



Eagles & Osprey

Large, striking and charismatic birds of prey, the bald eagle, golden eagle and osprey seem to embody power and majesty. All regularly occur in Pennsylvania, but only the bald eagle and osprey nest here. The golden eagle migrates through the state on a pathway connecting its breeding and wintering territories.

In the not so distant past, direct persecution and environmental contaminants drove eagle and osprey populations to catastrophically low levels. Protection at both state and federal levels, tremendous conservation efforts and improved waterway quality enabled them to rebound in Pennsylvania and elsewhere.

While persecution and environmental contaminants continue to impact these large raptors, today's primary threats include loss of habitat due to land-use changes and declining habitat quality.

Taxonomists place bald and golden eagles in the same family as hawks, kites, harriers and Old World vultures – the family Accipitridae. The osprey is the only species of the family Pandionidae.

Bald Eagle

The bald eagle's scientific name, *Haliaeetus leucocephalus*, means "white-headed sea eagle." The word "bald" is a misnomer. The mature eagle's head is covered with gleaming white feathers. Its body is dark brown, its tail white. Immatures are brown, mottled with white on their wings and body. Full adult plumage is attained in the fifth year. Both adults and immature bald eagles have yellow bills and feet, and their legs are feathered halfway down.

Bald eagles were listed as a federally endangered species until 1995, when their status was upgraded to "threatened." In 2007, following a remarkable population recovery, the bald eagle was removed from the federal List of Endangered and Threatened Wildlife in the lower 48 states. Although no longer listed at the federal level, the bald eagle remains protected under the federal Bald and Golden Eagle Protection Act, the Lacey Act and the Migratory Bird Protection Treaty Act. In Pennsylvania, the bald eagle is given additional protections under the state Game and Wildlife Code.



Adult bald eagles are 30 to 40 inches in length and weigh 8 to 14 pounds. Their wingspans are 6 to 8 feet, and they stand about 2 feet tall. As with other birds of prey, the female is larger than the male.

Bald eagles fly with strong, deep strokes, or soar on flattened wings. Their eyesight is among the keenest in the animal world, five or six times sharper than a human's. A bald eagle's call is a rapid, harsh cackle, kweek-kik-ik-ik-ik-ik, or a lower kak-kokkak.

Fish, either caught live or scavenged as carrion, make up 60 to 90 percent of a bald eagle's diet. Bald eagles also eat birds, small mammals, reptiles, amphibians and invertebrates. Eagles soar above the water or sit on a perch, and when they spot a fish near the water's surface, they swoop down and snatch it in their talons. They use their talons for killing, and their heavy bills for tearing prey apart for eating. Sometimes an eagle will go after an osprey or another fish-eating bird, forcing it to drop a captured fish, which the eagle grabs in midair. This behavior is known as "pirating" prey.

Generally, bald eagles mate for life, although when one partner dies, the other quickly finds a new mate if one is available. Nesting is preceded by a spectacular aerial courtship, with the birds locking talons, diving and somersaulting in the sky.

An eagle's nest is called an eyrie. The big raptors choose large, sturdy trees with good views of their surroundings. Nest sites are near lakes, rivers, reservoirs, and seashores.

A new nest is about 5 feet wide and 2 feet high, with an inside depression 4 to 5 inches deep and 20 inches in diameter. Often a pair returns to the same nest year after year, repairing damage and adding a new layer of sticks, branches and cornstalks, plus a lining of grass, moss, twigs and weeds. Enlarged annually, some nests grow so big and heavy that they break the branches or tree supporting them. Unlike ospreys, bald eagles are not likely to build on artificial structures, although a few have done so in Pennsylvania.

The female lays two eggs (sometimes only one and occasionally three) during the span from February through April. Eggs are about 2¾ by 2½ inches, dull white and unmarked. Both parents incubate, with the pair taking turns at the nest.

If all goes well, the eggs begin hatching after about 35 days. Young birds (eaglets) are fed by their parents. Because eggs hatch over several days, age and size differences among hatchlings often gives the first hatchling a head start and a competitive advantage at feeding time. A large, healthy eaglet might kill a smaller, weaker one or out-compete it for food.

Eaglets develop most of their feathers by 3 to 4 weeks, walk in the nest at 6 to 7 weeks, and begin to fly at about 3 months. Young separate from their parents in autumn.

Factors affecting nest success are many. Bald eagle nests and young eagles are easily disturbed and nest failure can occur when people get too close to an active nesting area. Adults might abandon a nest site altogether or leave eggs or hatchlings exposed to sun, cold temperatures, severe weather and predators. Also, when growing eaglets are disturbed before their first flight, they may fledge prematurely which makes them vulnerable to terrestrial predators and inclement weather. To protect eagles, people should keep their distance from active nests, roost sites or feeding areas, and avoid approaching a nest directly. Federal regulations prohibit any intrusion within 660 feet of the nest.

Eagles do not breed until 4 or 5 years of age. Their natural reproduction rate is slow. High water quality, riparian forest and wetland habitat are vital for Pennsylvania's breeding eagles. Breeding habitat – tall, sturdy trees near bodies of water in protected areas—continues to dwindle. Toxic

chemicals introduced into the environment cause repeated nest failures.

Bald eagles are now fairly widespread in Pennsylvania, and may show up here in all seasons, and particularly along major river systems. Nesting pairs might remain in their territories year-round. Many eagles migrate through the state, some from the north and others from southern parts of the United States. In fall, bald eagles are among the earliest raptors to pass through, soaring on thermals over mountain ridges and along large streams. Many of the early migrants are southern bald eagles that have wandered north into Pennsylvania and other northeastern states following nesting and are returning south again. During winter, bald eagles are seen around water bodies across the state. During colder winters, when open water is rare, eagles congregate in areas where

water remains unfrozen and they can forage. Bald eagles congregate at several locations in winter, including sites along the lower Susquehanna River, upper Delaware River, Raystown Lake, and the reservoirs and wetlands of northwestern Pennsylvania. In order to record wintering eagle populations and to get a preview of nesting behavior, the Game Commission each year coordinates a mid-winter bald eagle survey in cooperation with volunteer eagle-watchers and the U. S. Army Corps of Engineers.

While bald eagles today appear in Pennsylvania in good numbers, not so very long ago, the future for the state's eagles looked bleak. In 1983, when the Game Commission launched what would be a seven-year restoration program, only three pairs of nesting eagles remained in the state—all of them located in Crawford County, in northwestern Pennsylvania along the Ohio border.

As part of a federal restoration initiative, the Game Commission sent employees to the Canadian province of Saskatchewan to obtain eaglets from wild nests. From

A bald eagle's head feathers change as it matures.

1983 to 1989, 88 eaglets were brought to Pennsylvania, where they were raised in specially constructed towers and released into the wild through a process known as "hacking." Hacking is a falconer's term for maintaining a young bird in a semi-wild condition, providing food until it can fend for itself. Pennsylvania's reintroduction effort jump-started a remarkable recovery.

By 1998, Pennsylvania was home to 25 pairs of nesting bald eagles. Within the next three years, the number of nesting pairs doubled. By 2006, more than 100 nests were confirmed statewide. And the number of nests topped 250 in 2013, with



bald eagles nesting in all but a handful of the state's counties. The nesting population continues to grow in size and expand in geographical range, and a lot of good habitat remains.

Bald eagles can live 32 years or longer in the wild. They have few natural enemies and mortality is often directly or indirectly related to humans. They are sometimes killed by motor vehicles, occasionally shot and some get lead poisoning from ingesting contaminated prey. Eagles are sometimes electrocuted when they land on powerlines, and are at risk of colliding with wind turbines on ridgetops during migration.

The bald eagle was chosen the United States' national symbol in 1782. At that time, an estimated 100,000 lived in what is now the lower 48 states. In 2007, the U.S. Fish and Wildlife Service estimated that at least 9,789 nesting pairs populated the contiguous United States.

Golden Eagle

The golden eagle, *Aquila chrysaetos* is a magnificent predator of remote, mountainous areas. The species occurs in Europe, Asia, northern Africa and North America, where it's most common in the western United States, Canada and Alaska.

The golden eagle is rare in the Northeast. A small population exists in eastern North America. This geographically isolated population breeds in northeastern Canada in the northern forests of Quebec, Labrador and northern Ontario.

The eastern golden eagle is closely linked to the Appalachian Mountains where it travels the mountain ridgelines during southbound and northbound migrations and spends the winter on the steep forested ridges of the central and southern Appalachians, primarily in Virginia and West Virginia. Pennsylvania hosts its share of migrating and wintering golden eagles, mainly in the Ridge and Valley Province between the Allegheny Front and the Kittatinny Ridge.

Pennsylvania's Wildlife Action Plan designates the golden eagle as a vulnerable species, and as a top predator, it is an indicator of habitat quality.

Like the bald eagle, the golden eagle is federally protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act and the Lacey Act. The golden eagle generally prefers open country on its breeding range, but on migration and during winter it favors the Appalachian's forest ridges and small openings along those ridges.

Adults and immatures have rich, dark-brown body plumage, with gold-tipped feathers on the back of the head and neck.

The golden eagle is in a subfamily of "booted" eagles and its legs are feathered to the toes. Adults resemble immature bald eagles, but goldens are darker with fewer splotches of white. Immatures have white wing patches and, for their first several years, a broad, white band at the base of the tail. In flight the eagle's tail protrudes noticeably more than its small-looking head protrudes. It also holds its wings in a slight "V" as compared to the bald eagle's flat plane, the so-called "flying plank" of hawk watches.

Golden eagles are shaped like buteo hawks, with long, rounded wings. They flap less and soar more than bald eagles. Body length is 28 to 40 inches; wingspan is 6 to more than 7 feet, and standing height is about 2 feet. Their calls are a series of rapid, sharp chirps or yelps, although they are most often silent. Neither eagle calls as much as the more common red-tailed hawk.



golden eagle

A golden eagle's prey includes small rodents, hares, rabbits, birds, reptiles and fish. They also eat carrion and are capable of killing large animals. Golden eagles crush prey in their sharp talons, and use their large, hooked beaks to rip it apart for eating. In Pennsylvania, golden eagles are regular migrants in mid-October through early December. Northbound migrations occur in late winter and spring with most sightings at hawk-watch sites in March and April.

Golden eagles do not breed in Pennsylvania. Some occasionally winter here in rugged, remote forest terrain, remaining out of site most of the time. Most golden eagles breed across central Canada, in the western United States, Alaska and mountainous parts of Mexico.

Breeding habits are similar to those of bald eagles, except golden eagles often locate their nests on cliffs. After fledging, young remain in the nest area during summer, then wander away from the site with their parents. They do not breed until 5 years of age.

A recent four-year survey (2006 to 2009) conducted by the U.S. Fish and Wildlife Service suggests there may be 30,000 golden eagles across the United States. The eastern golden eagle population is believed to be fewer than 2,000. The golden eagle is not on the federal threatened or endangered list, but has disappeared from most of the northeastern states.

Osprey

The osprey, *Pandion haliaetus*, is a large, eagle-like hawk found throughout North America and in the Eastern Hemisphere. It inhabits seacoasts and the areas near large rivers and lakes. In Pennsylvania, it shows up along the major rivers and their tributaries and around lakes, ponds, reservoirs

and wetlands. The osprey prefers shallow water and requires an abundant supply of fish within a reasonable distance from its nest. Nests are usually nearby food sources, but occasionally up to about 12 miles away. Ospreys are not as likely as bald eagles to nest near flowing fresh water. Ospreys also are more likely to nest in clusters at a lake or reservoir, and usually on an artificial structure.

Osprey plumage is dark brown above and white below. Adults and juveniles are colored similarly except juveniles show buffy-white spots on their backs, a buffy shading on their necks and chests and reddish-orange eyes. Adults have yellow eyes. The osprey's head is largely white, with a black patch across each cheek. A conspicuous crook to the wings, creating a characteristic "M" shape, and black "wrist" marks are good field identifiers.

Except when migrating, ospreys flap more than they sail. Wingbeats are slow and deep. Ospreys hover 50 to 150 feet in the air and then plunge to the water for their fish prey, sometimes going all the way under.

Ospreys are 21 to 24 inches from bill to tail. Their wings span 4 ½ to 6 feet. They stand about 1 ½ feet tall. Ospreys are quite vocal and use several different calls to communicate with one another. Their call is a series of loud whistles, cheep, cheep, etc.

Ospreys typically migrate south in winter and return to Pennsylvania in late March and early April to nest. They can be seen migrating south along the mountain ridges in August, September and October, with peak migration occurring around the middle of September. During fall, many migrating ospreys are also observed along Pennsylvania's rivers. Ospreys migrate to southern wintering grounds along the Gulf Coast and in southern Florida south through Central America and South America.

Like eagles, ospreys build bulky nests of sticks and twigs, lined with inner bark, sod or grasses. Sometimes they add debris (rope, fishnet fragments, cans, seashells, etc.). Nests are in living or dead trees, on the ground, or on manmade structures – cell towers, utility poles, fishing shacks, billboards, channel buoys, light standards, chimneys and platform-topped poles or towers erected specifically for osprey nesting. In Pennsylvania, most known osprey nests are on manmade structures. Since ospreys add to nests year after year, the nests can become huge and conspicuous.

The nests usually include three eggs, sometimes two and rarely four. Eggs are 2¾ by 1¾ inches, and white or pinkish-white with brown spots and blotches. The female incubates 36 to 42 days, and young leave the nest when they are 51 to 59 days old.

Dr. Larry Rymon of East Stroudsburg University in 1980 began reintroducing ospreys to the state's northeastern counties. The first Pennsylvania-hatched osprey returned in 1983, and two years later the state documented its first nesting pair since 1910. An osprey has strong ties to the area where it was hatched, and usually returns in the same area to breed. Between 1980 and 1996, 265 young ospreys were

released into Pennsylvania at three different locations: the Poconos in northeastern Pennsylvania, the Tioga County reservoirs in northcentral Pennsylvania and Moraine State Park in western Pennsylvania. These nestling birds were obtained from the Chesapeake Bay, which has the largest nesting

population of ospreys in the world. A total of five reintroduction projects between 1980 and 2007 helped fuel the osprey's recovery in Pennsylvania. The recent Second Breeding Bird Atlas (2004-08) documents the osprey's recovery with confirmed nests reported in at least 90 atlas blocks, a tenfold increase compared to the nine blocks confirming nests during the first atlas period (1984-89). Most recently, osprey nest surveys in 2010 reported 115 osprey nests in 21 counties with more found since that year. The osprey is a state threatened species and protected under the Game and Wildlife Code. Although not listed at the federal level, all migratory birds are protected under the Migratory Bird Treaty Act.



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Raptor Reproduction

Reproductive failure is a problem for bald eagles and ospreys. Much of the problem stems from man's use of now-banned toxic chemicals. DDT, dieldrin, and other chlorinated hydrocarbons sprayed to kill insects, which contaminates water and prey species in the food chain. Bald eagles eat a lot of fish, and accumulate the chemicals in their bodies. Other pollutants such as PCBs and heavy metals may also affect their reproduction.

The chemicals cause birds to lay infertile or thin-shelled eggs, which break under the weight of an incubating bird. Although environmental regulations have banned the use of "hard" pesticides, some chemicals remain in our natural food chains because they do not break down rapidly and some harmful chemicals banned in the United States continue to be used in other parts of the world. Many birds are still exposed to these toxins during migration and on wintering territories. Monitoring bald eagle nests helps the agency follow the recovery process and determine their population status. It also allows biologists to detect environmental problems that may be occurring both locally and statewide.