



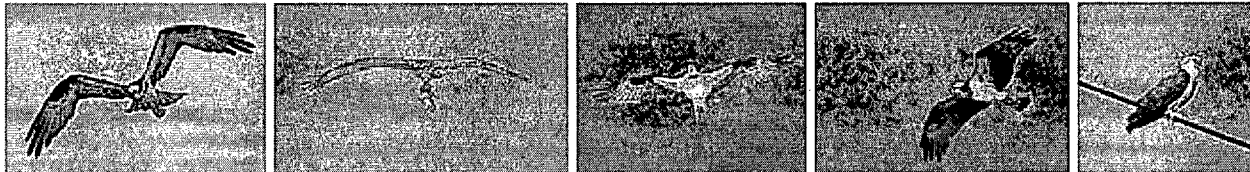
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Home ▶ Kingdom Animalia ▶ Phylum Chordata ▶ Subphylum Vertebrata ▶ Class Aves ▶ Order Falconiformes ▶ Family Accipitridae ▶ Subfamily Pandioninae ▶ Species **Pandion haliaetus**

Pandion haliaetus osprey

Information Pictures Sounds Classification



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By Kari Kirschbaum

Geographic Range

Kingdom: Animalia
 Phylum: Chordata
 Subphylum: Vertebrata
 Class: Aves
 Order: Falconiformes
 Family: Accipitridae
 Subfamily: Pandioninae
 Genus: Pandion
 Species: **Pandion haliaetus**

Ospreys have a worldwide distribution, wintering or breeding on every continent except Antarctica. Ospreys are not known to breed in South America or Indo-Malasia, but are sometimes found there in the winter. Ospreys are winter breeders in Egypt and some Red Sea islands. Regions where ospreys are particularly abundant include Scandinavia and the Chesapeake Bay region of the United States. ()

There are four subspecies of ospreys, which are separated by geographic region. *Pandion haliaetus carolinensis* breeds in North America and the Caribbean, and winters in South America. *P. h. haliaetus* breeds in the Palearctic region (Europe, north Africa and, in Asia, north of the Himalayas) and winters in south Africa, India and the East Indies. *P. h. ridgwayi* is a non-migratory subspecies. It resides in the Caribbean, with a range that extends from the Bahamas and Cuba to southeast Mexico and Belize. The final subspecies, *P. h. leucocephalus* is also a non-migratory subspecies. Its range includes Australia and the southwest Pacific.

Biogeographic Regions:

nearctic ♀ (native ♀); palearctic ♀ (native ♀); oriental ♀ (native ♀); ethiopian ♀ (native ♀);

neotropical ☞ (native ☞); australian ☞ (native ☞); oceanic islands ☞ (native ☞).

Other Geographic Terms:

holarctic ☞; cosmopolitan ☞.

Habitat

Ospreys have a wide distribution because they are able to live almost anywhere where there are safe nest sites and shallow water with abundant fish. Nests are generally found within 3 to 5 km of a water body such as a salt marsh, mangrove (*Rhizophora*) swamp, cypress (*Taxodium*) swamp, lake, bog, reservoir or river. The frequency with which each of these habitat types is used varies by geographic region. ()

Ospreys choose structures that can support a bulky nest, and that are safe from ground-based predators. Nest sites can be safe from predators either by being difficult for a predator to climb (e.g. on a cliff) or by being over water or on a small island. Over-water nest sites that are often used by ospreys include buoys and channel markers, dead trees and artificial nest platforms. Ospreys have also been known to nest on various man-made structures, such as power poles, duck blinds, communication towers, buildings and even billboards. In many cases, nests that are built on artificial structures such as nest platforms and power poles are more stable and fledge more chicks per breeding season than nests on naturally-occurring structures. ()

These animals are found in the following types of habitat:

temperate ☞; tropical ☞; terrestrial ☞; saltwater or marine ☞; freshwater ☞.

Terrestrial Biomes:

forest ☞; rainforest ☞; mountains ☞.

Aquatic Biomes:

lakes and ponds; rivers and streams; coastal ☞; brackish water ☞.

Wetlands: marsh ☞, swamp ☞.

Other:

suburban ☞; riparian ☞; estuarine ☞.

Physical Description

Mass
1200 to 2000 g (42.24 to 70.4 oz)
Length
55 to 58 cm (21.65 to 22.83 in)
Wingspan
145 to 170 cm (57.09 to 66.93 in)

Ospreys are large birds of prey (55 to 58 cm long), with a wingspan ranging from 145 to 170 cm. Their long wings have a characteristic bend at the carpal ("wrist") joints. They are bright white underneath, with dark brown patches at the carpal joints and a mottled dark brown necklace. Other identifying markings include a dark stripe through each eye, and a dark brown back. The feet of this species are pale blue-gray, and the beak is black.

Juvenile ospreys resemble adults, but have a somewhat speckled appearance due to buff-colored tips on their dark brown upper-wing and back coverts and a less well-defined necklace. Juveniles also have an orange-red iris, rather than the yellow iris that is typical of adults. Juvenile plumage is replaced by adult plumage by 18 months of age. ()

On average, while not necessarily longer, female ospreys are 20% heavier than males and have a wingspan that is 5 to 10% greater. In North America, for example, male ospreys range in mass from 1200 to 1600 g, whereas females range from 1600 to 2000 g. Female ospreys also often have darker plumage and a more defined necklace than their male counterparts. ()

Ospreys display morphological variation by region. Tropical and subtropical individuals tend to be smaller than individuals that breed at higher latitudes. The four subspecies of ospreys show some variation in size and color. *Pandion haliaetis haliaetus* and *P.h. carolinensis* are the largest and darkest subspecies. *P.h.ridgwayi* is approximately the same size as *carolinensis*, but is paler on the head and breast. *P.h. cristatus* is the smallest subspecies, with a dark necklace and pale crown. ()

Ospreys have several morphological adaptations to their unique fish-eating lifestyle. These adaptations include relatively long legs for a raptor, spiny footpads called spicules, long, sharp, curved claws, and a reversible outer toe to aid in gripping slippery fish. In addition, ospreys have dense oily plumage and efficient nasal valves that prevent water from entering the nostrils when the bird dives to catch a fish. ()

Some key physical features:

endothermic ☞; homoiothermic; bilateral symmetry ☞.

Sexual dimorphism: ☞female larger, sexes colored or patterned differently.

Reproduction

Breeding interval

Ospreys breed once yearly.

Breeding season

The breeding season lasts for approximately 2.5 to 4 months. Breeding begins between December and March in non-migratory populations. In migratory populations, breeding begins in April or May.

Eggs per season

1 to 7; avg. 3

Time to hatching

32 to 43 days

Time to fledging

48 to 59 days

Time to independence

7 to 17 weeks

Age at sexual or reproductive maturity (female)
3 years (average)

Age at sexual or reproductive maturity (male)
3 years (average)

Some ospreys migrate seasonally, but not all. Non-migratory populations breed and winter in the same location, though they may wander several hours from their nest during the non-breeding season. These populations begin breeding between December and March. Migratory populations generally breed where winters are cold enough to drive fish into deep water where they are inaccessible. These populations begin breeding in April or May. ()

Courtship in ospreys centers on food and nest sites. In migratory osprey populations, males and females arrive at the nest site separately, the male often arriving several days earlier than the female. Male ospreys sometimes perform a conspicuous aerial display near the nest site. This display usually occurs during early courtship, and may serve to attract potential mates or to threaten an intruder. Both sexes collect materials for the nest, but the female does most of the arranging of materials at the nest. Osprey nests are typically constructed of sticks, and lined with softer materials such as seaweed, kelp, grasses or cardboard. A wide variety of flotsam and jetsam may also be incorporated into osprey nests, including fishing line, plastic bags and nearly anything else that an osprey might find and can lift. Osprey pairs use the same nest year after year, but must spend some time each year repairing it and adding materials before eggs can be laid. ()

Once a pair has established a nest, the male begins to deliver food to the female. This feeding continues until the young fledge or the nest fails. Generally, females that receive more food are more receptive to mating attempts by the male, and are less likely to copulate with other males. Females beg for food from their mates, and occasionally from neighboring males if they are not well fed by their mate. Males may protect their paternity by feeding their mate. They may also protect their paternity by guarding their mate from other males and copulating frequently when she is most fertile (several days before egg laying). ()

Ospreys are generally monogamous. However, polygyny can occur in rare instances where nest sites are close enough together that a male can defend two nests. When this occurs, the first nest usually experiences higher reproductive success than the second because the male devotes more resources to that nest. ()

Mating systems:

monogamous ♀; polygynous ♀.

The breeding season of ospreys differs between populations. Non-migratory populations breed in the winter and spring, laying eggs between December and March. The breeding season of migratory populations occurs in the spring and summer, with egg laying in April and May. Two to four eggs are laid over a period of several days, each 1 to 2 days apart. Both the male and female incubate the eggs, which hatch after approximately 40 days. Because incubation starts when the first egg is laid, the eggs hatch asynchronously in the order in which they were laid. Chicks that hatch first are larger and have a competitive advantage over those that hatch later. If food becomes scarce, the smaller chicks are less successful in competing for food, and often die. This decrease in the number of chicks in the nest makes food more available to the surviving chicks, and increases their likelihood of survival. This process, common in raptors, is called brood reduction. ()

When osprey chicks hatch, they are covered in white down, which is replaced by charcoal-colored down after approximately 10 days. Feathers begin to replace the down at approximately two weeks. By one month after hatching, chicks have reached 70 to 80% of the adult size. Osprey chicks fledge between 48 and 76 days old. Generally, chicks in migratory populations fledge sooner than those in non-migratory populations. After fledging, young ospreys begin to hunt on their own. However, they often continue to return to the nest to receive food from their parents for two to eight weeks after fledging. Because ospreys migrate individually, juvenile ospreys must be fully independent of their parents by the time the southward migration begins. ()

Ospreys are sexually mature at approximately 3 years old, but may not breed until age 5 in areas where nest sites are scarce. Migratory ospreys in both Europe and the U.S. exhibit a pattern of behavior that is unusual in raptors. Rather than returning to the breeding grounds in their first summer, yearling ospreys almost always remain on the wintering grounds throughout the year. They then return to the breeding grounds the following summer when they are more likely to be able to breed successfully. This strategy allows young ospreys that are too physically immature to breed to avoid an unnecessary migration. ()

Key reproductive features:

iteroparous ♀; seasonal breeding ♀; gonochoric/gonochoristic/dioecious (sexes separate); sexual ♀; fertilization ♀; oviparous ♀.

Both male and female ospreys care for their young. Ospreys provide parental care by protecting their young from predators and weather, and by feeding them. During incubation and the nestling stage, the male osprey provides food to the female and the chicks. This entails delivering 60 to 100 g of fish to the nest per daylight hour (3 to 10 fish per day) during the nestling and fledgling stages. When a fish is delivered to the nest, one of the adults rips pieces of flesh from the fish and feeds them to the chicks. Parents continue to feed the young until two to eight weeks after they fledge. ()

During the first weeks after hatching, osprey chicks are not able to control their body temperature well. The female parent broods the chicks almost constantly for the first two weeks. She continues to brood them intermittently during very hot or cool weather until they are approximately four weeks old. Both parents expend considerable effort protecting the nest from intruders, including other ospreys and potential predators. ()

Parental investment:

no parental involvement; altricial ♀; pre-hatching/birth (provisioning: male, protecting: male, female); pre-weaning/fledging (provisioning: male, female, protecting: male, female); pre-independence (provisioning: male, female, protecting: male, female).

Lifespan/Longevity

**Extreme lifespan
(wild)**

25 years (high)

**Average lifespan
(wild)**

314 months [Ref]

Ospreys are a relatively long-lived bird species. The oldest known osprey in North America was a 25-year old male. The oldest known female was 23 years old. However, very few individuals live to this age. Chance of survival from one year to the next varies between populations, but is estimated to be approximately 60% for young ospreys (less than 2

years old) and 80 to 90% for adult ospreys. ()

Behavior

Ospreys can be migratory or sedentary (non-migratory). Non-migratory populations breed and winter in the same location. Migratory osprey populations generally breed north of the non-migratory populations and winter south of them, with very little overlap between the two groups. The geographic division between migratory and non-migratory populations is roughly 30 degrees N latitude in North America and 38 to 40 degrees N latitude in Europe. ()

Ospreys nest at a range of densities, from very solitary (many kilometers from the nearest neighboring nest) to loose colonies, with nests less than 100 m apart. Colonies may form because the presence of established nests is a signal of suitable habitat to arriving individuals, or because good nest sites are often clustered together, such as on an island or along a power line. Grouping of nests is uncommon in raptor species because most raptors defend a feeding territory around their nest. Ospreys defend their nest or nest site, but do not defend a territory around the nest. It is not profitable for an osprey pair to defend a territory around the nest because their prey are patchily distributed, mobile, and often located several kilometers away from the nest. Indeed, ospreys are often observed hunting in groups, and may be able to hunt more efficiently by doing so. ()

Ospreys do vigorously defend their actual nests or nest sites from intruders. This is most likely because nests are used by the same pair for many years, and represent a significant investment of time and energy by that pair. ()

Home Range

Breeding ospreys are known to travel as far as 14 km from their nest during hunting forays. Non-breeding individuals are known to travel as far as 10 km between their daytime feeding grounds and their roosts. ()

Key behaviors:

flies; diurnal Q; motile Q; migratory Q; sedentary Q; solitary Q; colonial Q.

Communication and Perception

Ospreys use several different vocalizations to communicate with one another. Up to five different calls have been recognized by researchers. These calls are nearly always associated with a visual display, such as a characteristic flight or posture. Vocalizations are used for begging, alarm, courtship, and nest defense. One notable display is the "sky-dance," which is an elaborate aerial display performed by males during courtship and early incubation. During this display, a male carrying a fish or nest material gives a screaming call while simultaneously performing short undulating flights separated by periods of hovering. Alarm calls are often given when a potential predator or disturbance such as a boat or human approaches the nest. These calls are usually accompanied by erect posturing and diving flight. ()

Communicates with:

visual Q; tactile Q; acoustic Q.

Perception channels:

visual Q; tactile Q; acoustic Q; chemical Q.

Food Habits

Ospreys are unusual among raptors for being piscivores. Their diet consists almost exclusively of fish ($\geq 99\%$ of prey items). They are generally opportunistic, and will eat whatever fish species are accessible to them – either in shallow waters, or near the surface of deeper waters. Studies in North America have documented more than 80 different prey species of ospreys. However, 2 or 3 common species may dominate the diet of local ospreys in a given area. ()

Ospreys hunt for fish on the wing (less often from a perch), flapping and gliding 10 to 40 meters above the water. When an osprey spots a fish, it hovers briefly, then dives toward the surface of the water. Just before hitting the water, the osprey swings its legs forward and bends its wings back, plunging feet-first into the water. The osprey uses strong, almost horizontal wing beats to lift itself and its prey from the water. Once airborne, the osprey rearranges the fish in its feet, carrying it with one foot in front of the other so that the fish is facing forward. This position presumably makes the fish more aerodynamic, and easier to carry. The osprey then takes the fish to a perch, often near the nest, to eat. Osprey generally eat fish beginning with the head and working toward the tail. A male who is also providing food for a mate and offspring during the breeding season will typically consume at least part of the fish before delivering the remainder to the female. Ospreys do not cache fish. If a fish is larger than an osprey (and his mate and offspring if breeding) can consume, the fish is discarded, carried around with the osprey, or left in the nest. Ospreys do not generally need to drink water. Fish flesh supplies sufficient amounts of water to meet their requirements. ()

Ospreys catch fish on 24 to 74% of their dives. This success rate is affected by individual ability, weather and tide. Some studies have shown that ospreys are most successful hunting at midtide and when the weather is calm. ()

Though the vast majority of osprey prey items are live fish, ospreys have been observed to eat other foods on occasion. These include birds, snakes, voles, squirrels, muskrats (*Ondatra zibethicus*), salamanders, conchs, and even a small alligator (*Alligator mississippiensis*). Reports of ospreys feeding on carrion are rare. However, they have been observed eating dead white-tailed deer (*Odocoileus virginianus*) and opossum (*Didelphis virginiana*). ()

Primary Diet:

carnivore ☞ (piscivore ☞).

Animal Foods:

birds; mammals; amphibians; reptiles; fish; carrion ☞; mollusks.

Predation


Known predators

- great horned owls (*Bubo virginianus*)
- raccoons (*Procyon lotor*)
- Nile crocodiles (*Crocodylus niloticus*)
- bald eagles (*Haliaeetus leucocephalus*)

Ospreys are vulnerable to predation from aerial predators, such as owls and eagles. In North America, Bald eagles and great horned owls are known predators of osprey nestlings

and (occasionally) adults. The speckled appearance of osprey chicks camouflages them in the nest and may be an adaptation to minimize predation by diurnal avian predators like the bald eagle. ()

Raccoons, snakes and other climbing animals are suspected predators of osprey eggs and nestlings. Selection by such terrestrial predators may explain why the majority of osprey nests in many area, for example in the Chesapeake Bay region of the U.S., are built over water. Crocodylians may prey on wintering ospreys. Nile crocodiles (*Crocodylus niloticus*) sometimes kill ospreys bathing and roosting near water in Africa. ()

cryptic .

Ecosystem Roles

While ospreys provide food for some species (see Predation), it is unlikely that they represent a significant portion of the diet of any species. Ospreys do prey on fish, and are likely have some effect on local fish populations. Like most predators, ospreys are host to many different species of parasites, including feather mites. They are not parasitic or mutualistic with any other species. ()

Ospreys nests are used by many species of birds other than ospreys. Smaller cavity-nesting species, such as common grackles, tree swallows, barn swallows, European starlings and house sparrows build nests within osprey nests. Other larger species will usurp osprey nests for their own use in the spring before the resident ospreys return. In North America, these species include great blue herons, Canada geese, bald eagles, Red-tailed hawks, Great horned owls, herring gulls and common ravens. ()

Ospreys in some areas, particularly boreal and other northern forested regions, may have historically been dependant on beavers for creation of habitat. Beavers create osprey habitat by building dams, which create shallow ponds for fishing and dead trees appropriate for building nests. ()

Economic Importance for Humans: Negative

There are no known negative impacts of ospreys on humans. In the past, some fishermen have believed that ospreys competed with them for fish. However, studies have demonstrated that ospreys take a very small portion of all fish harvested and are not serious competition for commercial and recreational fishing. ()

Economic Importance for Humans: Positive

Ospreys may be a valuable indicator species for monitoring the long-term health of large rivers, bays and estuaries. Ospreys are well-suited to this role because of their piscivorous lifestyle and their known sensitivity to many contaminants. They are also relatively easily studied because they have conspicuous nests and are tolerant of short-term disturbance such as nest observations by researchers. The presence of ospreys may also benefit local economies by boosting ecotourism. ()

Ways that people benefit from these animals:
ecotourism .

Conservation Status

IUCN Red List: [\[link\]](#):

Least Concern.

US Migratory Bird**Act: [link]:**
Protected.**US Federal List:****[link]:**
No special status.**CITES: [link]:**

Appendix II.

State of Michigan**List: [link]:**
Threatened.

Ospreys are not listed under the Endangered Species Act. However, this species is listed as threatened, endangered or a species of special concern in several U.S. states, including Michigan. Ospreys are also protected under the U.S. Migratory Bird Act and CITES Appendix II. They are not listed on the IUCN Red List.

In the late 19th and early 20th centuries, the main threats to osprey populations were egg collectors and shootings. These declined by the mid-twentieth century, though some shootings still occur. With the introduction and widespread use of the pesticide DDT (dichloro-diphenyl-trichloroethane), osprey populations in many areas declined sharply from the 1950's through the 1970's. During this period, 90% of breeding pairs disappeared from the Atlantic coast between New York City and Boston. DDT was banned in the U.S. around 1970, but continues to be used in some countries that serve as wintering grounds for ospreys. Populations of ospreys largely rebounded after the banning of DDT and are now reaching historic levels. Installation of artificial nest structures, hacking projects and new habitat created by reservoirs have allowed osprey populations to increase and expand their range. ()

Other Comments

Bones belonging to earlier *Pandion* species from the mid- to late-Miocene (approx. 13 million years ago) were found in California and Florida. These prehistoric osprey species were slightly less robust than modern ospreys, but otherwise very similar. ()

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