

# OSPREY - PANDION HALIAETUS

**Taxonomy:** Kingdom: Animalia Phylum: Chordata Class: Aves Order: Accipitriformes Family: Pandionidae Genus: Pandion  
Species: P. haliaetus

## **Habitat:**

**Biomes:** Unable to dive to more than about three feet below the water's surface, Ospreys gravitate toward shallow fishing grounds, frequenting deep water only where fish school near the surface. Ospreys nest in a wide variety of locations, from Alaska to New England, Montana to Mexico, Carolina to California; their habitat includes almost any expanse of shallow, fish-filled water, including rivers, lakes, reservoirs, lagoons, swamps, and marshes. Whatever the location, Osprey nesting habitat must include an adequate supply of accessible fish within a maximum of about 12 miles of the nest; open, usually elevated nest sites free from predatory mammals such as raccoons, and a long enough ice-free season to allow the young to fledge.

## **Distribution:**

**In US:** It has a worldwide distribution and is found in temperate and tropical regions of all continents except Antarctica. In North America it breeds from Alaska and Newfoundland south to the Gulf Coast and Florida, wintering further south from the southern United States through to Argentina. It is found in summer throughout Europe north into Ireland, Scandinavia, Finland and Scotland, England, and Wales though not Iceland, and winters in North Africa. In Australia it is mainly sedentary and found patchily around the coastline, though it is a non-breeding visitor to eastern Victoria and Tasmania. There is a 1,000 km (620 mi) gap, corresponding with the coast of the Nullarbor Plain, between its westernmost breeding site in South Australia and the nearest breeding sites to the west in Western Australia. In the islands of the Pacific it is found in the Bismarck Islands, Solomon Islands and New Caledonia, and fossil remains of adults and juveniles have been found in Tonga, where it probably was wiped out by arriving humans. It is possible it may once have ranged across Vanuatu and Fiji as well. It is an uncommon to fairly common winter visitor to all parts of South Asia, and Southeast Asia from Myanmar through to Indochina and southern China, Indonesia, Malaysia and the Philippines.

**In Other Countries:** ^^^^^

**Holistic Description:** Unique among North American raptors for its diet of live fish and ability to dive into water to catch them, Ospreys are common sights soaring over shorelines, patrolling waterways, and standing on their huge stick nests, white heads gleaming. These large, rangy hawks do well around humans and have rebounded in numbers following the ban on the pesticide DDT. Hunting Ospreys are a picture of concentration, diving with feet outstretched and yellow eyes sighting straight along their talons.

**Species Richness:** 4 SUBSPECIES

**Population Dynamic:** The osprey has a large range, covering 9,670,000 km<sup>2</sup> (3,730,000 sq mi) in just Africa and the Americas, and has a large global population estimated at 460,000 individuals. Although global population trends have not been quantified, the species is not believed to approach the thresholds for the population decline criterion of the IUCN Red List (i.e., declining more than 30% in ten years or three generations), and for these reasons, the species is evaluated as Least Concern. There is evidence for regional decline in South Australia where former territories at locations in the Spencer Gulf and along the lower Murray River have been vacant for decades.

## **Evolution and Systematics:**

**Evolution:** Wing bones from mid-Miocene (approximately 13 million years ago) in California were used to describe the paleospecies Pandion homalopteron. Other mid- to late-Miocene fossils include hind-limb bones from Florida, the remains of paleospecies P. lovensis, complete enough to show that Miocene Ospreys were quite similar to the modern species, although not so robust.

**Systematics:** Sexual differences in plumage and size confuse the issue of geographic variation: within populations, females average 15–20% larger in body mass than males and 5–10% longer in wing, tail, claw, and bill. In addition, females tend to have the head darker and the breast-band fuller and darker, although each trait varies among populations. FOUR SUBSPECIES.

**Number of Species:** 4 SUBSPECIES

**Number of Genera:** 4 SUBSPECIES

## **Physical Characteristics:**

**Size and Length:** Length: 21.3-22.8 in (54-58 cm) Weight: 49.4-70.5 oz (1400-2000 g)

**Wingspan:** 59.1-70.9 in (150-180 cm)

**Coloration:** Ospreys are brown above and white below, and overall they are whiter than most raptors. From below, the wings are mostly white with a prominent dark patch at the wrists. The head is white with a broad brown stripe through the eye. Juveniles have white spots on the back and buffy shading on the breast.

**General Body Features:** Ospreys are very large, distinctively shaped hawks. Despite their size, their bodies are slender, with long, narrow wings and long legs. Ospreys fly with a marked kink in their wings, making an M-shape when seen from below.

**Special Features of the Body:** Osprey youngsters' feathers are covered with lots of tiny spots. This serves as protection while they're in the nests, as it helps them blend in with their surroundings. Some owls and eagles are big predator threats to juvenile ospreys, which is why this defensive adaptation is so imperative.

**Special Features of the Head and Sensory Organs:** Its long, slender, arched wings help the Osprey get clear of the water too, as it takes flight with the fish's head facing the front—the most aerodynamically efficient position.

**Dentition:** Lamellae/Beak/Gizzard

**Special Features of the Limbs and Digits:** It has powerful legs and pale gray feet with sharp talons that help it catch fish. The osprey's feet have rough, pointed scales on them that help the osprey hold onto the fish it catches. Its feet have two toes pointing backwards that also help the osprey grab and hold onto fish.

**Any Special Internal Anatomy:** The Osprey's nostrils shut tight as it hits the water. Then as it ascends, it shakes itself off, shedding water easily thanks to its oily feathers. In fact, it's the only raptor that has this oily plumage.

**Sexual Dimorphisms:** The sexes appear fairly similar, but the adult male can be distinguished from the female by its slimmer body and narrower wings. The breast band of the male is also weaker than that of the female, or is non-existent, and the underwing coverts of the male are more uniformly pale. It is straightforward to determine the sex in a breeding pair, but harder with individual birds. CHECK SYSTEMATICS

**Differences Between Juvenile Stage and Adult:** The juvenile osprey may be identified by buff fringes to the plumage of the upperparts, a buff tone to the underparts, and streaked feathers on the head. During spring, barring on the underwings and flight feathers is a better indicator of a young bird, due to wear on the upperparts.

## **Behavior:**

**Diurnal, Nocturnal, or Crepuscular:** Diurnal

**Activity:** Adept at soaring and diving but not as maneuverable as other hawks, Ospreys keep to open areas, flying with stiff wingbeats in a steady, rowing motion. Primarily solitary birds, they usually roost alone or in small winter flocks of six to ten. Nesting Ospreys defend only the immediate area around their nest rather than a larger territory; they vigorously chase other Ospreys that encroach on their nesting areas. In breeding season, males perform an aerial "sky-dance," sometimes called "fish-flight." With dangling legs, often clasping a fish or nesting material in his talons, the male alternates periods of hovering with slow, shallow swoops as high as 600 feet or more above the nest site. Sustaining this display for 10 minutes or more, he utters repeated screaming calls while gradually descending in an undulating fashion to the nest.

**Locomotion:** Ospreys are somewhat awkward on ground and rarely walk, although individuals can move delicately around small young in the nest, toes and claws closed tight. Usually flies with a steady, rowing flight, as befits a species with narrow wings and relatively high wing-loading. In migration, readily crosses large water and desert barriers. Soars high on thermals, particularly at midday near breeding colonies, but also in migration. Long wings preclude flight in all but open areas; not maneuverable; recently flighted young occasionally found dead, tangled in vegetation, presumably after a failed landing.

**Communication and Perception:** Ospreys have high-pitched, whistling voices. Their calls can be given as a slow succession of chirps during flight or as an alarm call—or strung together into a series that rises in intensity and then falls away, similar to the sound of a whistling kettle taken rapidly off a stove. This second type of call is most often given as an unfamiliar Osprey approaches the nest. As the perceived threat increases, the call can build in intensity to a wavering squeal.

**Home Range:** Like other fish-eating birds, generally defends only the nest site, not feeding territories. On wintering grounds, may be territorial at times; e.g., when hunting from perches in mangroves. Spacing of nests varies greatly depending on region (food availability) and availability and type of nest support.

**Degree of Sociality:** Generally more solitary than social; see Behavior: Spacing. Breeding colonies promote social behavior; e.g., group soaring on warm days when thermals form; groups soar high over the colony, often giving slow Guard Calls. This behavior needs study; males certainly participate, not clear if females do as well. Not clear why individuals soar; perhaps a territorial function or perhaps to cool off.

**Level of Aggression:** No North American studies, but behavior does not appear to differ greatly. Revolves mostly around defending nest sites against other Ospreys. Nest sites are a key limiting factor for the species, so defense is critical and often intense, especially where individuals nest close together in colonies.

**Migration:** Resident to long-distance migrant. Most Ospreys that breed in North America migrate to Central and South America for the winter, with migration routes following broad swaths of the eastern, interior, and western U.S. A few Ospreys overwinter in the southernmost United States, including parts of Florida and California.

**Predators:**

**Predators:** Bald Eagle, Great Horned Owl, Raccoons, Nile Crocodiles, Bubo Owls.

**Anti-Predator Defenses:** Breeding Ospreys react to predators in 2 ways: with Alarm Calls; at the nest, by diving at the intruder and occasionally striking it with their claws.

**Diet and Nutrition:**

**Adult Diet:** The Osprey is the only hawk on the continent that eats almost exclusively live fish. In North America, more than 80 species of live fresh- and saltwater fish account for 99 percent of the Osprey's diet. Captured fish usually measure about 6–13 inches in length and weigh one-third to two-thirds of a pound. The largest catch on record weighed about 2.5 pounds. On very rare occasions, Ospreys have been observed feeding on fish carcasses or on birds, snakes, voles, squirrels, muskrats, and salamanders. Ospreys probably get most of the water they need from the flesh of their prey, although there are reports of adults drinking on hot days.

**Juvenile Diet:** ^^^^^

**Special Adaptations for Getting Prey:** CHECK FEATURES

**Reproduction:**

**Mode of Reproduction:** Monogamous

**Mating System:** Generally monogamous; rarely polygynous. In southeastern Massachusetts, 3 of 190 nests monitored held polygynous trios (1 male mated simultaneously with 2 females). Each of these cases involved nest sites in close proximity, so a male could easily defend 2 sites, undoubtedly a key factor in promoting polygyny. One female (secondary) was always given less attention than the other (primary). Secondary females settled later than primary females and were fed less by the attending male. Males copulated with both, but secondary females never hatched eggs, probably because, being inadequately fed, they had to leave the nest for extended periods to forage for themselves.

**Mating Season:** April - June

**Courtship:** Generally seen during courtship period and early in incubation, but nonbreeders display throughout the breeding season. In this dramatic display flight (sometimes called “fish-flight”), male dangles legs (often clasping a fish or nesting material) and proceeds in slow, undulating flight over the nest site, usually high overhead (up to 300 m or more) giving Screaming Calls repeatedly. Undulations are shallow (10–20 m) with the bird rising steeply at the end of each and hovering. Display and calling may continue for  $\geq 10$  min; male sometimes losing altitude all the while, descending slowly in an undulating staircase fashion to the nest site.

**Territoriality:** HOME RANGE

**Mating:** Pairs copulated frequently, on average 160 times/clutch (range: 88–338), but only 39% of these resulted in cloacal contact. Pairs averaged 59 successful copulations/clutch, starting 14 d before and peaking few days before the start of egg-laying. Pairs copulated most often in early morning, at the same time as egg-laying. No association noted between courtship feeding and copulation; thus no evidence females traded copulations for food. Most copulations took place at the nest or nearby. Males maximized the time they spent at the nest with their mate just before and during egg-laying, suggesting a male protects his paternity by frequent copulation and by guarding his mate when she is most fertile.

**Nesting:** Ospreys require nest sites in open surroundings for easy approach, with a wide, sturdy base and safety from ground predators (such as raccoons). Nests are usually built on snags, treetops, or crotches between large branches and trunks; on cliffs or human-built platforms. Usually the male finds the site before the female arrives. Osprey nests are built of sticks and lined with bark, sod, grasses, vines, algae, or flotsam and jetsam. The male usually fetches most of the nesting material—sometimes breaking dead sticks off nearby trees as he flies past—and the female arranges it. Nests on artificial platforms, especially in a pair's first season, are relatively small—less than 2.5 feet in diameter and 3–6 inches deep. After generations of adding to the nest year after year, Ospreys can end up with nests 10–13 feet deep and 3–6 feet in diameter—easily big enough for a human to sit in.

**Egg-Laying:** Clutch Size: 1-4 eggs Number of Broods: 1 brood Egg Length: 2.2-2.7 in (5.5-6.8 cm) Egg Width: 1.6-2.0 in (4.2-5 cm) Incubation Period: 36-42 days Nestling Period: 50-55 days Egg Description: Cream to pinkish cinnamon; wreathed and spotted with reddish brown.

**Hatching and Incubation/Gestation:** Capable of limited motion. Covered with down and with eyes open. Semiprecocial; down-covered. Weak in movements but can beg, briefly. Brooded almost continually and fed small bits of fish by female parent.

**Development:** NONE

*Parental Care:* Almost entirely by female. Small young (1–14 d old) brooded almost continually; brooding intermittent thereafter, up to about 4 wk of age, as necessary. Male brings fish to nest, or nearby, often feeding first (usually consuming the head and foreparts of the fish), before presenting the remainder to the female. Female distributes food to nestlings, seemingly feeding whichever begs closest and most vigorously. Female dissects small pieces of fish, and carefully presents them in her bill; generally from anterior portion of the fish, working toward the tail; female discards or eats bones and hard parts herself and often eats the entire tail in one gulp. By about 40 days of age, young begin to feed on their own, taking prey from the male as he lands at the nest or from the female parent after she has fed. With large young, however, female generally feeds last.

*Lifespan:* 7-10 years.

**Conservation:**

*Official Federal Status:* Least Concern

*Special Statuses in Individual States:* NONE

*Threats:* Ospreys are a conservation success story and overall their populations grew by 2.5% per year from 1966 to 2015, according to the North American Breeding Bird Survey. Partners in Flight estimates a global breeding population of 500,000 with 21% spending some part of the year in the U.S., 28% in Canada, and 3% in Mexico. The species rates a 7 out of 20 on the Continental Concern Score. Osprey is not on the 2016 State of North America's Birds' Watch List. The species' decline was halted by pesticide bans and the construction of artificial nest sites. Osprey numbers crashed in the early 1950s to 1970s, when pesticides poisoned the birds and thinned their eggshells. Along the coast between New York City and Boston, for example, about 90 percent of breeding pairs disappeared. Osprey studies provided key support for wider legal arguments against the use of persistent pesticides. After the 1972 U.S. DDT ban, populations rebounded, and the Osprey became a conservation success symbol. But Ospreys are still listed as endangered or threatened in some states—especially inland, where pesticides decimated or extirpated many populations. As natural nest sites have succumbed to tree removal and shoreline development, specially constructed nest platforms and other structures such as channel markers and utility poles have become vital to the Osprey's recovery. Sadly, a growing cause of death for Ospreys is entanglement at the nest: the adults incorporate baling twine and other discarded lines into their nests; these can end up wrapped around a chick's feet and injure it or keep it from leaving the nest.

*Conservation Efforts:* ^^^^^^

**Extra Facts:**

1. An Osprey may log more than 160,000 migration miles during its 15-to-20-year lifetime. Scientists track Ospreys by strapping lightweight satellite transmitters to the birds' backs. The devices pinpoint an Osprey's location to within a few hundred yards and last for 2-3 years. During 13 days in 2008, one Osprey flew 2,700 miles—from Martha's Vineyard, Massachusetts, to French Guiana, South America.
2. Ospreys are unusual among hawks in possessing a reversible outer toe that allows them to grasp with two toes in front and two behind. Barbed pads on the soles of the birds' feet help them grip slippery fish. When flying with prey, an Osprey lines up its catch head first for less wind resistance.
3. Ospreys are excellent anglers. Over several studies, Ospreys caught fish on at least 1 in every 4 dives, with success rates sometimes as high as 70 percent. The average time they spent hunting before making a catch was about 12 minutes—something to think about next time you throw your line in the water.
4. The Osprey readily builds its nest on manmade structures, such as telephone poles, channel markers, duck blinds, and nest platforms designed especially for it. Such platforms have become an important tool in reestablishing Ospreys in areas where they had disappeared. In some areas nests are placed almost exclusively on artificial structures.
5. Osprey eggs do not hatch all at once. Rather, the first chick emerges up to five days before the last one. The older hatchling dominates its younger siblings, and can monopolize the food brought by the parents. If food is abundant, chicks share meals in relative harmony; in times of scarcity, younger ones may starve to death.
6. The name "Osprey" made its first appearance around 1460, via the Medieval Latin phrase for "bird of prey" (avis prede). Some wordsmiths trace the name even further back, to the Latin for "bone-breaker"—ossifragus.
7. The oldest known Osprey was at least 25 years, 2 months old, and lived in Virginia. It was banded in 1973, and found in 1998.

**Notable Species:**

1. *Pandion haliaetus haliaetus* – (Linnaeus, 1758): the nominate subspecies, occurring in the Palearctic ecozone.
2. *P. haliaetus carolinensis* – (Gmelin, 1788): North America. This form is larger, darker bodied and has a paler breast than the type of the first description.

3. *P. haliaetus ridgwayi* – Maynard, 1887: Caribbean islands. This form has a very pale head and breast compared with nominate *haliaetus*, with only a weak eye mask. It is non-migratory. Its scientific name commemorates American ornithologist Robert Ridgway.
4. *P. haliaetus cristatus* – (Vieillot, 1816): coastline and some large rivers of Australia and Tasmania. The smallest and most distinctive subspecies, also non-migratory. Some authorities have assigned it full species status as *Pandion cristatus*, known as the eastern osprey.