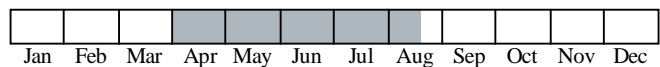


Best Survey Period



Status: State threatened

Global and State Ranks: G5/S4

Family: Accipitridae

Total Range: The Osprey (*Pandion haliaetus*) is one of the most widespread birds in the world, found on all continents except Antarctica. The North American breeding range spans from Alaska across Canada, southward locally, and along the east and west coasts to Mexico, the Caribbean, and Florida. Osprey also breed in Eurasia, Middle East, Australia, and Indonesia (Poole et al. 2002). Poole et al. (2002) describes four recognized subspecies of Ospreys which are separated by geographic region: *Pandion haliaetus carolinensis* breeds in North America and the Caribbean, and winters in Florida, the Caribbean, on the Gulf Coast, and in South America, *P. h. haliaetus* breeds in Europe, north Africa and in Asia, and winters in south Africa, India and the East Indies, *P. h. ridgwayi* breeds the Caribbean, from the Bahamas and Cuba to southeast Mexico and Belize, and finally, *P. h. leucocephalus* inhabits coastal Australia and the southwest Pacific. The latter two subspecies are essentially non-migratory residents (Poole et al. 2002). In North America, Osprey populations breeding at latitudes north of 30-32 N (northern Florida) are migratory (Poole 1994).

State Distribution: It was not until the 1960s that breeding numbers were adequately quantified in Michigan, with over 60 nests reported (Postupalsky 1969). Prior observations reported Osprey as a state breeder and uncommon summer resident (Wood 1951; Zimmerman & Van Tyne 1959). Later, Michigan Breeding Bird Atlas (MBBA) records from 1983-1988 documented 156 atlas blocks (each block encompassing nine square miles) with confirmed breeding, the majority of those concentrated in the eastern Upper Peninsula of Michigan (Poole 1989; Brewer et al. 1991). The figure above identifies counties with confirmed breeding during Atlas surveys and from known occurrences from the Michigan Natural Features Inventory database.

Recognition: The scientific name (*Pandion haliaetus*) comes from the Greek Pandion (the mythical king of Athens, who, along with his two daughters, was turned into a bird), halos (referring to the sea) and aetos (meaning eagle). The name “Osprey” comes from the Latin ossifragus, meaning bone breaker, which does not accurately describe Osprey hunting habits (see below). Also known as the “fish hawk”, the Osprey is a large, diurnal raptor with a wingspan of 150-180 cm (59-71 in) and weight from 1400-2000 g (49.42-70.6 ounces) (Poole et al. 2002). It possesses a white breast and belly, black back, wings and bill, a finely barred tail and wings, a dark eyestripe, gray legs, and yellow eyes. Its



long, narrow wings have a large black mark (carpal patch) at the wrist or bend in the wing, and the wings are crooked; held with wingtips angled slightly backwards (Sibley 2000). Ospreys acquire their adult plumage around 18 months of age. Although sexes look similar, females are slightly larger and tend to have a fuller and darker chest band, and sometimes a darker head. Juveniles appear similar to adults, but with white or buff colored edging on back feathers, fewer markings on the chest, and orange eyes (Poole 1994).

Ospreys display morphological variation by region; individuals breeding in tropical and subtropical regions tend to be smaller than individuals at higher latitudes. In addition, the four subspecies of Ospreys show some variation in size and color. For example, P.h. *carolinensis* is one of the largest and darkest subspecies and breeds in North America (Poole 1994). Osprey are similar in appearance to the Bald Eagle (*Haliaeetus leucocephalus*), but eagles are larger, have a dark chest and underside, yellow legs, and fly with their wings held flat.

Ospreys are quite vocal, with shrill whistles “tewp, tewp, tewp, teelee, teelee, tewp” and single, loud shrills “teeeeee” (Sibley 2000), with females having lower pitched calls than males (Poole 1994). Poole (1994) discusses three main vocalizations used for guarding, alarm and courtship, and begging, which are nearly always associated with a visual flight display or posturing. For example, before and during courtship the “sky-dance” display is performed: with dangling legs, a male carrying a fish or nest material gives a screaming call while simultaneously performing short undulating flights separated by periods of hovering (Poole 1989).

Best Survey Time: The best time to survey for Osprey shortly follows arrival on breeding grounds in spring (in Michigan starting in April) and through the breeding season (ending in early-to-mid August in Michigan) (Postupalsky 1991). Depending on site accessibility and visibility of nests from the ground, either ground or aerial survey methods can be employed to monitor occupancy, productivity, and trends among nesting populations. In either case, methods should include at least two properly timed visits: an early check to locate occupied nests and a late check to determine nesting success. For example, Osprey nests in far northern Michigan, such as on Isle Royale, should be

checked for occupancy during the last week of May, and for numbers fledged, during the last week of July (Romanski 2001). However, young, inexperienced pairs often initiate breeding later than older pairs; consequently, more frequent visits are suggested to measure productivity with accuracy (Poole 1989).

Habitat: Throughout their range Osprey winter and breed in a variety of habitats in association with water, primarily near lakes, rivers, reservoirs, desert salt-flat lagoons, and along coastal waters (Poole et al. 2002). All sites include shallow water, an adequate fish supply within 10-20 km of nest, and open nest sites, which can include artificial structures (Poole et al. 2002). Local breeding habitat includes forested areas near the Great Lakes, inland lakes and swamps. Nesting sites are typically characterized by pine, aspen, and hardwood forests. Many nest sites are located in large snags and dead-topped pines along lake and stream shorelines, in recent clearcut areas near water, in swamp conifer stands, and in marshes and bogs (Wisconsin Department of Natural Resources 2007). All nesting Osprey populations must be afforded an ice-free period long enough to permit egg-laying, incubation, fledging of young, and food acquisition.

Biology: The longevity record for Osprey is 26 years, 2 months (Patuxent Wildlife Research Center 2007). Survivorship varies among populations, but is estimated to be approximately 60% for young Ospreys (< 2 years old) and 80 to 90% for adult ospreys (Poole et al. 2002). Ospreys do not sexually mature until approximately 3 years of age but may not breed until age 3-7, depending on nest site availability. Hatch-year birds almost always remain on wintering grounds throughout the year before returning to the area where they learned to fly (Poole et al. 2002). Migratory Osprey populations arrive on breeding grounds shortly before and/or after ice-melt, with males and females arriving separately, the male often arriving several days earlier than the female (Poole 1985). Male Ospreys sometime perform a conspicuous aerial “sky dance” display (described below) near the nest site during early courtship which may serve to attract potential mates or to threaten intruders. Once paired, both sexes collect materials for the nest and the female arranges most of the nest materials (Poole 1989). Previous nests are usually reused from year to year and can get quite large and conspicuous. Nests are generally located within 3 to



5 km of a water body, but breeding Ospreys are known to travel over 10 km to hunt (Poole et al. 2002). The Osprey readily builds its nest on the tops of isolated, large, dead trees and on manmade structures, such as telephone poles, channel markers, duck blinds, and nest platforms. In some areas nest platforms have become the preferred structures for nesting (Poole et al. 2002). Where mammalian predators are not a threat, such as on small, isolated islands, this species will nest directly on the ground, sometimes forming dense colonies (Poole 1989). Although pairs do not defend the feeding territory, they aggressively defend the nest (up to 50-100 m) from intruders such as Bald Eagles with vocalizations, postures, chases, and dives. Other nest predators include snakes, raccoons, and Great-horned Owls (*Bubo virginianus*) (Poole 1989). Parents (mostly the female) incubate 1-4 (usually 3) eggs for 32-43 days, with the male delivering food to the female at the nest. Ospreys are generally monogamous, however rare instances of polygyny, and even rarer, polyandry, have been reported (Poole 1989). Ospreys are single brooded, laying slightly glossy, yellowish or creamy eggs with chestnut-red to dark brown colored spots (Baicich & Harrison 1997). The first chick hatches up to five days before the last one. Consequently the older chick dominates younger siblings, and if food is limited, the younger chicks often starve (Poole et al. 2002). Osprey leave the nest when about 50 days old and receive food from their parents for two to eight weeks thereafter (Poole 1989, 1994). The Osprey is a fish-eating specialist with several physical adaptations including barbed pads on the soles of its feet, long, curved talons, and a reversible outer toe to aid in catching and holding slippery fish. In addition, dense oily plumage and efficient nasal valves prevent Ospreys from getting wet and drowning when diving into water (Poole 1994). Ospreys dive feet-first into water to grab fish from a depth up to about one meter. With two toes pointed forward and two backward, they carry fish headfirst; making it more aerodynamic (Poole et al. 2002). Eagles are known to pirate Osprey food, often relentlessly diving and chasing them; forcing Osprey to drop fish that they have caught, after which eagles catch the fish in midair (Poole 1994). In Michigan, migratory departure from breeding territories begins in August (Postupalsky 1991). Although females typically depart breeding grounds earlier and travel farther than males, migration routes

do not differ by sex and both sexes display strong fidelity to wintering and breeding sites (Martell et al. 2001).

Conservation/Management: Ospreys are not currently 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, where it is threatened. Ospreys can serve as valuable bio-indicators of general environmental quality in aquatic systems because they rapidly accumulate chemical contaminants contained in fish. Like the Bald Eagle, Peregrine Falcon (*Falco peregrinus*), and other birds, Osprey numbers declined drastically in 1950-1970s, primarily due to egg shell thinning from DDE, the longer lived metabolite of DDT (Paige 2000). During this time, Postupalsky (1969) noted over 60 Osprey nests in Michigan. After the ban on DDT and implementation of clean water regulations, Michigan Osprey populations increased, with an estimated 70 pairs in the late 1970s and 167 pairs by 1988 (Postupalsky 1991). Moreover, surveys in the early 1990s in U.S. and most Canadian parts of the Great Lakes basin recorded at least 750 occupied Osprey nests (Environment Canada 1994). Despite this population increase, a lack of adequate nesting pairs in southern Michigan was noted. Since 1998, the Michigan Department of Natural Resources (MDNR) Nongame Wildlife Fund has supported the transfer of Osprey chicks from the northern Lower Peninsula to southern Michigan. Chicks are reared in “hacking” towers until they are ready to fly and feed on their own. After fledging, the young Ospreys migrate to South America to winter. After one or two years, Ospreys often return to nest in the area where they fledged. Males are more likely than females to return as adults to the fledging location for nesting. It is anticipated these released birds will form the core of a breeding population in southern Michigan, eventually expanding their range along rivers and other floodings (MDNR 2007). As of 2006, 59 Ospreys have been released through this program (personal communication L. Sargent 2007).

Research Needs: Ongoing management activities insuring statewide productivity and population recovery of Osprey must include understanding the effects of environmental contaminants. There is a need for more information on the effects of certain contaminants, including mercury, PBDEs, PCBs, DDT, and organochlorines.



Related Abstracts: Bald Eagle (*Haliaeetus leucocephalus*), Peregrine Falcon (*Falco peregrinus*)

Selected References:

- Baicich, P. J., and C. J. O. Harrison. 1997. A guide to the nests, eggs and nestlings of North American birds. Second edition. Academic Press, New York, New York.
- Brewer, R., G. A. McPeck, and R. J. Adams Jr., editors. 1991. The Atlas of Breeding Birds of Michigan. Mich. State Univ. Press, East Lansing, Michigan.
- Environment Canada. 1994. The fall and rise of Osprey populations in the great lakes basin. Great lakes fact sheet. Environment Canada, Ontario Region, Burlington, Ontario.
- Martell, M. S., C. J. Henny, P. E. Nye, and M. J. Solensky. 2001. Fall migration routes, timing, and wintering sites of North American Ospreys as determined by satellite telemetry. *Condor* 103:715-724.
- MDNR. Osprey (*Pandion haliaetus*). Available at http://www.michigan.gov/dnr/0,1607,7-153-10370_12145_12202-60853—,00.html (accessed March 2007).
- Paige, L.C. 2000. America's Wildlife: The Challenge Ahead. International Association of Fish and Wildlife Agencies. Washington, D.C.
- Patuxent Wildlife Research Center. Species longevity records. Available at <http://www.pwrc.usgs.gov/bbl/homepage/long5930.htm> (accessed February 2007).
- Poole, A. 1985. Courtship feeding and Osprey reproduction. *Auk* 102:479-492.
- Poole, A. 1989. Ospreys: A Natural and Unnatural History. New York: Cambridge University Press.
- Poole, A. 1994. Family Pandionidae (Osprey). Pages 42-50 in J. Del Hoyo, A. Elliott, J. Sargatal, editors. Handbook of the Birds of the World, Vol. 2. Barcelona: Lynx Edicions.
- Poole, A. F., R. O. Bierregaard, and M. S. Martell. 2002. Osprey. Number 683 in A. Poole and F. Gill, editors. The Birds of North America. The Birds of North America, Philadelphia, Pennsylvania.
- Postupalsky, S. 1969. The status of Osprey in Michigan in 1965. Pages 338-340 in Joseph J. Hickey editor. Peregrine falcon populations; their biology and decline. University of Wisconsin Press. Madison, Wisconsin.
- Postupalsky, S. 1991. Species account for Prothonotary Warbler. Pages 158-159 in Brewer, R., G. A. McPeck, and R. J. Adams Jr., editors. The Atlas of Breeding Birds of Michigan. Michigan State University Press, East Lansing, Michigan.
- Romanski, M. 2001. Executive summary for resource management report 01-04 2001 raptor monitoring program. Isle Royale National Park, Michigan.
- Sibley, D. A. 2000. National Audubon Society The Sibley Guide to Birds. Alfred A. Knopf, New York, New York.
- Wisconsin Department of Natural Resources. Osprey (*Pandion haliaetus*). Available at <http://dnr.wi.gov/org/land/er/factsheets/birds/osprey.htm#Endangered%20Resources%20Reports> (accessed March 2007).
- Wood, N. A. 1951. The birds of Michigan. University of Michigan Museum Zoology, Miscellaneous Publication 75:l-559.
- Zimmerman, D. A., and J. Van Tyne. 1959. A distributional check-list of the birds of Michigan. University of Michigan Museum Zoology, Occasional Paper 608:1-63.

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