

Eagles in the Classroom - Study Guide



Photo: M. Bacro 2008

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Eagles in the Classroom – Classroom Program Description

This fun and interactive program will cover the decline and rebound of Bald Eagle populations in Southern Ontario, including the Long Point area and the efforts to monitor the health of the population (i.e., the Bird Studies Canada program *Destination Eagle*). We will demonstrate how the birds are banded and measured as well as how we attach the satellite transmitters. This exercise will also involve audience participation using some props. Finally a good proportion of the time will be spent learning about the biology of Bald Eagles by using a live bird. This program is being presented by Bird Studies Canada in partnership with the Canadian Raptor Conservancy.

Eagles in the Classroom will be for everyone interested in learning about the biology of Bald Eagles and how they relate to a healthy aquatic ecosystem. Anyone who has never seen a live Bald Eagle up close will definitely want to attend! The program can also be utilized as a stand alone program for any teachers and students with a serious interest in birds or biology.

For more information about this program please contact **Jody Allair, Biologist and Science Educator, Bird Studies Canada** by email: jallair@bsc-eoc.org, or by phone at 1-888-448-2473 x 117.



Eagles in the Classroom – Background Material

Species	Bald Eagle, Pygargue à tête blanche <i>Haliaeetus leucocephalus</i>
Status	Recently changed from Provincially Endangered to a Species of Special Concern
Globally	Found only in North America. Has declined but has subsequently begun to recover across much of its range.

Description

Weight: males: 3.5 - 4.5 kg (7.7-9.9 lbs), females: 4.5 - 6.5 kg (10-14 lbs).
 Wingspan: 1.8 to 2.2 metres (6 - 7 ft).
 Height: 0.6 -1.0 metres (2 - 3 ft).

Adults: blackish-brown back and breast, white head, neck and tail, yellow legs, yellow bill.

Juvenile: predominantly brown, with some white feathers, black bill. Confusable with Golden eagle/ Aigle royal (*Aquila chrysaetos*). Golden eagles are larger and lack white feathers. Reach maturity at 4-5 years, when they resemble adults.



Juvenile Bald Eagles Photo: M.Bacro



Adult Bald Eagle Photo: R. Ridout

Lifespan

- Wild bald eagles can live up to 30 years, though 20 years is more typical.
- Southern Ontario bald eagles appear to have a shortened lifespan of 12 years or less, possibly due to the persistence of pollutants in the food chain.
- The oldest known bald eagle was a captive eagle in West Stephentown, New York that lived to be almost 50 years old.
- Survival rate of juveniles in their first year is variable, and depends on food and habitat availability.

Nesting

Bald eagles are socially monogamous, and tend to reneest with the same mate from year to year. If one of the pair fails to return to the breeding territory, the remaining bird will accept a new mate.

The nests are massive structures made of branches. Other materials such as moss, hay and twine may also be used. They are usually around 3-4 meters deep and over 2 meters wide, though they can be larger. Nests are typically built in the top of the most dominant tree within an established territory. Bald eagles may also nest on large rock pinnacles and hydro-towers. They prefer to nest near water bodies.

Eggs are laid two or three days apart and are then incubated for 35 days. When the eaglets hatch out they are covered with a very light grayish down and are capable of very limited locomotion. Daily weight gain averages 116g/d (Bortolotti 1984) and they reach their maximum growth at approximately 3-4 weeks of age.

Eaglets remain in the nest for about 70 days, during which time the parents deliver food. After leaving the nest, the young eagles usually remain in the natal area for a few weeks because they are still dependent on their parents for some prey provisioning. Juveniles are not efficient hunters when they are first beginning to fend for themselves. During their first few months of independence juveniles will often scavenge dead prey, and use these opportunities to practice their hunting skills.

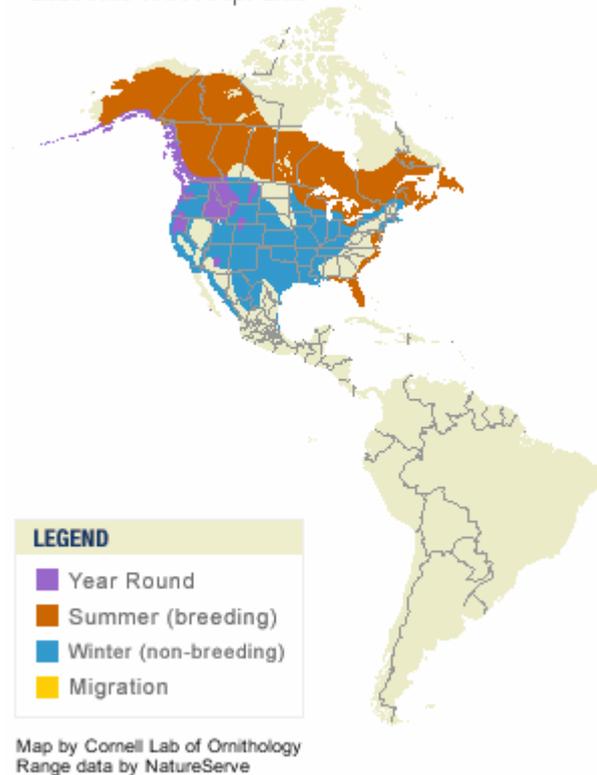
Distribution

The majority of Canada's breeding Bald Eagle population is found in British Columbia, especially along the coast where eagles follow the Pacific Salmon runs north. Bald Eagles are also found in the Boreal Forest from Alberta, Saskatchewan, and Manitoba to northwestern Ontario. Bald Eagles are also found in Southern Ontario, Quebec, and the Atlantic provinces. The Gulf of St. Lawrence has been identified as an important stopover area for migrating eagles and Baddeck, Cape Breton is home to numerous gregariously feeding eagles in spring and fall. Newfoundland and Labrador have healthy populations of eagles, which disperse from breeding grounds between mid-October and the first week of November, later than the rest of Canada.

Eagles move nomadically outside the breeding season, taking advantage of food resources wherever they find them. They may congregate at food sources, but tend to live fairly independently.

Bald Eagle

Haliaeetus leucocephalus



Habitat

- Require large trees, preferably in relatively undisturbed areas, for nesting.
- Hunt fish, mammals and aquatic birds. Juveniles in particular will also scavenge dead prey. They may also steal from other birds (e.g. will chase and steal fish from ospreys).

Population trend

- Population throughout North America severely reduced through hunting, habitat loss and pollution.
- Almost extirpated from Ontario in the early 1980s: complete reproductive failure in Lower Great Lakes region in 1980.
- Populations recovering at varying rates throughout the range.

Threats

- Bald eagles were extensively hunted, and fetched a bounty in Alaska until 1953.
- Clearing of forest for agriculture resulted in the loss of trees suitable for nesting.
- Pollutants become increasingly concentrated as they pass along the food chain, from aquatic plants to fish to fish eating birds and animals (bioaccumulation). As top predators, bald eagles are exposed to particularly high levels of pollutants, such as heavy metals and DDT. Uncontrolled disposal of chemical waste into waterways resulted in widespread reproductive failure in bald eagles, even several years after controls were introduced.

What you can do

- Help keep their environment clean – participate in cleanups, recycle your batteries support local environmental groups.
- Don't directly approach nesting or roosting eagles, whether on foot, vehicle or boat.
- Keep quiet, don't make them fly.
- Use binoculars rather than trying to get close for a better view.
- Spread the word that Bald Eagles are an important part of the ecosystem of southern Ontario.

Report Bald Eagle Sightings:

- Report any adult eagles between April 1st and June 30th, as this could lead to the discovery of new nests.
- Four or more eagles in one location between December and March, especially after 3:00 p.m. could reveal an important winter roost site.
- Look for coloured leg bands.
- Check out the Eagle Tracker <http://www.bsc-eoc.org/research/speciesatrisk/baea> to keep tabs on the movements of our satellite tagged eagles.

Contact

To report any Bald Eagle sightings or for more information on Destination Eagle or the southern Ontario Bald Eagle monitoring program please contact Jody Allair at:

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Bald Eagles – Frequently Asked Questions

Anatomy

- 1) How can you tell a Bald Eagle is male or female?
 - a. As with any birds where the genders have non-distinct plumages, the only ways to tell differences in sex are through size dimorphism (i.e., size differences) or in internal examination (laparoscopy). Female bald eagles are, on average, 1/3 larger than males. Biologists can also measure certain parts of the bird, do an algorithm and determine a “best guess” of the birds sex (Stalmaster 1987).
- 2) How do feathers stay attached to the bird? When I find a feather on the ground there doesn't seem to be any roots?
 - a. Feathers, like the scales on their feet, claws, or bill are keratinous outgrowths of the skin, similar to our nails. Similar to human hair, feathers grow out of skin follicles. The skin holds the feather cone at the follicle, and there are a bunch of muscles that hold the feather at the skin between the follicles. This allows the feather to also move.
- 3) What is a bald eagles wingspan?
 - a. Northern eagles range 200-235 cms; southern Ontario eagles are a bit smaller in all sizes (weight, wingspan, etc). One of the largest wing-spans on record is of a bird with a 243 cm!
- 4) Are bald eagles strong enough to carry off small pets, babies, and children?
 - a. No! I get this question a lot. They can only carry off a few kilograms at the most!
- 5) How can you tell an eagles age?
 - a. The easiest way is to look at their plumage. Once the bird is about 5 years old their head and tail becomes white and after that time it is difficult to age them.

Reproduction and Young

- 6) Why are eagle nests so large?
 - a. Most nests are about 150-250 cms across (approximately 6-8ft) and can be as deep as 250cms (8ft). One nest in Florida was recorded to be 672cm (22ft) deep! Nests get larger each year because pairs often return to the same nest every year and add sticks before the eggs are laid.
- 7) What is a territory and do bald eagles need one?
 - a. Bald eagle territories are an area chosen by an eagle that has everything they need for breeding. Things they are looking for include an easy access to food supply, suitable nesting and perching trees, and isolation from excessive human activity. Wintering birds do not commonly have a defined territory, but they will return to the same places year after year.
- 8) How long can a bald eagle live in the wild?

- a. On estimate, bald eagles can live upwards of 20-25 years. In the past, OMNR estimated Ontario eagles to have a lifespan of only 12 years. However, this number was based on only a few banding recaps of dead birds.
- 9) How long does it take a brown eagle to have a white head?
- a. Bald eagles retain their brown colouring until they are 5 years old. At age 5 they begin breeding and their signature white head makes them more identifiable.
- 10) How long does it take for baby eagles to hatch? And how long until they can fly?
- a. Young eaglets hatch out after 35 days of incubation. They can fly anywhere between 10 and 12 weeks of age. At that time they are full grown and are the same size as their parents!
- 11) Do bald eagles mate for life? If so, what happens if one dies?
- a. Yes, bald eagles are monogamous and mate for life. If one dies, the other carries on, finds a new mate, and continues breeding within their breeding territory.

Diet and Feeding

- 12) What do bald eagles eat?
- a. Bald eagles characteristically choose fish as their primary food source, but diets vary according to season and geographic location. For example, an eagle that lives up north may feed on the carcasses of dead ungulates
- 13) What eats a bald eagle? (i.e. what are some natural predators of bald eagles?)
- a. There are few predators of Bald Eagles. Other than bald eagles, racoons and great horned owls may predate on eagle eggs/young. Humans cause a decrease in success through disturbance and injury (i.e. hitting a bird with a car).
- 14) How many kilograms does an eagle eat in a day?
- a. An eagle consumes between 5-10% of their body weight. Average daily food consumption ranges between 250-550 grams per day.
- 15) How can eagles see fish underwater?
- a. Eagles have sharp eyesight, seeing 3 to 4 times better than humans. Eagles often capture fish near the surface of the water and can focus on their prey from a long ways up. Turbulent or cloudy water can create obstacles for fishing eagles!

Migration and Flight

- 16) When eagles get ready for migration, do they eat a lot for energy or eat less so they aren't as heavy?
- a. Before migrating eagles eat normally. They may even eat more if food is available. Day length often cues them when to start migrating and they will often eat en-route to wintering or breeding grounds. They are opportunistic and will stop to eat if there is food available (i.e. a productive pond, road kill, etc). They eat today, in case there isn't food tomorrow!
- 17) Do eagles go back to the nest where they were born? Or do they start a new nest elsewhere?

- a. Young eagles prepare to breed around 5 years of age; at that time they do not typically go back to the exact nest in which they were hatched (it's assumed their parents are still nesting there). The birds may end up in a similar area because they have a strong affinity towards their breeding area (this is a concept called site fidelity). We hope to discover what Great Lakes eaglets do through our satellite program Destination Eagle.

18) What do scientists use to study bald eagle movement?

- a. Scientists use traditional banding techniques to study movement, but now they also use satellite telemetry. Using the satellite transmitter back-pack we are able to follow young birds on their journeys into adulthood. Refer to the Destination Eagle page for more information.

19) How old are eagles when they migrate?

- a. Soon after young eagles leave the nest they begin to wander. This occurs at approximately 6 months. You can see when Great Lakes eaglets start moving by using Eagle Tracker (www.bsc-eoc.org).

20) Do eagles fly in flocks or alone?

- a. They usually fly alone, although some may follow others to feeding grounds, to their morning roost, or when going back to the roost in the late afternoon. They are gregarious feeders and sometimes change their migratory routes because they see other eagles feeding in the distance.

21) When we drive to Toronto every summer we stop at Tim Horton's, do eagles have favourite stops when they travel?

- a. Generally, we assume the answer is yes, but we are trying to use our research to find out more.

Habitat and Range

22) How does snow affect the eagles that spend winter here?

- a. Bald eagles can handle many extremes of weather, so long as food is available. There are non-migratory eagles found in Alaska. These birds have a readily available food source and do not need to migrate.

23) Where do bald eagles like to put their nest?

- a. Most researchers would agree that eagles like to nest near open water, in tall trees, and near to the top of the tree (often the top 1/3 of the tree).

24) How tall are the trees bald eagles like to nest in?

- a. In southern Ontario we have found that eagles tend to nest in trees that are 18-28 metres (approximately 60-90 ft) above the ground.

Conservation

25) Why don't I see as many eagles in Ontario as I would see in British Columbia?

- a. Southern Ontario eagles faced serious hardships after the DDT and DDE era and have been recovering since. The population in Ontario also struggles with lack of suitable nesting habitat and contaminated food sources. Your provincial government, community groups, concerned corporations, local naturalists, and NGOs like BSC are doing their best to make the Ontario greenspace a better place for nesting eagles.

26) Bald eagle numbers are increasing, why?

- a. Numbers are increasing because the population is becoming healthier and food sources are slowly becoming less contaminated.

27) When you take a blood sample from an eagle, what are you looking for?

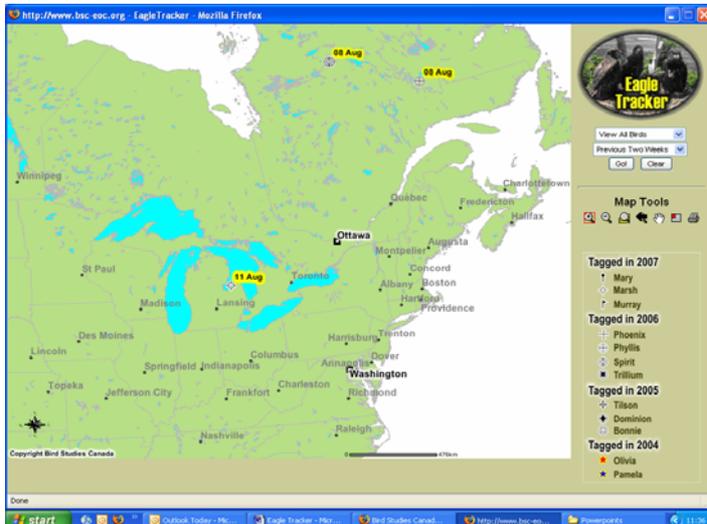
- a. We are looking for heavy metals, mercury, and/or other toxins that could be found in the eaglets. Eaglets are fed from a food source which is in close proximity to their nest site. Taking their blood is an indication of the health of their surrounding aquatic ecosystem, as well as the health of the individual chick.

28) How many bald eagles are there in Ontario?

- a. Numbers in Ontario are increasing (over 40+ nesting pairs in southern Ontario).



Eagle Tracker



Designed by Bird Studies Canada staff, the Eagle Tracker enables us to use satellite telemetry to track the movements of tagged eagles anywhere in North America. The popularity of this feature has allowed us to implement a public outreach and education program which focuses on Destination Eagle. BSC has been visiting classrooms in southwestern Ontario and we are encouraging teachers to use “Eagle Tracker” as an educational tool to inform school children about Bald Eagles and their link to the health of the aquatic ecosystem and ultimately to human health.

To explore the Eagle Tracker mapping application choose different birds and time periods from the drop-down menus. The map tools allow you to zoom in and out, and to move around the map window. Finally the print function on the Eagle Tracker can also be used to print your own map. Just follow the link below and start exploring.

<http://www.bsc-eoc.org/research/speciesatrisk/baea>

Suggested Research Questions for Classroom Use:

1. How many kilometres will Bald Eagles travel in their first year of life? Do birds from different regions (i.e., Lake Erie birds versus Lake Ontario birds) travel to different areas and travel different distances on average?
2. Which large water bodies are most commonly used by young Bald Eagles?
3. By utilizing the average wintering dates for Bald Eagles (November to February) can you determine the winter range of certain individual birds on the Eagle Tracker?
4. Which eagle(s) have transmitted the longest? Have those bird(s) covered the most total distance compared to the other birds?
5. What is the furthest a young Bald Eagle has travelled from the nest site?
6. How can this information be used to help conserve Bald Eagle populations?



Environmental Education Program Evaluation Eagles in the Classroom

Your feedback is important to us! We intend to improve the quality of our programs by incorporating feedback from participants involved in our educational programs. We welcome all comments and suggestions for change.

1. Program and location _____
2. Grade Level _____
3. School Name _____ Teacher's Name _____
4. Teacher's Email _____

Please rate your satisfaction with the following aspects of the program.

	Scale:			
	1-Excellent	2-Good	3-Fair	4-Poor
5. Program appropriate to the grade level of your students	1	2	3	4
6. Curriculum connections were met	1	2	3	4
7. Program was interesting and engaging for the students	1	2	3	4
8. Friendliness and professionalism of staff	1	2	3	4
9. Knowledge level of staff	1	2	3	4
10. Was the program well organized and delivered smoothly?		Yes		No
11. Would you recommend this program to another teacher?		Yes		No
12. Would you like to be contacted regarding future programs?		Yes		No
13. Overall, how would you rate your satisfaction with the visit?				

Excellent

Good

Fair

Poor

14. What did you and your students enjoy MOST about the visit?

15. What did you and your students enjoy LEAST about the visit?

16. Did you find the Study Guide useful? Any suggestions for improvement?

17. Do you have any additional comments or suggestions for improvement?

Thank you for taking the time to complete this form. We appreciate your feedback.

Please return the completed form by mail or email to:

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