and reservoirs north and south of the distribution shown (see text for details).

[All Illustrations \(1\) \(/bow/species/baleag/cur/multimedia?media=illustrations\)](/bow/species/baleag/cur/multimedia?media=illustrations)

 **2,849,042**

Observations

(<https://ebird.org/species/baleag>).

 **189,324**

Photos

(https://search.macaulaylibrary.org/catalog?taxonCode=baleag&mediaType=p&sort=rating_rank_desc).

 **516**

Recordings

(https://search.macaulaylibrary.org/catalog?taxonCode=baleag&mediaType=a&sort=rating_rank_desc).

 **368**

Videos

(https://search.macaulaylibrary.org/catalog?taxonCode=baleag&mediaType=v&sort=rating_rank_desc).

Recommended Citation

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(<https://doi.org/10.2173/bow.baleag.01>) (<https://doi.org/10.2173/bow.baleag.01>).

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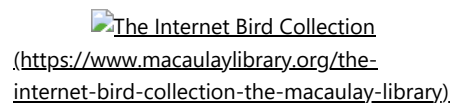


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▶ [\(/bow/species/whteag/cur/distribution\)](/bow/species/whteag/cur/distribution)

SPECIES

Bald Eagle *Haliaeetus leucocephalus*

David A. Buehler

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Text last updated January 1, 2000

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Birds of North America

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Distribution

Breeding Range

Figure 1 (<https://cdn.download.ams.birds.cornell.edu/api/v1/asset/25008761>). Associated with aquatic habitats (coastal areas, rivers, lakes, and reservoirs) with forested shorelines or cliffs in North America. Extensive breeding populations in Alaska, from s. Brooks Range, with major populations in coastal areas of se. Alaska across to Aleutian Is. (30 [\(/bow/species/baleag/cur/references#REF63025\)](/bow/species/baleag/cur/references#REF63025)). In Canada, breeding extends southward from n. Yukon to British Columbia, with extensive breeding populations in coastal areas (32 [\(/bow/species/baleag/cur/references#REF15960\)](/bow/species/baleag/cur/references#REF15960)). Breeds south of a line from Mackenzie River delta on Beaufort Sea to mouth of Churchill River on Hudson Bay (30 [\(/bow/species/baleag/cur/references#REF63025\)](/bow/species/baleag/cur/references#REF63025)), including Northwest Territories, northern half of Alberta (33 [\(/bow/species/baleag/cur/references#REF55543\)](/bow/species/baleag/cur/references#REF55543)), n. Saskatchewan, n. Manitoba, and nw. Ontario, with limited breeding in southern part of that province (34 [\(/bow/species/baleag/cur/references#REF58726\)](/bow/species/baleag/cur/references#REF58726)). Limited breeding in Quebec, generally south of James Bay (35 [\(/bow/species/baleag/cur/references#REF50823\)](/bow/species/baleag/cur/references#REF50823)), Labrador, Newfoundland, throughout New Brunswick (although uncommon breeder in the north), and throughout Nova Scotia and Prince Edward I. (36 [\(/bow/species/baleag/cur/references#REF64430\)](/bow/species/baleag/cur/references#REF64430)). Extensive breeding populations along the Atlantic Coast from Florida (extending south to Florida Keys; 37 [\(/bow/species/baleag/cur/references#REF50842\)](/bow/species/baleag/cur/references#REF50842)) to S. Carolina, Chesapeake Bay (Maryland and Virginia), and north to Maine and Maritime Provinces of Canada. Extensive breeding populations in Great Lakes states (Michigan, Wisconsin, and Minnesota) and Pacific Northwest (n.

California, Oregon, and Washington). Breeding populations building along Rocky Mtns. in Colorado, Wyoming, Idaho, and Montana, including the greater Yellowstone ecosystem. Breeding populations building along Gulf Coast in Louisiana and Texas. Limited breeding in sw. U.S. (Arizona and New Mexico). Breeds in all other contiguous U.S. states except Rhode Island and Vermont, where no historic record of nesting ([38 \(/bow/species/baleag/cur/references#REF24038\)](#)). Limited number of breeding pairs (<10) in Mexico located in Baja California on Magdalena Bay, s. Sonora, and Chihuahua ([39 \(/bow/species/baleag/cur/references#REF1812\)](#)).

Winter Range

Majority of wintering population located in lower 48 states, coastal Canada and Alaska ([40 \(/bow/species/baleag/cur/references#REF24045\)](#)), associated with aquatic areas with some open water for foraging. Includes but not limited to coastal areas in se. Alaska and British Columbia ([32 \(/bow/species/baleag/cur/references#REF15960\)](#)); coastal estuaries and river systems associated with Puget Sound ([41 \(/bow/species/baleag/cur/references#REF62031\)](#)), lower Klamath Basin in Oregon, and n. California; rivers and reservoirs in Arizona; intermountain region from s. Alberta ([33 \(/bow/species/baleag/cur/references#REF55543\)](#)) to New Mexico on both upland rangeland and along river systems; along major inland river systems in the Midwest (e.g., Missouri, Mississippi, Wisconsin, Ohio, and Tennessee rivers), especially below dams; Texas, Oklahoma, Arkansas, and Kansas reservoirs and river systems; coastal Maine, New Brunswick, and Nova Scotia; reservoirs in Massachusetts ([42 \(/bow/species/baleag/cur/references#REF17580\)](#)); Chesapeake Bay and its tributaries; and se. U.S. lakes, reservoirs, and coastal areas, including Tennessee, N. and S. Carolina, Georgia, Alabama, Mississippi, Louisiana, and Florida. Limited reports of adults wintering in interior Alaska near Fairbanks along Tanana River where open water is present year round ([43 \(/bow/species/baleag/cur/references#REF36166\)](#)). Limited reports of birds wintering in Mexico, including Gulfs of Mexico and California, Baja California, and several river systems in Sonora and Chihuahua ([44 \(/bow/species/baleag/cur/references#REF62109\)](#)). Four old records ([45 \(/bow/species/baleag/cur/references#REF36636\)](#)) and 2 modern records ([46 \(/bow/species/baleag/cur/references#REF58276\)](#)) from Bermuda; 2 modern records from Puerto Rico ([47 \(/bow/species/baleag/cur/references#REF7180\)](#)).

Extralimital Records

Not recorded breeding outside North America. Reported as occasional visitor to coastal areas in Siberia and Greenland. Reported accidental in Ireland ([30 \(/bow/species/baleag/cur/references#REF63025\)](#)). Unconfirmed report from ne. Asia ([14 \(/bow/species/baleag/cur/references#REF24049\)](#)). One possible specimen from Sweden from 1850 reported by Bent ([7 \(/bow/species/baleag/cur/references#REF23961\)](#)) but identity of bird was of some question ([14 \(/bow/species/baleag/cur/references#REF24049\)](#)).

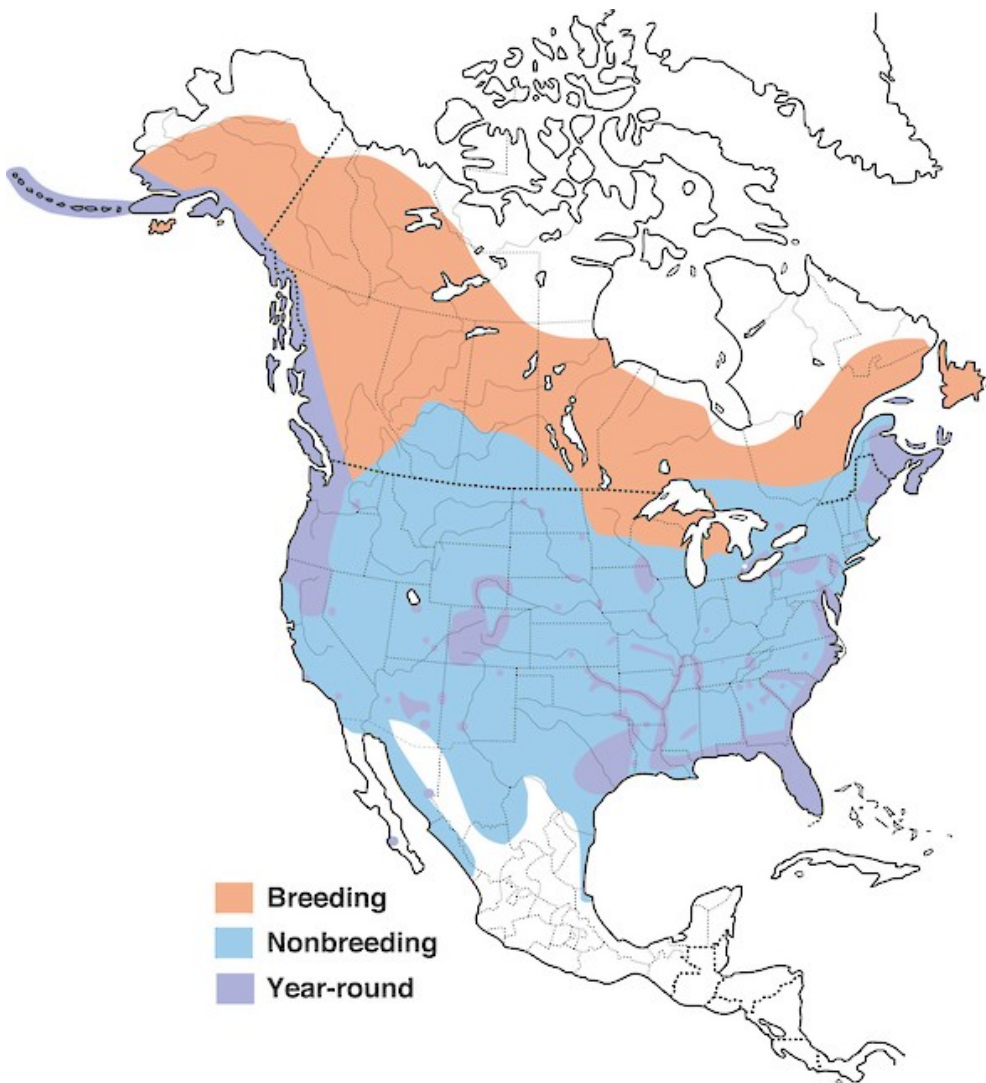
Historical Changes to the Distribution

Historic breeding range probably similar to present breeding distribution with major changes, both loss and gain of breeding areas, in the twentieth century. Distribution reported by Oberholser ([48 \(/bow/species/baleag/cur/references#REF50881\)](#)) very similar to present distribution. For historic records from 1600 to present for 25 northern states, see [38 \(/bow/species/baleag/cur/references#REF24038\)](#). Pre-European

1000 to present for 25 northern states, see [36 \(/bow/species/baleag/cur/references#REF24036\)](#). Pre-European

settlement, species very common with probable nesting in all of continental U.S. except possibly Rhode Island, W. Virginia, and Vermont ([49 \(/bow/species/baleag/cur/references#REF24075\)](#), [38 \(/bow/species/baleag/cur/references#REF24038\)](#)). On Chesapeake Bay and elsewhere, populations declined over the past 250 yr from habitat loss to settlement of shoreline areas by European immigrants, and from shooting, trapping, and poisoning. Estimated density of 1 nest/1.6 km of shoreline on Chesapeake Bay as late as 1890 ([50 \(/bow/species/baleag/cur/references#REF24027\)](#)), suggesting about 8,000 pairs on the bay. A more conservative estimate for Chesapeake Bay was >3,000 pairs at European settlement ([51 \(/bow/species/baleag/cur/references#REF50849\)](#)). First actual census on Chesapeake estimated only 600 pairs left in 1930s ([52 \(/bow/species/baleag/cur/references#REF50890\)](#)). Trends from Chesapeake Bay may be similar to historical trends elsewhere in lower 48 states. After 1947, use of DDT across much of range greatly reduced breeding productivity, and continued shooting led to drastic population declines. Along 160 km of west coast of Florida, for example, 73 active nests with 103 young in 1947, but only 43 active nests with 8 young in 1957 ([9 \(/bow/species/baleag/cur/references#REF50830\)](#)). Active nests on Chesapeake Bay declined from an estimated 600 pairs in 1936 to only 70 active nests in 1965 ([53 \(/bow/species/baleag/cur/references#REF50817\)](#)). Similar declines reported across much of the range, especially in the lower 48 states. As a result, became locally extirpated from breeding throughout much of s. and e. U.S., Midwest and Great Plains states (except Great Lakes states), Utah, Nevada, and s. California. Banned use of DDT on 31 Dec 1972 and reduced human persecution led to dramatic population increases after 1980 ([11 \(/bow/species/baleag/cur/references#REF50858\)](#), [54 \(/bow/species/baleag/cur/references#REF50907\)](#)). Populations have reached recovery goals in most parts of the lower 48 states, but are still probably well below pre-European settlement levels. See [Appendix 1 \(/bow/appendix/ACT1052433/APP1004080\)](#).

[< Systematics \(/bow/species/baleag/cur/systematics\)](#) [Habitat \(/bow/species/baleag/cur/habitat\)](#) [>](#)



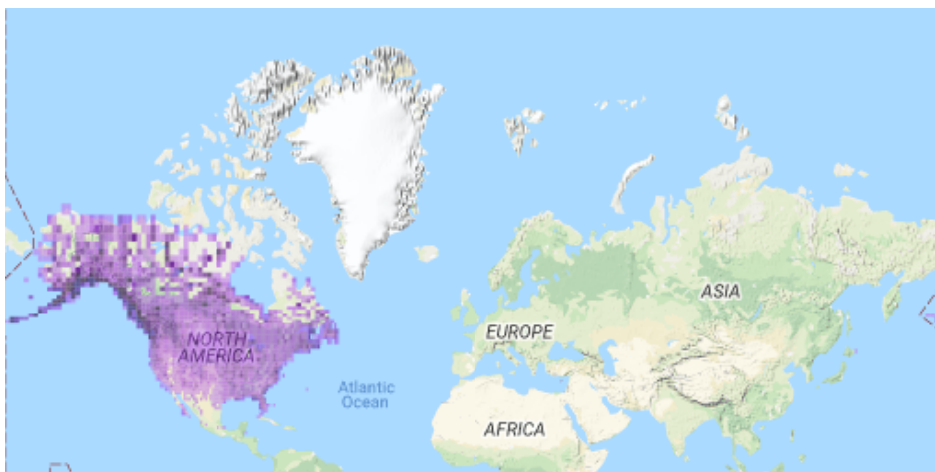
(<https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831>).

Year-round Breeding
 Migration Non-Breeding

[+ Enlarge \(https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831\)](https://cdn.download.ams.birds.cornell.edu/api/v1/asset/31954831)

Figure 1. Distribution of the Bald Eagle.

Distribution of the Bald Eagle. The wintering range includes estuaries, rivers, lakes, and reservoirs north and south of the distribution shown (see text for details).





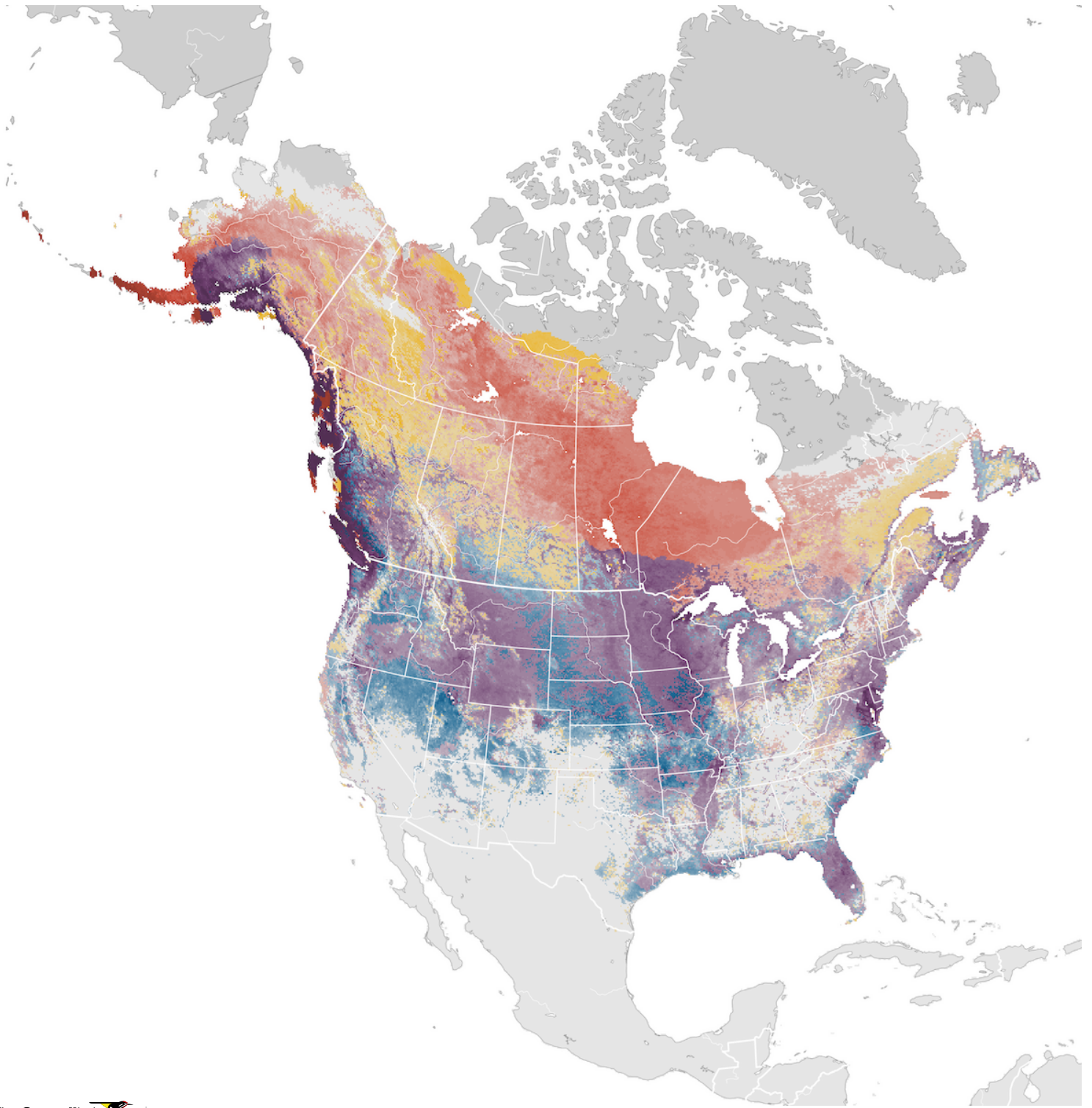
Map data ©2021

eBird range map for Bald Eagle

[+ Enlarge \(https://ebird.org/embedmap/baleag?scrollwheel=true&draggable=true&mapType=terrain\)](https://ebird.org/embedmap/baleag?scrollwheel=true&draggable=true&mapType=terrain)

Generated from eBird observations (Year-Round, 1900-present)

[Explore more on eBird \(https://ebird.org/map/baleag\)](https://ebird.org/map/baleag).



The Cornell Lab of Ornithology | Data provided by eBird
(Lightbox-embedded map)

Bald Eagle *Haliaeetus leucocephalus*

Abundance

Relative abundance is depicted for each season along a color gradient from a light color indicating lower relative abundance to a dark color indicating a higher relative abundance. Relative abundance is the estimated number of individuals detected by an eBirder during a traveling count at the optimal time of day. [Learn more \(https://ebird.org/science/status-and-trends/faq#abundance\)](https://ebird.org/science/status-and-trends/faq#abundance).

RELATIVE ABUNDANCE

Year-round

Breeding season May 24 - Jul 13

Non-breeding season Dec 21 - Feb 1

Pre-breeding migratory season Feb 15 - May 17

0.01

0.6

2.3

Note: Seasonal ranges overlap and are stacked in the order above; view full range in season maps.

SEASONS TIMELINE [Learn more \(https://ebird.org/science/status-and-trends/faq#seasons\)](https://ebird.org/science/status-and-trends/faq#seasons)

J F M A M J J A S O N D

Modeled area (0 abundance)

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eBird data from 2005-2020. Estimated for 2019.

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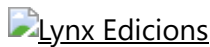


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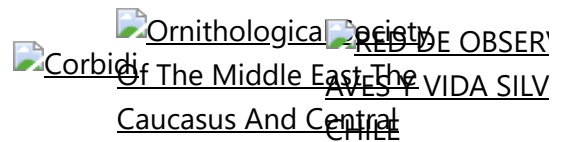
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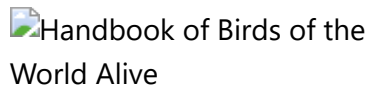


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Bald Eagle *Haliaeetus leucocephalus*

David A. Buehler

Version: 1.0 — Published March 4, 2020

Text last updated January 1, 2000

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Habitat

Habitat in Breeding Range

Typically breeds in forested areas adjacent to large bodies of water. Nests in trees, rarely on cliff faces and ground nests in treeless areas (e.g., Amchitka I., AK; [55 \(/bow/species/baleag/cur/references#REF24059\)](/bow/species/baleag/cur/references#REF24059)). At the macro scale, nests occur in mature and old-growth forest with some habitat edge, relatively close (usually <2 km) to water with suitable foraging opportunities. Actual distance to water varies within and among populations. In some cases, distance to water is not as critical as the quality of the foraging area that is present. Quality of foraging areas defined by diversity, abundance, and vulnerability of the prey base ([56 \(/bow/species/baleag/cur/references#REF24033\)](/bow/species/baleag/cur/references#REF24033)), structure of aquatic habitat, such as the presence of shallow water ([57 \(/bow/species/baleag/cur/references#REF24035\)](/bow/species/baleag/cur/references#REF24035)), and absence of human development and disturbance ([58 \(/bow/species/baleag/cur/references#REF24043\)](/bow/species/baleag/cur/references#REF24043)).

Areas with considerable shoreline development or human activity (e.g., Florida, Chesapeake Bay, Minnesota, parts of the greater Yellowstone ecosystem, coastal Oregon) have nests located farther from the shoreline than nest sites in less developed areas, such as Alaska ([59 \(/bow/species/baleag/cur/references#REF24054\)](/bow/species/baleag/cur/references#REF24054)), [60 \(/bow/species/baleag/cur/references#REF23959\)](/bow/species/baleag/cur/references#REF23959), [61 \(/bow/species/baleag/cur/references#REF36152\)](/bow/species/baleag/cur/references#REF36152), [62 \(/bow/species/baleag/cur/references#REF24069\)](/bow/species/baleag/cur/references#REF24069), [63 \(/bow/species/baleag/cur/references#REF36143\)](/bow/species/baleag/cur/references#REF36143), [64 \(/bow/species/baleag/cur/references#REF24084\)](/bow/species/baleag/cur/references#REF24084)).

Size of forest tract holding the nest tree may be unimportant if tract is isolated from human development and disturbance. Minimum distance from a nest to human development in some populations is <100 m; average distance in most populations, however, is >500 m and reflects habitat selection away from these developments ([60](#) ([/bow/species/baleag/cur/references#REF23959](#)), [65](#) ([/bow/species/baleag/cur/references#REF23994](#)), [61](#) ([/bow/species/baleag/cur/references#REF36152](#)), [63](#) ([/bow/species/baleag/cur/references#REF36143](#)), [64](#) ([/bow/species/baleag/cur/references#REF24084](#)), [56](#) ([/bow/species/baleag/cur/references#REF24033](#))). Forested tracts with nests have relatively open canopies, some form of habitat discontinuity or edge, or high levels of foliage-height diversity that provide access to nest trees ([66](#) ([/bow/species/baleag/cur/references#REF24000](#)), [67](#) ([/bow/species/baleag/cur/references#REF24042](#)), [63](#) ([/bow/species/baleag/cur/references#REF36143](#)), [64](#) ([/bow/species/baleag/cur/references#REF24084](#))).

Diurnal perch habitat characterized by presence of tall, easily accessible, often super-canopy trees adjacent to shoreline foraging habitat, usually away from human disturbance ([68](#) ([/bow/species/baleag/cur/references#REF50833](#)), [69](#) ([/bow/species/baleag/cur/references#REF50838](#)), [70](#) ([/bow/species/baleag/cur/references#REF50839](#))). Perch-tree species used are highly variable, including both coniferous and deciduous species if present. Most perch trees used are live trees, although dead trees preferred if available ([12](#) ([/bow/species/baleag/cur/references#REF24062](#)), [68](#) ([/bow/species/baleag/cur/references#REF50833](#))). Selects a wider range of tree species and sizes for perching than for nesting or roosting ([12](#) ([/bow/species/baleag/cur/references#REF24062](#))).

Roosting Habitat

Roost use and roost-site characteristics studied extensively in mid- and w. U.S. (e.g., [71](#) ([/bow/species/baleag/cur/references#REF50891](#)), [72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [73](#) ([/bow/species/baleag/cur/references#REF50895](#)), [74](#) ([/bow/species/baleag/cur/references#REF57924](#)), [75](#) ([/bow/species/baleag/cur/references#REF24056](#))). Relatively little study on roost use and site characteristics for eastern populations except in New York ([76](#) ([/bow/species/baleag/cur/references#REF57927](#))), N. Carolina ([77](#) ([/bow/species/baleag/cur/references#REF23981](#))), and Chesapeake Bay ([78](#) ([/bow/species/baleag/cur/references#REF23978](#))).

Throughout range, selects large, super-canopy roost trees that are open and accessible ([72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [73](#) ([/bow/species/baleag/cur/references#REF50895](#)), [79](#) ([/bow/species/baleag/cur/references#REF57915](#)), [74](#) ([/bow/species/baleag/cur/references#REF57924](#)), [77](#) ([/bow/species/baleag/cur/references#REF23981](#)), [78](#) ([/bow/species/baleag/cur/references#REF23978](#))). Roost trees in e. North America are deciduous or coniferous ([71](#) ([/bow/species/baleag/cur/references#REF50891](#)), [73](#) ([/bow/species/baleag/cur/references#REF50895](#)), [77](#) ([/bow/species/baleag/cur/references#REF23981](#)), [78](#) ([/bow/species/baleag/cur/references#REF23978](#))); most western roost trees are conifers ([72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [79](#) ([/bow/species/baleag/cur/references#REF57915](#)), [74](#) ([/bow/species/baleag/cur/references#REF57924](#))), except in some riparian zones ([80](#) ([/bow/species/baleag/cur/references#REF50889](#)), [81](#) ([/bow/species/baleag/cur/references#REF24058](#))). Roost trees range in diameter from 30 to 110 cm and 15 to 60 m in height ([12](#)

([/bow/species/baleag/cur/references#REF24062](#)). Roost-tree age varies widely from 200- to 300-yr-old old-growth trees in the Pacific Northwest to 50- to 100-yr-old trees in e. U.S. ([79](#)

([/bow/species/baleag/cur/references#REF57915](#)), [74](#) ([/bow/species/baleag/cur/references#REF57924](#)), DAB).

Macro-scale roost-site characteristics differ in several significant ways from nest-site characteristics. Roosts are generally associated with aquatic foraging areas, but they are not located nearly as close to water as nests, especially in western states. A roost site in Utah was located 29 km from the major foraging area ([82](#) ([/bow/species/baleag/cur/references#REF24070](#))) and many other western roosts are located > 10 km from foraging areas ([72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [83](#) ([/bow/species/baleag/cur/references#REF24012](#)), [84](#) ([/bow/species/baleag/cur/references#REF50870](#))). Roosts in N. Carolina and the Chesapeake, in contrast, were <1 km from aquatic foraging areas ([77](#) ([/bow/species/baleag/cur/references#REF23981](#)), [78](#) ([/bow/species/baleag/cur/references#REF23978](#))). Roost sites located away from houses and roads throughout their range ([72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [83](#) ([/bow/species/baleag/cur/references#REF24012](#)), [78](#) ([/bow/species/baleag/cur/references#REF23978](#))). Chesapeake Bay roosts located in relatively large forested blocks but adjacent to large, open flight corridors for easy access ([78](#) ([/bow/species/baleag/cur/references#REF23978](#))).

Ultimate factor(s) driving roost-site selection may be energetics, information exchange, other social function, or combination of the above. Bald Eagles in Washington State saved energy by selecting conifer sites <4.0 km from foraging areas, rather than roosting in closer deciduous stands ([85](#) ([/bow/species/baleag/cur/references#REF43314](#))). Klamath Basin Bald Eagles selected distant, protected conifer roosts but energy savings did not offset cost of flying there ([84](#) ([/bow/species/baleag/cur/references#REF50870](#))). N. Chesapeake Bay Bald Eagles also did not save energy by flying back to the protected communal roosts at night, even though distances and flight costs involved were rather small ([86](#) ([/bow/species/baleag/cur/references#REF50836](#))). Roost-site selection may not be driven by energy-balance considerations alone. Most roosts, however, are located in areas that are at least protected from prevailing winter winds, regardless of whether they occur in coniferous or deciduous trees ([72](#) ([/bow/species/baleag/cur/references#REF50861](#)), [85](#) ([/bow/species/baleag/cur/references#REF43314](#)), [84](#) ([/bow/species/baleag/cur/references#REF50870](#)), [86](#) ([/bow/species/baleag/cur/references#REF50836](#))). Site characteristics that facilitate social interaction in communal roosts, such as information exchange ([87](#) ([/bow/species/baleag/cur/references#REF57515](#))), also may affect roost-site selection.

Habitat in Nonbreeding Range

Habitat in Migration

Few data available on characteristics of stopover habitat used during migration. Stopover habitat similar in nature to winter habitat (see below), except food may only be available during spring and/or fall. Capable of passing over otherwise unsuitable, human-developed habitat during migration, such as the extensive urban-suburban corridor along the East Coast. Suitability of stopover habitat most related to food availability rather than

vegetative composition or structural characteristics. Drastic decline in salmon availability at Glacier National Park, MT, led to abandonment of historic stopover site, supporting theory that stopover suitability is food-driven ([88 \(/bow/species/baleag/cur/references#REF60879\)](#)). Sites with abundant food resources located along traditional migration pathways will likely be used by adults and immatures in fall and at least by immatures in spring. These sites may feature consistent fish-kills (e.g., salmon spawning runs on Chilkat River, AK; [89 \(/bow/species/baleag/cur/references#REF24020\)](#)); former salmon spawning runs on Lake MacDonald, Glacier National Park, MT; [88 \(/bow/species/baleag/cur/references#REF60879\)](#)); below dams on Missouri and Mississippi Rivers ([71 \(/bow/species/baleag/cur/references#REF50891\)](#), [90 \(/bow/species/baleag/cur/references#REF24065\)](#)), fish and waterfowl concentrations (e.g., Chesapeake Bay; [91 \(/bow/species/baleag/cur/references#REF57926\)](#)), or presence of large mammals as carrion ([92 \(/bow/species/baleag/cur/references#REF50875\)](#)). Most stopover sites have traditional roost sites, often clumps of mature deciduous trees in riparian areas protected from human disturbance and proximate to foraging opportunities.

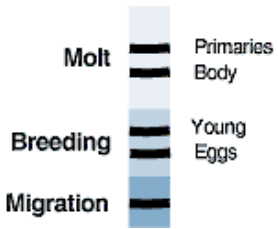
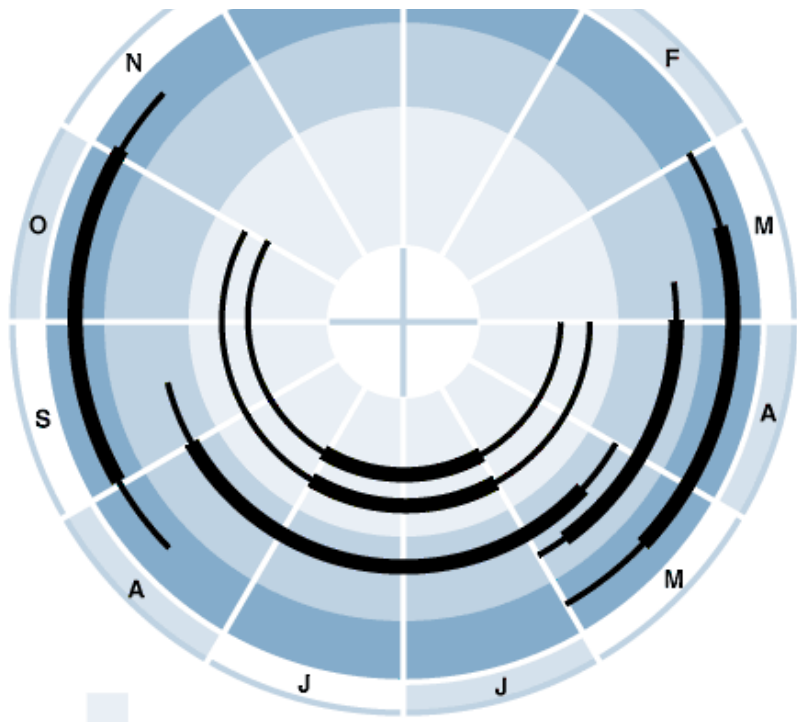
Habitat in Overwintering Range

Winters primarily in temperate zone ([93 \(/bow/species/baleag/cur/references#REF10209\)](#)), generally below 500 m elevation, except in some western states where wintering areas may reach 2,500 m elevation (e.g., San Luis Valley, CO; [83 \(/bow/species/baleag/cur/references#REF24012\)](#)). Majority of wintering occurs along major midwestern river systems, Chesapeake Bay, Pacific Northwest rivers, Klamath Basin, Oregon-California, and intermountain west ([40 \(/bow/species/baleag/cur/references#REF24045\)](#)). Also winters in coastal areas of ne. North America, coastal se. Alaska, and very limited into nw. Mexico. Typically associated with aquatic habitats with some open water for foraging, although may occur in arid regions of Southwest. Often concentrates in large numbers (100s–1,000s) on wintering grounds. Winter habitat suitability defined by food availability, presence of roost sites that provide protection from inclement weather (see below), and absence of human disturbance. Food type (avian, mammalian, or fish) and means of availability (live prey or as carrion) vary greatly across wintering range. Some wintering areas feature absence of human activity associated with site, although Bald Eagles will tolerate some human activity in areas of high prey availability (e.g., below hydroelectric facilities on Missouri and Mississippi Rivers; [90 \(/bow/species/baleag/cur/references#REF24065\)](#)). Perching habitat characterized by presence of tall trees located adjacent (<50 m) to foraging areas, similar to other times of the year ([90 \(/bow/species/baleag/cur/references#REF24065\)](#), [94 \(/bow/species/baleag/cur/references#REF24064\)](#), [75 \(/bow/species/baleag/cur/references#REF24056\)](#), [77 \(/bow/species/baleag/cur/references#REF23981\)](#), [68 \(/bow/species/baleag/cur/references#REF50833\)](#), [70 \(/bow/species/baleag/cur/references#REF50839\)](#)).

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Figure 4. Bald Eagle annual cycle.

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Annual cycle of migratory Bald Eagles in Alaska. Adults migrate early in spring, followed by immatures; reverse pattern occurs in fall. Thick lines indicate peak activity; thin lines, off-peak.





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Figure 2. Bald Eagles feeding at salmon-spawning runs, Alaska. Drawing by N. John Schmitt.

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Thousands of Bald Eagles show up on the Chilkat River, AK, each fall to take advantage of salmon-spawning runs. Drawing by N. John Schmitt.

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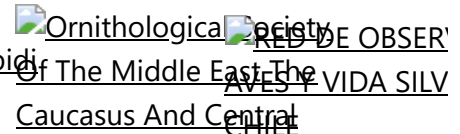
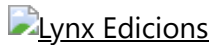


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SPECIES

Bald Eagle *Haliaeetus leucocephalus*

David A. Buehler

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Breeding

Phenology

Varies with latitude; nesting season in southern latitudes (e.g., Florida and other Gulf Coast states) prolonged from late fall to early spring; in n. U.S. including Alaska and Canada, fairly synchronous in early spring.

Pair Formation

Not well documented. Thought to occur on breeding grounds but may also occur on wintering grounds ([83 \(/bow/species/baleag/cur/references#REF24012\)](#)). Radio-tagged adult male often associated with unmarked adult female in late winter and attempted copulation on wintering area ([182](#))

([/bow/species/baleag/cur/references#REF36169](#)). In Ohio, after male was lost, female took only 4 d to attract another mate. In contrast, female lost mate on 2 occasions from an Ohio territory in late fall; 11 and 14 wk passed until female returned with a new mate ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). In Arizona, male disappeared on 13 Feb during incubation phase of nesting; replacement male appeared in territory 1 d later and delivered prey and sticks to nest by 19 Feb ([183 \(/bow/species/baleag/cur/references#REF36155\)](#)).

Nest-Building

Generally begins 1–3 mo prior to egg-laying. In Florida, nest-building and maintenance begin late Sep–early Oct ([8 \(/bow/species/baleag/cur/references#REF23973\)](#)); in Ohio, usually begins in Feb, although adults repaired existing nests all year ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). On Amchitka I., AK, begins as early as 20 Jan, although adults observed carrying materials all year and often perched by the nest in Dec ([55 \(/bow/species/baleag/cur/references#REF24059\)](#)). In se. Alaska, begins Apr ([2 \(/bow/species/baleag/cur/references#REF50887\)](#)). In Saskatchewan, adults build or repair nests in Sep prior to migration and build or repair nests in Apr upon return from wintering grounds ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)).

First/Only Brood Per Season

Figure 4 (<https://cdn.download.ams.birds.cornell.edu/api/v1/asset/25008771>). Only 1 brood/season. Replacement clutches possible if eggs taken or destroyed during incubation, especially at southern latitudes. Timing of laying varies with latitude. Bent ([7 \(/bow/species/baleag/cur/references#REF23961\)](#)) reported range of egg dates (dates eggs were collected from nests) but because incubation is long (35 d), and eggs persist in abandoned nests, these data do not accurately document laying and incubation phenology. In Florida, breeding season is prolonged, with incubation beginning as early as Oct and as late as Apr; Apr breeding may be second attempt; most incubation initiated Dec–Jan ([8 \(/bow/species/baleag/cur/references#REF23973\)](#)). On Chesapeake Bay, begin incubation last week in Jan to end of Feb (DAB). In Saskatchewan, laying is fairly synchronous, with 90% of pairs laying within a 10-d period in mid-Apr ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)). In greater Yellowstone ecosystem, WY, clutch laid from early Mar–mid-Apr; later dates at greater elevations ([62 \(/bow/species/baleag/cur/references#REF24069\)](#)). Eggs typically laid in Arizona late Jan–mid-Feb ([184 \(/bow/species/baleag/cur/references#REF36154\)](#)). Nests observed in Mexico had incubating adults in Jan; therefore, laying may have occurred from late Dec to early Jan ([185 \(/bow/species/baleag/cur/references#REF24015\)](#)). In Alaska and Yukon Territory, laying extends from late Apr to end of May, peaking in second week of May ([177 \(/bow/species/baleag/cur/references#REF24016\)](#), [186 \(/bow/species/baleag/cur/references#REF23963\)](#)).

In Florida experimental egg removal, 78% of 58 pairs laid replacement clutches with 29-d average interval between removal and relaying. No apparent relationship between stage of incubation and likelihood of relaying, although clutches removed prior to 1 Jan were more apt to be replaced than clutches removed after 1 Jan ([187 \(/bow/species/baleag/cur/references#REF24083\)](#)). In captivity, 9 of 11 females relaid after first clutch was removed up to 8 d after clutch completion ([188 \(/bow/species/baleag/cur/references#REF24079\)](#)).

Nest Site

Selection

Unclear which sex is responsible for nest-site and nest-tree selection. Herrick (4 ([/bow/species/baleag/cur/references#REF24018](#))) observed 1 female on 2 occasions after mate loss procure a new mate during winter and return to her territory, suggesting that females may select sites. Observations of females defending territories and attempting to attract mates also reported from Saskatchewan (13 ([/bow/species/baleag/cur/references#REF23998](#))).

Microhabitat

In suitable area, nest tree generally one of largest trees available with accessible limbs capable of holding nest (3 ([/bow/species/baleag/cur/references#REF24017](#)), 60 ([/bow/species/baleag/cur/references#REF23959](#)), 62 ([/bow/species/baleag/cur/references#REF24069](#)), 63 ([/bow/species/baleag/cur/references#REF36143](#)), 64 ([/bow/species/baleag/cur/references#REF24084](#)), 56 ([/bow/species/baleag/cur/references#REF24033](#))). A large, super-canopy nest tree provides good flight access to the nest and good visibility of surrounding area. Nest-tree branches must be capable of holding first sticks brought to nest as breeding pair begin nest construction. Ground nests used in treeless regions (e.g., Alaska, n. Canada, islands off coast of California, Arizona); rare elsewhere (e.g., Minnesota, 189 ([/bow/species/baleag/cur/references#REF50864](#)); s. Florida, 37 ([/bow/species/baleag/cur/references#REF50842](#))). Ground nest sites usually on prominent ridges, cliff sides, or sea stacks with good flight access but limited ground access for potential predators (55 ([/bow/species/baleag/cur/references#REF24059](#))). In Arizona, 9 of 17 nests were on cliffs (190 ([/bow/species/baleag/cur/references#REF10252](#))).

Tree species used for nesting vary throughout range because of regional differences in dominant trees; see 12 ([/bow/species/baleag/cur/references#REF24062](#)) for review. Coniferous trees (pines [*Pinus* spp.], spruces [*Picea* spp.], and firs [*Abies* spp. and *Pseudotsuga* spp.]) used where conifers become dominant in canopy. Deciduous trees, including oaks (*Quercus* spp.), hickories (*Carya* spp.), and cottonwoods and aspens (*Populus* spp.) used where large conifers absent (primarily e. U.S.). At southern limits of range, mangroves used in s. Florida (37 ([/bow/species/baleag/cur/references#REF50842](#))) and Gulf of California, Mexico (191 ([/bow/species/baleag/cur/references#REF50841](#))). Hecho cactus (*Pachycereus pectinaboriginum*) used in Sonora, Mexico (192 ([/bow/species/baleag/cur/references#REF60783](#))).

Site Characteristics

Size of nest tree highly variable, depending on individual tree species available and how it compares with the surrounding canopy. Stalmaster (12 ([/bow/species/baleag/cur/references#REF24062](#))) reviewed nest-tree data from 14 areas across range; nest trees varied from 20 to 60 m in height and 50 to 190 cm in diameter. On Chesapeake Bay, nest trees (both conifer and deciduous) averaged 82 cm in diameter and 28 m in height (60 ([/bow/species/baleag/cur/references#REF23959](#))). Nest trees in Florida smaller on average: 28 cm in diameter and 23 m tall (64 ([/bow/species/baleag/cur/references#REF24084](#))). Pair usually builds nest in live tree, although adjacent snags (dead trees) are used for perching (3 ([/bow/species/baleag/cur/references#REF24017](#)), 66 ([/bow/species/baleag/cur/references#REF24000](#)), 62 ([/bow/species/baleag/cur/references#REF24069](#)), 63

([/bow/species/baleag/cur/references#REF36143](#)), [64 \(/bow/species/baleag/cur/references#REF24084\)](#), [56 \(/bow/species/baleag/cur/references#REF24033\)](#)). Nest usually placed in top quarter of tree, just below the crown (e.g., 52 nests in greater Yellowstone ecosystem were on average 5 m below crown of trees averaging 27 m in height; [62 \(/bow/species/baleag/cur/references#REF24069\)](#)). Nest usually placed against trunk or in fork of large branches close to trunk.

Nest

Construction Process

Both sexes contribute, although female may place the sticks. Sticks collected from ground of surrounding area for building materials or broken off of nearby trees. One pair in Ohio carried sticks from up to 1.6 km to the nest site ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). Once initiated, nest-building may take up to 3 mo to complete, although nests may be completed in as little as 4 d ([5 \(/bow/species/baleag/cur/references#REF50863\)](#)). Additional materials regularly added to the nest throughout the year, including daily additions during the breeding season ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)), such that nests used for multiple years may achieve enormous dimensions.

Structure And Composition Matter

Nests usually constructed below crown of tree, often highest point where large branches join bole of tree. Nests constructed from an array of sticks placed in an interwoven pattern. Other materials added as fillers may include grasses, mosses, even corn stalks ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). Nest boles lined with finer woody materials, especially Spanish moss in Florida, and ultimately lined with downy feathers from the adults ([8 \(/bow/species/baleag/cur/references#REF23973\)](#)). Nests often contain sprigs of greenery ([5 \(/bow/species/baleag/cur/references#REF50863\)](#)). Ground nests in Alaska, n. Canada, and coastal California constructed of variety of materials available at the site, including kelp and driftwood ([55 \(/bow/species/baleag/cur/references#REF24059\)](#)).

Dimensions

Among the largest nests of all birds; on cliffs, nests generally larger with larger sticks than those of Golden Eagles ([190 \(/bow/species/baleag/cur/references#REF10252\)](#)). Famous nest site in Vermillion, OH, used for 34 yr was wine glass-shaped and measured 2.7 m in diameter, 3.6 m high; estimated to weigh almost 2 metric tons ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). Largest nest on record, in St. Petersburg, FL, was 2.9 m in diameter and 6.1 m tall ([8 \(/bow/species/baleag/cur/references#REF23973\)](#)). Typical nests, however, are 1.5–1.8 m in diameter and 0.7–1.2 m tall; nest shape conforms to shape of tree that it is in, ranging from cylindrical or cone-shaped to flat ([12 \(/bow/species/baleag/cur/references#REF24062\)](#)).

Microclimate

Nest often shaded at southern latitudes, where heat stress may be a concern. One Chesapeake Bay pair abandoned their nest site after gypsy-moths (*Lymantria dispar*) defoliated and killed the tree; pair rebuilt in a loblolly pine (*Pinus taeda*) with shade (DAB). Nests in Saskatchewan tend to be on east and southeast shorelines

of lakes (facing west and northwest), possibly because these shorelines are protected from prevailing east winds during incubation ([66 \(/bow/species/baleag/cur/references#REF24000\)](#)). Little other data on nest orientation with respect to prevailing winds and exposure to the sun.

Maintenance Or Reuse Of Nests, Alternate Nests

Nests often reused year after year. Nest in Ohio used for 34 yr before tree blew down ([3 \(/bow/species/baleag/cur/references#REF24017\)](#)). Have alternate nests in territory and may switch nest site in successive years, especially after nesting failures. Across range, average 1.5 nests/pair, with up to 5 nests reported in several cases ([12 \(/bow/species/baleag/cur/references#REF24062\)](#)). Only 10% of pairs in Saskatchewan had alternate nests ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)); pairs on Amchitka I., AK, did not have extra ground nests ([55 \(/bow/species/baleag/cur/references#REF24059\)](#)). Maintains nest year round at southern latitudes. In Saskatchewan, nest maintenance in Sep prior to migration and then in Apr after return from wintering grounds ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)). Immatures (2–4 yr old) observed building “false” nests that are never used ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)). Half of nests ($n = 48$) in Besnard Lake, Saskatchewan, were extant after 6 yr ([168 \(/bow/species/baleag/cur/references#REF57921\)](#)).

Eggs

Shape

Rounded-oval to oval ([7 \(/bow/species/baleag/cur/references#REF23961\)](#)).

Size

As with body size, egg size increases with increasing latitude and can be predicted by regression equations (length = $67.38 + 0.14 \times \text{latitude}$; breadth = $53.09 + 0.07 \times \text{longitude}$; [12 \(/bow/species/baleag/cur/references#REF24062\)](#)). Across entire range, eggs varied in size from 5.8 to 8.4 cm in length and 4.7 to 6.3 cm in breadth. Average eggs were 7.0–7.6 cm in length and 5.3–5.6 cm in breadth ($n = 8776$ 300) [12 \(/bow/species/baleag/cur/references#REF24062\)](#)).

Mass

Eight eggs in Alaska averaged 130 g ([177 \(/bow/species/baleag/cur/references#REF24016\)](#)); 17 fertile eggs in Saskatchewan averaged $114.4 \text{ g} \pm 2.57 \text{ SE}$ ([22 \(/bow/species/baleag/cur/references#REF23964\)](#)).

Color

Dull white in color with no markings except rarely brown spots ([12 \(/bow/species/baleag/cur/references#REF24062\)](#)).

Surface Texture

Rough.

Eggshell Thickness

Few published data on eggshell thickness prior to introduction of DDT, although eggs from that era still exist in various collections. Large sample of eggs from Florida pre-1947 averaged 0.584 mm in thickness ([10](#) ([/bow/species/baleag/cur/references#REF46340](#))). Eggs collected from 15 states 1969–1979 (DDT era) ranged from a low of 0.450 mm (–26% below pre DDT norm) and 0.473 mm (–3%) for 1 egg from New York and 1 from Delaware to 0.62 mm for 1 egg from Ohio (+1%) and 0.584 mm (–5%) for 7 eggs from Alaska, where DDT contamination was limited. Almost all states showed some eggshell thinning comparing 1969–1979 values with pre-1947 values. Eggshell thickness reported by Wiemeyer et al. ([193](#) ([/bow/species/baleag/cur/references#REF24080](#))) for eggs collected from 15 states from 1980 to 1984 showed little improvement; 5 states had eggshell thickness >15% thinner than pre-1947 norm, including Wyoming (–24%), New Jersey (–23%), Minnesota (–21%), Delaware (–19%), and Florida (–17%). Almost all states sampled (1980–1984) still showed some eggshell thinning compared with pre-1947 data. Some trends not statistically significant because of small sample sizes. During the 1990s, eggshell thinning still present at failed nests in New Jersey ([194](#) ([/bow/species/baleag/cur/references#REF23982](#))), British Columbia ([195](#) ([/bow/species/baleag/cur/references#REF38210](#))), and Lake Superior ([196](#) ([/bow/species/baleag/cur/references#REF50845](#))).

Eggshell thinning of >15% correlated with reproductive failure ([10](#) ([/bow/species/baleag/cur/references#REF46340](#))). Reproductive failure, however, more closely linked to DDE concentrations, with eggshell thinning probably a secondary effect ([197](#) ([/bow/species/baleag/cur/references#REF50880](#))). See Demography and populations: measures of breeding activity and Conservation and management: effects of human activity, below, for more on DDE and impairment of reproduction.

Clutch Size

Generally 1–3, with 2 most common (see Demography and populations: measures of breeding activity, below). Reports of 4 very rare, with unconfirmed reports of 2 females laying in the same nest ([4](#) ([/bow/species/baleag/cur/references#REF24018](#)), [7](#) ([/bow/species/baleag/cur/references#REF23961](#)), S. Nesbitt, unpubl., DAB).

Egg-Laying

One egg laid/d, not always on successive days, with clutch generally completed in 3–6 d ([4](#) ([/bow/species/baleag/cur/references#REF24018](#)), [12](#) ([/bow/species/baleag/cur/references#REF24062](#))).

Incubation

Onset Of Broodiness And Incubation In Relation To Laying

Incubation begins after first egg is laid; thus, young hatch over a period of several days ([4](#) ([/bow/species/baleag/cur/references#REF24018](#)), [177](#) ([/bow/species/baleag/cur/references#REF24016](#))).

Incubation Patches

Both sexes have brood patches, although female patch is better developed than that of the male.

Incubation Period

Generally reported to be 35 d, although some authors report limited variance (e.g., ± 1 d; [4](#) (</bow/species/baleag/cur/references#REF24018>)).

Parental Behavior

Female does majority of incubation, but male also participates. Captive birds nesting in open-air cage in Maryland incubated eggs 98% of 24-h d, with female responsible for 72% of incubation ([155](#) (</bow/species/baleag/cur/references#REF24003>)). Adults show great deal of care around eggs to avoid breakage, including walking with clenched feet apparently to prevent talons from puncturing eggs. Adults carefully step over eggs and settle with side-to-side motion to a flat, low incubation posture ([13](#) (</bow/species/baleag/cur/references#REF23998>)). No data on frequency eggs are turned in nest. Eggs in captive study were left exposed by adults for longer duration when temperatures were $>7.2^{\circ}\text{C}$ and winds were <16.2 km/h ([155](#) (</bow/species/baleag/cur/references#REF24003>)). Adults in wild occasionally cover eggs when they leave the nest unattended; may be more an adaptation to avoid predation than to avoid egg cooling ([3](#) (</bow/species/baleag/cur/references#REF24017>), [8](#) (</bow/species/baleag/cur/references#REF23973>), [12](#) (</bow/species/baleag/cur/references#REF24062>), [13](#) (</bow/species/baleag/cur/references#REF23998>)).

Hardiness Of Eggs Against Temperature Stress; Effect Of Egg Neglect

Eggs can tolerate some cooling but exactly how much before death of the embryo is unknown.

Hatching

Young pip the egg and emerge without assistance from parents. Pipping may take up to 1 d ([177](#) (</bow/species/baleag/cur/references#REF24016>)). Hatching, like laying, usually asynchronous, with 1–4 d between hatching; 13 of 16 2-egg clutches in Saskatchewan hatched 2 d apart ([198](#) (</bow/species/baleag/cur/references#REF50825>)). Adults (both sexes) brood young and incubate remaining eggs until all eggs hatch. Difference in hatch date gives first hatchling significant advantage in competing for food. Shells often found in nest along with other debris, indicating that adults do not routinely discard eggshells after hatching.

Young Birds

Condition At Hatching

On day of hatching, mass was 79% of egg mass for 6 hatchlings in the wild ([22](#) (</bow/species/baleag/cur/references#REF23964>)). At hatching, covered with light-gray down, initially wet but dries quickly, eyes brown, gape and legs pink, and skin pink ([22](#) (</bow/species/baleag/cur/references#REF23964>)). Capable of limited locomotion.

Growth And Development

Few data except from Saskatchewan (Bortolotti [22 \(/bow/species/baleag/cur/references#REF23964\)](#), [199 \(/bow/species/baleag/cur/references#REF23968\)](#)), summarized here. Second down begins to emerge at 9–11 d. Flight feathers emerge at 2–3 wk; body contour feathers begin emerging with the humeral tract at 3–4 wk. Great variability in emergence of contour feathers, such that same-aged individuals may look different. Feathers on head and back emerge at 4–5 wk; lateral ventral surface at 4–6 wk; and feathering on tarsi last at 6–8 wk. Daily weight gain substantial, with maximum average of 102 g/d and 130 g/d for males and females, respectively. Maximum growth attained at about 3–4 wk of age. Male develops flight feathers and asymptotic size more rapidly than female, such that measurement of wing chord, central rectrice, and eighth primary not sexually dimorphic during nestling period, although these characters show considerable sexual dimorphism in fully developed birds ([22 \(/bow/species/baleag/cur/references#REF23964\)](#)).

In Saskatchewan, second chick hatched in a clutch showed delayed development compared to first ($n = 38$; [22 \(/bow/species/baleag/cur/references#REF23964\)](#)), and chicks with hatching interval of 2 d showed greater differential growth than chicks with hatching interval of 1 d ([199 \(/bow/species/baleag/cur/references#REF23968\)](#)), presumably because of differential nutrition. Hatching asynchrony and differential growth leads to differential mass in siblings, facilitating competition and fratricide ([200 \(/bow/species/baleag/cur/references#REF50826\)](#)). Sibling competition and mortality is greatest early in nestling period, when size differences are greatest ([200 \(/bow/species/baleag/cur/references#REF50826\)](#)). Third-hatched chicks in Saskatchewan nests received little food and usually starved. In 1 nest, mass of 9-d-old, 8-d-old, and 6-d-old siblings were 477, 260, and 80 g, respectively ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)).

Feather development not complete at nest departure. Bortolotti ([22 \(/bow/species/baleag/cur/references#REF23964\)](#)) used equations from Dunn ([201 \(/bow/species/baleag/cur/references#REF14611\)](#)) to calculate that thermoregulation should occur at 14.7 d, coincident with emergence of second down. Equations developed by Bortolotti ([202 \(/bow/species/baleag/cur/references#REF23965\)](#)) useful for aging/sexing northern nestlings.

Parental Care

For first 2–3 wk of nestling period, female present at nest about 90% of time, male present about 50% of time; at least 1 adult at nest almost 100% of time ([160 \(/bow/species/baleag/cur/references#REF57919\)](#), [203 \(/bow/species/baleag/cur/references#REF24077\)](#)). Nest attendance declines sharply after 5–6 wk and adults roost away from nest, usually in adjacent trees ([203 \(/bow/species/baleag/cur/references#REF24077\)](#), [157 \(/bow/species/baleag/cur/references#REF57923\)](#)). At 1 Virginia nest, male was present 25% and female 38% of daylight time from hatching to fledging; at least 1 adult was present 54% of daylight time. Adult shades young to avoid heat stress ([157 \(/bow/species/baleag/cur/references#REF57923\)](#)) and shields young from inclement weather ([3 \(/bow/species/baleag/cur/references#REF24017\)](#)).

Brooding

Adult (usually female) broods constantly during inclement and otherwise cool weather until about 4 wk of age ([12 \(/bow/species/baleag/cur/references#REF24062\)](#), [13 \(/bow/species/baleag/cur/references#REF23998\)](#)). In Minnesota, during 4 d of observation, young were brooded, on average, 85% of daylight period during first week after hatching, with female brooding 65% of time and male 35% of the time ([160 \(/bow/species/baleag/cur/references#REF57919\)](#)).

Feeding

Both sexes hunt and feed young. Adult brings food to nest, tears off small pieces, and delivers them to young at early age. Male provides most of food in first 2 wk, while female tends young in nest ([203 \(/bow/species/baleag/cur/references#REF24077\)](#), [13 \(/bow/species/baleag/cur/references#REF23998\)](#)). After 3–4 wk, female delivers as much prey as male ([204 \(/bow/species/baleag/cur/references#REF50886\)](#), [203 \(/bow/species/baleag/cur/references#REF24077\)](#)). After 3–4 wk, young able to peck at food but not able to tear off food and feed self until 6 wk ([14 \(/bow/species/baleag/cur/references#REF24049\)](#)). Adult female did majority of feeding in captivity ([188 \(/bow/species/baleag/cur/references#REF24079\)](#)) and in 1 Virginia nest monitored by video camera ([203 \(/bow/species/baleag/cur/references#REF24077\)](#)). During late nestling phase in 2 nests in Ohio, female provided about twice as much food as male; adults delivered food 2–8 times/day (mean = 4; [3 \(/bow/species/baleag/cur/references#REF24017\)](#)). Early-morning period (05:00–09:00) accounted for 36 of 105 visits to nest ([3 \(/bow/species/baleag/cur/references#REF24017\)](#)). Largest young gets majority of food; in one 10-min feeding bout, largest young fed 39 times, second nestling 8 times, and third 11 times ([5 \(/bow/species/baleag/cur/references#REF50863\)](#)). In a nest where hatching asynchrony was 4 d, in 1 feeding bout when nestlings were 4 wk old, older nestling got 76 pieces of fish while younger nestling got 2 pieces; younger nestling died 1 d later during rain and hail storm ([4 \(/bow/species/baleag/cur/references#REF24018\)](#)). Few data on relationship between clutch size and number of young fledged; unless food is abundant, apparently most 3-egg clutches fail to produce 3 young because youngest chick starves ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)).

Nest Sanitation

Uneaten food from nestlings often buried in nest under grass and moss rather than tossed out of the nest, perhaps to avoid attraction of mammalian predators to nest site ([4 \(/bow/species/baleag/cur/references#REF24018\)](#), [13 \(/bow/species/baleag/cur/references#REF23998\)](#)). At end of nesting cycle, however, numerous prey remains can be retrieved from under nest. Nestlings usually defecate over side of nest, leaving a pungent spray of “whitewash” on shrubs and saplings in the understory ([13 \(/bow/species/baleag/cur/references#REF23998\)](#)).

Carrying Of Young

Not known to occur.

Cooperative Breeding

On Amchitka I., AK, 2 different nests had 3 adults in attendance in 2 separate years, and 3 adults were reported at 3 nests in 1 yr ([55 \(/bow/species/baleag/cur/references#REF24059\)](#)). Fraser et al. ([169 \(/bow/species/baleag/cur/references#REF23995\)](#)) reported 3 adults at the same nest in Minnesota over a 3-yr period. Sex of third individual unknown. In Connecticut, extra male delivered food to nestlings but generally avoided interactions with pair ([170 \(/bow/species/baleag/cur/references#REF50866\)](#)). In California, extra female assisted with incubation and food provisioning of young; was tolerated by pair. Low numbers of adult males may have provided incentive to female for cooperative venture ([171 \(/bow/species/baleag/cur/references#REF50850\)](#)).

Brood Parasitism by Other Species

None reported.

Fledgling Stage

Departure From The Nest

For several weeks prior to first flight from nest (fledging), nestlings flap wings across nest and to adjacent limbs to practice flight, developing muscle strength, flight coordination, and (importantly) landing ability ([3 \(/bow/species/baleag/cur/references#REF24017\)](#)). Up to half of nest departures unsuccessful; such young may remain on ground for weeks before regaining flight ability; in most cases, parents will continue to feed these young. Grounded birds more vulnerable to predators, however, and may not be fed if trapped in dense vegetation ([153 \(/bow/species/baleag/cur/references#REF50871\)](#), [160 \(/bow/species/baleag/cur/references#REF57919\)](#)).

Nest departure can occur at 8–14 wk. Variability in departure date related to effects of sex and hatching order on growth and development ([205 \(/bow/species/baleag/cur/references#REF23967\)](#)). Males in Saskatchewan tend to leave first, regardless of hatching order (males, mean = 78 d, $n = 29$; females, mean = 82 d, $n = 21$; [205 \(/bow/species/baleag/cur/references#REF23967\)](#)). Saskatchewan nestlings usually leave 1–2 d apart, although in 1 nest in which a male was hatched first followed by a female, the male left nest 10 d prior to the female ([205 \(/bow/species/baleag/cur/references#REF23967\)](#)). California nestlings leave on average at 12 wk ([97 \(/bow/species/baleag/cur/references#REF36159\)](#)); Florida nestlings at about 11 wk ([108 \(/bow/species/baleag/cur/references#REF57929\)](#)); Maine nestlings at 11–13 wk ([106 \(/bow/species/baleag/cur/references#REF24041\)](#)). Adults may “encourage” nest departure by flying around nest with prey item vocalizing when young are hungry. One first flight observed by Herrick ([6 \(/bow/species/baleag/cur/references#REF24019\)](#)) was about 1.6 km in length. Humans climbing to nests with eaglets >6 wk old can cause premature departure; young returned to nests continue to be fed by adults and may not fly again for 1–3 wk (DAB). Fledglings may continue to use nest as feeding platform for several weeks as they gain flight and foraging skills.

Growth

Juveniles continue to grow and develop postfledging. Mass may actually decrease or remain stable postfledging, depending on food availability and foraging ability of individual. Skeletal growth and development minimal postfledging. Muscle mass continues to develop and flight feathers fully emerge. Little data on when growth is complete in immatures.

Association With Parents Or Other Young

Associated with other young and adults for 4–10 wk post-fledging in Montana prior to dispersal ([92 \(/bow/species/baleag/cur/references#REF50875\)](#)); 4–11 wk in Florida ([206 \(/bow/species/baleag/cur/references#REF38213\)](#)); 5–10 wk in Maine ([106 \(/bow/species/baleag/cur/references#REF24041\)](#)); 2–5 wk in California ([97 \(/bow/species/baleag/cur/references#REF36159\)](#)); and 7–8 wk in Saskatchewan ([99 \(/bow/species/baleag/cur/references#REF24002\)](#)). Fledglings follow adults and may be fed by adults up to 6 wk after leaving nest ([153 \(/bow/species/baleag/cur/references#REF50871\)](#)). Most Florida fledglings (>80% of 292 observations) were located <230 m from nest during postfledging period ([206 \(/bow/species/baleag/cur/references#REF38213\)](#)).

Ability To Get Around, Feed, And Care For Self

Degree of independence increases regularly until dispersal; after leaving nest, young dependent on adults for all food, and often follow adults to foraging sites. In Minnesota, no fledglings observed catching live prey during the first 6 wk after nest departure ([153 \(/bow/species/baleag/cur/references#REF50871\)](#)). During this period, young spend progressively less time with adults and increasingly begin to hunt on their own. Fledglings developed hunting skill by trial and error rather than learning from adults, first by scavenging fish carcasses along shoreline areas and then by picking up floating dead fish ([153 \(/bow/species/baleag/cur/references#REF50871\)](#)). Fledglings in Minnesota during this period fed almost exclusively on fish ([153 \(/bow/species/baleag/cur/references#REF50871\)](#)).

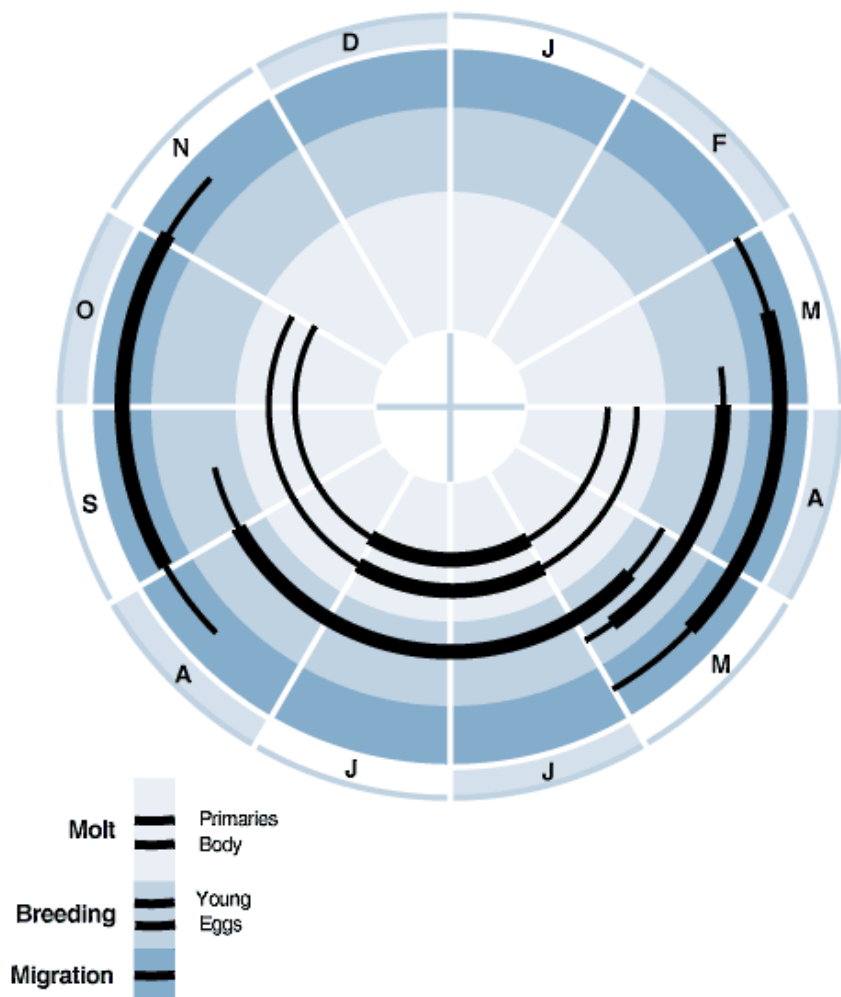
Immature Stage

Prolonged period of great exploration lasting for 4 yr in this species until Definitive plumage is attained (see Appearance, below). Juveniles on Chesapeake Bay dispersed either north up the bay or south down the bay. Siblings showed no similarity in initial dispersal direction, suggesting direction not genetically based (DAB). Initial dispersal in Montana was either west to Pacific Coast or south to intermountain winter sites ([92 \(/bow/species/baleag/cur/references#REF50875\)](#)). Maine juveniles moved to coastal areas and in general dispersed south ([106 \(/bow/species/baleag/cur/references#REF24041\)](#)). Florida juveniles dispersed north ([8 \(/bow/species/baleag/cur/references#REF23973\)](#), [108 \(/bow/species/baleag/cur/references#REF57929\)](#)). California juveniles dispersed north up the coast as far as Canada and se. Alaska ([97 \(/bow/species/baleag/cur/references#REF36159\)](#), [207 \(/bow/species/baleag/cur/references#REF50869\)](#)). Saskatchewan juveniles dispersed south ([99 \(/bow/species/baleag/cur/references#REF24002\)](#)). Texas juveniles dispersed generally northward, although several band recoveries from Atlantic Coast (eastward dispersal) and west of Rockies (westward dispersal; [110 \(/bow/species/baleag/cur/references#REF24034\)](#)).

Little apparent fidelity for any 1 area; movements largely opportunistic related to heritable tendencies (i.e., to migrate), local food availability, and weather. These patterns can be repeated year after year, such that the same immatures may use the same areas in summer and winter, as well as migratory stopover sites (DAB).

< [Behavior \(/bow/species/baleag/cur/behavior\)](/bow/species/baleag/cur/behavior)

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Figure 4. Bald Eagle annual cycle.

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Annual cycle of migratory Bald Eagles in Alaska. Adults migrate early in spring, followed by immatures; reverse pattern occurs in fall. Thick lines indicate peak activity; thin lines, off-peak.





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Typical Bald Eagle nest; Cape Coral, FL; Feb.

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Note small young in nest.; photographer Arthur Morris





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Bald Eagle fledgling, 1 day out of the nest. Florida, March.

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Bald Eagle fledgling, 1 day out of the nest. Florida, March.; photographer David McNicholas



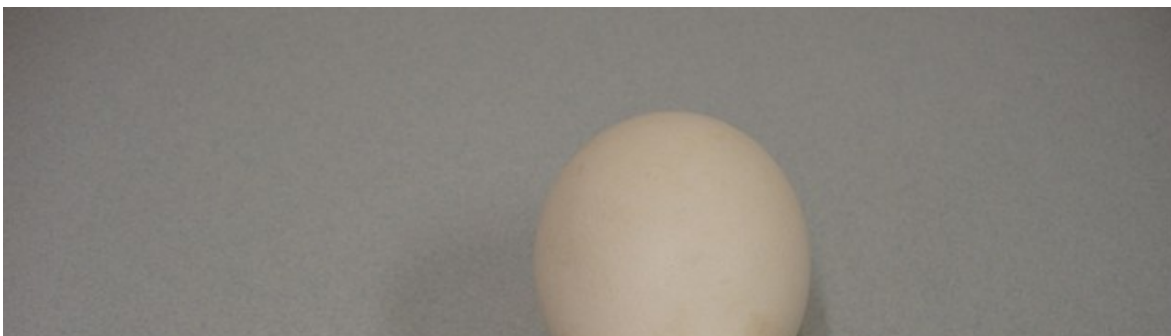


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Bald Eagle nest, California

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Santa Rosa I., Santa Barbara Co., CA. 12 Mar 1934 , Mar 12, 1934; photographer Rene Corado





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Bald Eagle eggs, Virginia

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Aquia Creek, Woody Gibson, Virginia. 18 Mar 1933 , Mar 18, 1933; photographer Rene Corado

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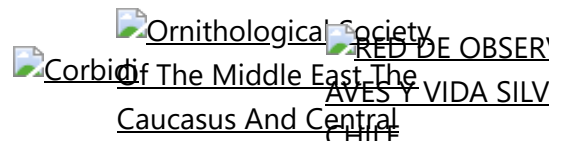
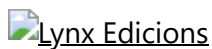
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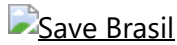
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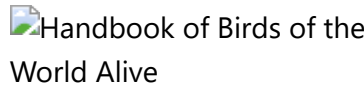


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SPECIES

Bald Eagle *Haliaeetus leucocephalus*

David A. Buehler

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Diet and Foraging

Extensively studied (see [12 \(/bow/species/baleag/cur/references#REF24062\)](/bow/species/baleag/cur/references#REF24062), [91 \(/bow/species/baleag/cur/references#REF57926\)](/bow/species/baleag/cur/references#REF57926) for comprehensive reviews). Early studies based on stomach-contents analysis ([115 \(/bow/species/baleag/cur/references#REF61230\)](/bow/species/baleag/cur/references#REF61230), [116 \(/bow/species/baleag/cur/references#REF56003\)](/bow/species/baleag/cur/references#REF56003), [117 \(/bow/species/baleag/cur/references#REF24039\)](/bow/species/baleag/cur/references#REF24039), [24 \(/bow/species/baleag/cur/references#REF50867\)](/bow/species/baleag/cur/references#REF50867)). Other approaches include direct observation of prey delivery to nests ([3 \(/bow/species/baleag/cur/references#REF24017\)](/bow/species/baleag/cur/references#REF24017), [118 \(/bow/species/baleag/cur/references#REF24048\)](/bow/species/baleag/cur/references#REF24048)), studies based on prey remains collected from nests and other feeding perches (many), studies of egested pellets collected from nests and roosts (many), and studies based on direct observation of foraging.

Feeding

Hunts from perches or while soaring over suitable habitat. Attempts to take most prey on the wing (e.g., fish, waterfowl, small mammals) but success varies greatly. Uses carrion of fish, birds, and mammals extensively wherever encountered at sites that provide disturbance-free access from the ground.

Main Foods Taken

An opportunistic forager; food habits highly varied across range and site-specific, based on prey species available ([119 \(/bow/species/baleag/cur/references#REF38624\)](#), [12 \(/bow/species/baleag/cur/references#REF24062\)](#), [91 \(/bow/species/baleag/cur/references#REF57926\)](#)). In most regions, seeks out aquatic habitats for foraging and prefers fish ([120 \(/bow/species/baleag/cur/references#REF56757\)](#), [121 \(/bow/species/baleag/cur/references#REF24061\)](#), [90 \(/bow/species/baleag/cur/references#REF24065\)](#), [12 \(/bow/species/baleag/cur/references#REF24062\)](#), [122 \(/bow/species/baleag/cur/references#REF23987\)](#)). Uses birds and mammals often as carrion, especially in winter. Eats a great variety of aquatic and terrestrial mammals, including muskrats (*Ondatra zibethicus*) and hares (*Lepus* spp.), reptiles and amphibians, crustaceans, and a variety of birds, including many species of waterfowl, gulls (*Larus* spp.), and even Great Blue Herons (*Ardea herodias*; see [12 \(/bow/species/baleag/cur/references#REF24062\)](#)). May eat garbage at dumps in Alaska ([55 \(/bow/species/baleag/cur/references#REF24059\)](#)).

Microhabitat For Foraging

Good foraging habitat defined by conditions that make live fish available to the limited fishing ability of Bald Eagles or conditions that make fish, birds, and mammals available as carrion. Typically forages at or near the surface of any body of water, more often close (<500 m) to shoreline perching habitat ([91 \(/bow/species/baleag/cur/references#REF57926\)](#)). Perch trees used in Montana were adjacent to shallow water ([69 \(/bow/species/baleag/cur/references#REF50838\)](#)). Shallow water increases likelihood that live fish will be available because limited depth of water column brings fish closer to surface ([119 \(/bow/species/baleag/cur/references#REF38624\)](#), [57 \(/bow/species/baleag/cur/references#REF24035\)](#), [91 \(/bow/species/baleag/cur/references#REF57926\)](#), [56 \(/bow/species/baleag/cur/references#REF24033\)](#)). Live fish species most available are those that spend the most time near the surface or naturally occur in shallow water, such as gizzard shad (*Dorosoma cepedianum*), threadfin shad (*D. petenense*), and white bass (*Morone chrysops*). Benthic-dwelling species, like catfish (*Ictalurus* spp.), often captured on Chesapeake Bay dead, floating on the surface ([91 \(/bow/species/baleag/cur/references#REF57926\)](#)), contrary to reports of live capture of benthic-dwelling species by Haywood and Ohmart ([123 \(/bow/species/baleag/cur/references#REF36158\)](#)). Some benthic-dwelling species may be more vulnerable to predation because their eyes are focused downward and their avoidance reactions are limited ([124 \(/bow/species/baleag/cur/references#REF36170\)](#)).

In addition to capture of live fish, any natural or human-caused event that kills fish or other potential prey species may provide food. Availability of such food sources may be independent of habitat structure (e.g., turbines at hydroelectric facilities produce dead and stunned fish). High water temperatures and oxygen depletion of shallows during hot periods in summer or oxygen depletion in shallow, iced-over areas during severe winters can lead to sporadic fish-kills and concentrate foraging opportunities ([91 \(/bow/species/baleag/cur/references#REF57926\)](#), [122 \(/bow/species/baleag/cur/references#REF23987\)](#)). Bald

Eagles use shallow gravel bars on Pacific Northwest and Alaskan rivers where salmonid carcasses accumulate after spawning mortality ([125 \(/bow/species/baleag/cur/references#REF24029\)](#), [89 \(/bow/species/baleag/cur/references#REF24020\)](#)). Bald Eagles also frequent traditional waterfowl concentration areas in winter where hunter-induced mortality leads to a reliable supply of waterfowl carcasses for scavenging ([114 \(/bow/species/baleag/cur/references#REF16232\)](#)).

Food Capture And Consumption

Obtains food by direct capture, scavenging (use of dead prey), and stealing food from other Bald Eagles, other birds, and mammals. Adults more apt than immatures to capture live prey because of superior foraging ability and experience ([119 \(/bow/species/baleag/cur/references#REF38624\)](#), [83 \(/bow/species/baleag/cur/references#REF24012\)](#)). Stalmaster ([12 \(/bow/species/baleag/cur/references#REF24062\)](#)) identified 5 methods of food capture: hunting in flight, hunting from perches, wading in water, hunting on the ground (seldom), and cooperative hunting; usually hunts from perches or in flight by soaring over suitable foraging areas. Scavenging opportunities usually discovered through soaring flights over likely habitat. On n. Chesapeake Bay, dead fish composed 25–67% of all fish captured, even though dead fish abundance was low ([91 \(/bow/species/baleag/cur/references#REF57926\)](#), [122 \(/bow/species/baleag/cur/references#REF23987\)](#)). Steals food from other Bald Eagles and other avian species, especially fish-eaters like Osprey (*Pandion haliaetus*) and herons that are better at capture of live fish but have limited defense ability. Will also (rarely) steal food from mammals, such as sea otters (*Enhydra lutris*; [55 \(/bow/species/baleag/cur/references#REF24059\)](#), [126 \(/bow/species/baleag/cur/references#REF24078\)](#)), or displace mammals like coyotes (*Canis latrans*) and foxes at scavenging sites. Food piracy more common in fall, winter, and spring than during breeding season ([119 \(/bow/species/baleag/cur/references#REF38624\)](#), [125 \(/bow/species/baleag/cur/references#REF24029\)](#), [85 \(/bow/species/baleag/cur/references#REF43314\)](#), [91 \(/bow/species/baleag/cur/references#REF57926\)](#)). Will displace or be displaced by other species at scavenging sites (e.g., corvids, coyotes, bobcats [*Lynx rufus*], domestic dogs; [103 \(/bow/species/baleag/cur/references#REF50876\)](#)). Based on cost-benefit analysis, hunting and stealing food in Alaska had approximately equal cost/benefits ([127 \(/bow/species/baleag/cur/references#REF57922\)](#)).

To capture live prey, soars overhead to visually locate the item, then suddenly stoops and attempts to capture such items with 1 or both feet. Repeatedly stoops on waterfowl on the water but often with poor success. Most prey taken to a nearby perch site for consumption, although small items may be consumed on the wing. In areas with high concentrations of Bald Eagles, successful foragers are often chased. In such cases, successful foragers select perches away from the foraging area for less conspicuous consumption of prey. Items taken as carrion that are too large to carry off are eaten on site, such as salmon carcasses on gravel bars, duck and goose carcasses, deer, and occasionally domestic livestock (cows, sheep, pigs). Very few documented cases of predation on live livestock; Bald Eagles implicated in cases attributable to Golden Eagles ([128 \(/bow/species/baleag/cur/references#REF60080\)](#), [129 \(/bow/species/baleag/cur/references#REF57918\)](#), [130 \(/bow/species/baleag/cur/references#REF24036\)](#)). Some large items such as mammalian carcasses can be fed on for many days. Bald Eagles in Utah hunted, flushed, and killed black-tailed jackrabbits (*Lepus californicus*) cooperatively ([131 \(/bow/species/baleag/cur/references#REF33293\)](#)). One nesting pair in Florida hunted

cooperatively for Cattle Egrets (*Bubulcus ibis*); this appeared to increase capture success (132 (/bow/species/baleag/cur/references#REF50848)). Bald Eagles wintering in Nebraska had 24% success rate (kills made/foraging search; $n = 1,997$ attempts) and captured 73% of strikes ($n = 667$). Gizzard shad composed 91% of all captures ($n = 489$), reflecting high susceptibility for this species, especially below hydroelectric facilities (133 (/bow/species/baleag/cur/references#REF50894)). Foraging can occur throughout day although concentrated in early morning hours (134 (/bow/species/baleag/cur/references#REF50893), 135 (/bow/species/baleag/cur/references#REF24066), 91 (/bow/species/baleag/cur/references#REF57926)).

Diet

Major Food Items And Quantitative Analyses

Many biases related to method of data collection, such that some conclusions based on prey remains/pellet analysis may be highly skewed toward items with hard bony structure (e.g., birds and mammals, catfish pectoral girdles), and under-representative of soft-bodied items, especially fish (136 (/bow/species/baleag/cur/references#REF50878)). Prefer fish throughout range wherever and whenever available (see 12 (/bow/species/baleag/cur/references#REF24062) for review of 20 food-habits studies). Fish species used vary based on location and seasonal availability. Averaged from 20 studies across range, fish compose 56% of diet of nesting Bald Eagles, birds 28%, mammals 14%, and other 2% (12 (/bow/species/baleag/cur/references#REF24062)).

In Maine, 64 species of vertebrates and 2 species of invertebrates identified from food remains collected primarily from nest sites (119 (/bow/species/baleag/cur/references#REF38624)); fish made up >75% of identified remains. Fish use was greatest at inland nests, with bird and mammal use greatest in coastal areas. On Chesapeake Bay, pellets collected from communal roosts contained 34 species of birds, 14 species of mammals, turtles, and blue crab (*Callinectes sapidus*), along with several fish species (91 (/bow/species/baleag/cur/references#REF57926)). Canada Goose (*Branta canadensis*) and Mallard (*Anas platyrhynchos*) most common avian prey; white-tailed deer (*Odocoileus virginianus*) and raccoons (*Procyon lotor*) most common mammalian prey. Based on year-round foraging observations, 8 species of fish used on Chesapeake; gizzard shad and catfish most common (91 (/bow/species/baleag/cur/references#REF57926)).

In Florida, nesting Bald Eagles used predominantly fish from 10 species (brown bullhead [*Ictalurus nebulosus*] and catfish composed 59% of total prey remains), 12 bird species (American Coot [*Fulica americana*] composed 19% of total), 9 mammal species, and 3 reptile species (137 (/bow/species/baleag/cur/references#REF36163)).

In the Pacific Northwest and Alaska, salmon carcasses scavenged as primary prey as salmon die after spawning (e.g., 125 (/bow/species/baleag/cur/references#REF24029), 89 (/bow/species/baleag/cur/references#REF24020)); use of salmon during nesting season restricted mostly to Alaska because most spawning runs in Pacific Northwest occur in fall and winter (118 (/bow/species/baleag/cur/references#REF24048)). Herring (*Clupea* spp.) are important in Alaska and British Columbia during nesting (138 (/bow/species/baleag/cur/references#REF23988), 139 (/bow/species/baleag/cur/references#REF23974), 118 (/bow/species/baleag/cur/references#REF24048)). Prey remains collected from w. Washington nests comprised

49 bird species ($n = 439$ individual items), 15 fish species ($n = 337$ items), 8 mammal species ($n = 99$ items), and 14 invertebrate species ($n = 36$ items); 55% of remains were birds, most commonly Western Grebes (*Aechmophorus occidentalis*) and Common Murres (*Uria aalge*), but based on direct observation, 92% of delivered prey items ($n = 47$) were fish ([140 \(/bow/species/baleag/cur/references#REF46548\)](#)). Nesting Bald Eagles on San Juan I., WA, preyed extensively on European rabbits (*Oryctolagus cuniculus*); 53% of observed prey ($n = 89$ total observations) delivered to nests were rabbits, taken primarily as carrion from car-kills. In addition, 5 species of fish were used (43% of prey items; [141 \(/bow/species/baleag/cur/references#REF24053\)](#)).

At Lake Superior nests, fish made up 50% of prey remains ($n = 156$ total; most commonly suckers; *Catostomus* spp.) and birds made up 48% of prey remains (primarily Herring Gulls [*Larus argentatus*]). Average total length of fish 354 mm ([142 \(/bow/species/baleag/cur/references#REF57925\)](#)). Wintering Bald Eagles on the Platte River and associated reservoirs in Nebraska used primarily fish (97% of 489 observations; [133 \(/bow/species/baleag/cur/references#REF50894\)](#)). Gizzard shad used most often, although waterfowl and carp (*Cyprinus carpio*) contributed the most energy to diet.

Even in desert settings, such as nests in Sonora, Mexico, 77% of prey remains ($n = 118$ total) were fish from 6 species (catfish most common), 20% were birds from 11 species, and <3% were mammals from 3 species ([143 \(/bow/species/baleag/cur/references#REF50831\)](#)). Similarly, fish (primarily catfish) composed 73–76% of prey captured during observation of foraging or prey deliveries to Arizona nests, whereas mammals and birds composed only 5–18% and 1–4% of prey items, respectively ($n = 481$ prey items [[123 \(/bow/species/baleag/cur/references#REF36158\)](#)], $n = 1,471$ prey deliveries [[144 \(/bow/species/baleag/cur/references#REF40858\)](#)]). Wintering Bald Eagles in Arizona along the Colorado River foraged primarily on fish (99% of 1,327 attempts) but used almost exclusively rainbow trout (*Oncorhynchus mykiss*; [145 \(/bow/species/baleag/cur/references#REF36145\)](#)).

Pattern of fish use does not hold up in some parts of the West, especially in winter where use of mammalian carrion is common. In greater Yellowstone ecosystem in winter, Bald Eagles used primarily ungulate carrion (93% of 148 foraging observations), although feeding on mammalian carcasses may have been more observable than feeding on birds or fish ([62 \(/bow/species/baleag/cur/references#REF24069\)](#)). Breeding Bald Eagles in greater Yellowstone ecosystem used proportionately more birds than reported rangewide; prey remains and pellets ($n = 368$) comprised 43% birds of 23 species, 43% fish of 6 species, and 14% mammals of 11 species ([62 \(/bow/species/baleag/cur/references#REF24069\)](#)).

Food Selection and Storage

Prefers fish when given a choice but an opportunistic forager that selects prey based on availability ([120 \(/bow/species/baleag/cur/references#REF56757\)](#), [122 \(/bow/species/baleag/cur/references#REF23987\)](#)). Prefers large fish (340–380 mm) over small fish (230–275 mm) during breeding season, with little selection for size during the nonbreeding season ([146 \(/bow/species/baleag/cur/references#REF36160\)](#)). Not known to cache food but will use carcasses of large items (fish, waterfowl, and large mammals) day after day until all consumed. Food accumulates at nest and may be used day after day by nestlings unless fresh food is provided ([5](#)

([/bow/species/baleag/cur/references#REF50863](#)). Can consume large amounts of food (gorging); individuals store food in crop, then digest food over several days. Capable of fasting for many days; 1 captive eagle deprived of food for 16 d lost 28% of body mass, consumed 924-g meal upon resumption of feeding, and recovered with no apparent ill effects ([147 /bow/species/baleag/cur/references#REF24067](#)). Another captive Bald Eagle survived food deprivation for 32 d ([48 /bow/species/baleag/cur/references#REF50881](#)). Poorly developed sense of smell but apparently has sense of taste and avoids foul-tasting items ([12 /bow/species/baleag/cur/references#REF24062](#)).

Nutrition and Energetics

Stalmaster and Gessaman ([148 /bow/species/baleag/cur/references#REF24063](#)) documented food consumption and energy requirements of captive Bald Eagles across a range of ambient temperatures based on diets comprised solely of chum salmon (*Oncorhynchus keta*), black-tailed jackrabbit (*Lepus californicus*), or Mallard. Greatest daily consumption occurred with salmon (92.0g/kg), was intermediate with jackrabbit (74.8 g/kg), and least on mallard (65.1 g/kg). Relative consumption was inversely related to energy content of food type. Daily gross energy intake, existence metabolism, and excretory energy for all 3 food types combined were 425.5, 341.9, and 83.6kJ/kg at 5°C, respectively. Energy assimilation efficiencies were greatest for Mallard (85.2%) and similar for salmon and jackrabbits (75.0 and 75.4%, respectively). Minimum gross energy requirements for a 4.5-kg eagle in a 90-d winter at 5°C ambient temperature would be 13 salmon, 20 jackrabbits, or 32 Mallards. Energy and food requirement in the wild estimated to be 10% greater than in captivity ([85 /bow/species/baleag/cur/references#REF43314](#)).

Free-ranging Bald Eagles in Washington need to consume 489g/d of salmon to maintain body weight. Adults consumed 522g/d of salmon, whereas immatures and subadults consumed only 410 and 459 g/d, respectively, thus were energy deficient during winter ([85 /bow/species/baleag/cur/references#REF43314](#)).

Metabolism and Temperature Regulation

Stalmaster and Gessaman ([85 /bow/species/baleag/cur/references#REF43314](#)) documented metabolic rates for captive Bald Eagles under a variety of environmental conditions. Basal metabolic rate measured by oxygen consumption was 11.595 kJ/g/h. Metabolic rate below thermal neutrality (10.6°C) linearly and inversely related to ambient temperature. Body temperature of free-ranging Bald Eagles averaged 38.8°C resting at night, 40.7°C resting during the day, and 41.2°C during flight. Metabolic rate increased 9% and 21% in response to artificially induced rainfall of 6.1 and 22.2 cm/h, respectively.

Drinking, Pellet-Casting, and Defecation

Water derived from moist prey and from metabolic sources. Nestlings not provided with water for drinking. Will drink water on occasion when bathing.

Casts pellets containing indigestible food components (hair, feathers, some bone, large fish scales). Meal-to-pellet interval for captive *Falconiformes*, including Bald Eagles, reported to be <1 meal/pellet ([149 \(/bow/species/baleag/cur/references#REF23989\)](#)). Multiple pellets can be produced by captive Bald Eagles in a 24-h period, including 16 separate pellets cast from 1 individual meal and 3 pellets from 1 meal observed in wild ([136 \(/bow/species/baleag/cur/references#REF50878\)](#)). Pellets generally cast in roost, possibly at dawn in response to daylight ([12 \(/bow/species/baleag/cur/references#REF24062\)](#)). Little information on defecation; often voids watery, white-colored excreta after feeding ([3 \(/bow/species/baleag/cur/references#REF24017\)](#)).

◀ **[Movements and Migration \(/bow/species/baleag/cur/movement\)](#)**

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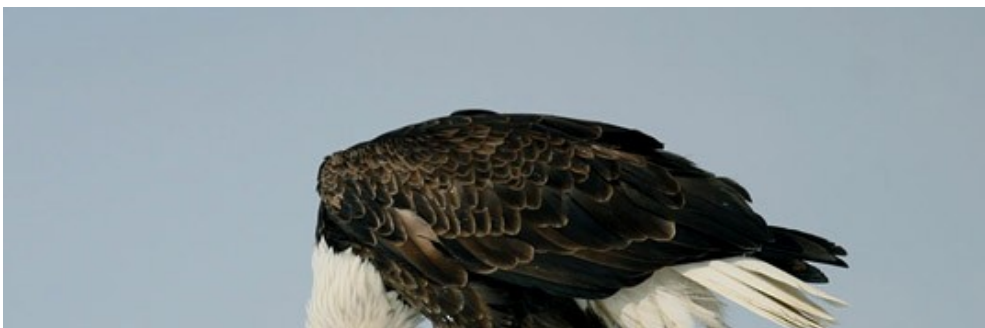


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Talons of an immature Bald Eagle; Homer, AK; Feb.; photographer Arthur Morris





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Adult Bald Eagle feeding; Utah, January

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Bald Eagle Adult feeding on fish, Farmington Bay, UT (January 2003); photographer Jerry and Sherry Liguori

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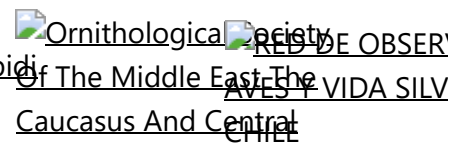
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