



Owls

Owls are birds of prey, occupying by night the hunting and feeding niches which the hawks hold by day. Superb, specialized predators, owls are adapted to find, catch and kill prey quickly and efficiently. They've been doing it for ages; owl fossils found in the midwestern United States in rocks of the Eocene period date back about 60 million years. Eight species of owls either nest or regularly visit Pennsylvania in winter. Some species like the great horned owl, barred owl, and eastern screech-owl are permanent residents. Barn owls, long-eared owls, short-eared owls, and northern saw-whet owls nest in the state but are migratory. Some individuals apparently nest where they spent the winter. Snowy owls are winter visitors, varying each year in the extent of their visitation to the state. Migrant owl populations seem to reflect the abundance of prey populations, so they vary greatly from year to year. In general, the populations of owls are not well-known because of their nocturnal habits. As such, these are among Pennsylvania's most mysterious birds and deserve more research and monitoring efforts.

Taxonomists divide owls (order Strigiformes) into two families, Tytonidae—barn owls—and Strigidae, a family to which all other Pennsylvania owls belong. The barn owl ranges over most of the world, with related species in South America, Europe, Africa, Asia, New Zealand, and Australia. Strigidae have near-worldwide distribution, including most Pacific islands and the arctic.

The plumage of owls is dense and soft, making them look heavier than they actually are. Their earth-toned feather colors are broken into mottled patterns which blend into the background of shaded daytime roosts and the darkness of night. The feathers on owls' legs provide insulation and protect against bites by prey. Both sexes are colored essentially alike, but females are usually larger and heavier than males of the same species.

Some unusual and highly effective adaptations help owls survive. Extremely large eyes and large retinas packed with a high number of light-gathering cells called rods make their vision 35 to 100 times more efficient than human sight at distinguishing small objects in low light. An owl cannot distinguish colors well, but it possesses binocular vision: each eye views the same scene from a slightly different angle, thus improving depth perception. Eyes are fixed in the skull; to look



eastern screech-owl

to the side, an owl moves its head, and some species can twist their necks over 270 degrees—almost all the way around.

An owl's head is large and broad to accommodate two widely spaced and highly developed ears. The facial disc and facial ruff, which consists of paired layers of densely packed feathers behind the ear openings, work together to funnel and intensify sounds. Owls hear sounds well below the threshold of human hearing. Even in complete darkness, a barn owl can detect and catch prey by using its hearing alone. Several owl species have asymmetrically positioned ears for a greater ability to pinpoint prey. This highly developed sense of hearing allows some species to detect and capture unseen voles and mice under snow pack or dense ground cover. The conspicuous "ears" or "horns" of great horned, long-eared and screech owls are really tufts of feathers that have little effect on their hearing.

Owls are silent hunters that take their prey by stealth. The leading parts of a night hunter's wings—which cut the air when the bird flies—have soft, serrated edges. Turbulence and noise is further reduced by soft fringes on the trailing edge of primary and secondary feathers and a downy covering on primaries, secondaries and wing coverts. These specialized feathers, lightweight wings and a large wing surface area let an owl fly and glide nearly silently. As its flight is virtually noiseless, an owl easily hears other sounds while hunting. It descends to its target in a silent, mothlike glide.

An owl grips and kills prey with its talons. Even the grip of a small owl is amazingly strong. Two of these strong, sharp claws branch off the front toes of the foot, and two off the back toes. If the prey is small enough, the owl swallows it whole; otherwise it holds the kill with its talons, tears the carcass apart with its hooked beak and bolts the pieces. The owl's stomach absorbs nutritious portions and forms indigestible matter (hair, feathers, bones, claws, insect chitin) into round pellets that are regurgitated about seven hours later.

Pellets, also called castings, can be found under daytime roosts or nighttime feeding stations. Generally, the larger the owl, the larger its pellets. Pellets can be broken apart and the hard bony parts separated from the fur and feathers. Close examination of the hard items gives insight into the owl's diet. These pellets are great educational tools for people, especially children, to see first-hand what an owl eats. It is surprising to many that most owls primarily eat small rodents and the smaller owls eat a lot of insects.

Most owls call to attract members of the opposite sex during mating season and to announce individual territory. They also call softly for short-range communication between mates or between parents and offspring. When cornered or frightened, owls hiss or make clicking noises by snapping their mandibles (upper and lower parts of the bill).

Owls do not build nests, preferring to take over abandoned crow or hawk nests or use cavities in trees or holes in banks. They may add lining material to existing nests. Owls are early nesters, some even lay eggs in late winter. By the time nestlings need fed and fledglings leave the nest, offspring of other wildlife abound and are fairly easy prey for the adults to provision the young or for the inexperienced young owls to prey upon.

Owl eggs, usually three to five, are rounded, white and undecorated. Incubation is generally the female's responsibility, while the male hunts and brings food to the female. After the eggs hatch, both parents feed the young.

Nestlings have thick white or light gray down. Young found in the same nest are invariably of different sizes, because incubation starts as soon as the female lays the first egg (unlike many other birds, which begin incubating only after all eggs are laid), and therefore this egg hatches first. As much as two weeks may pass between the laying and hatching of the first and last eggs. Young hatched latest will die if the parents cannot find enough food in the area, as the youngest nestlings cannot compete with the larger, older nestlings. This natural

check balances predator population with food supply and ensures that surviving fledglings are strong.

The sounds made by owls are among the most familiar night-time natural sounds. The stereotype is that owls hoot, but several owls make no such sound and screech, whinny, or bark instead. Even the "hoot owls" have wide repertoires and make many different kinds of sounds, especially in their more intimate family relationships. They also make non-vocal noises by snapping their bills when disturbed or clapping their wings during courtship flights.

During the day, most owls stay in hollow trees or dark, dense stands of vegetation, often the dense cover of conifer trees. They hunt mainly at night—occasionally at dusk or on cloudy days—quartering the ground in silent flight or scanning it from a convenient perch.

Owls generally kill whatever is easiest to catch or find. As with many natural predators, they are often blamed for killing more game species and poultry than they actually kill. Owls are beneficial birds of prey that help keep rodent populations in check, including pest species that may be more active at night. Mice, rats and voles form a major part of the owls' diets; smaller owls prey heavily on small animals, including mice, small birds, frogs and invertebrates, such as large insects, worms and crayfish. All Pennsylvania owls are federally protected under the Migratory Bird Treaty Act of 1918.

Barn Owl (*Tyto alba*)

The barn owl is a long-legged, light-colored bird with a white, heart-shaped face. It is sometimes called the monkey-faced owl. A barn owl is a medium-sized owl, 14 to 20 inches in length with a 44-inch wingspan; females weigh about 24 ounces, males up to 20 ounces. Both sexes have whitish or pale cinnamon underparts and buffy or rusty upper plumage.

A barn owl has neither of two characteristics often associated with owls: "horns" or hooting-type calls. Its calls include a long, drawn-out whistle, loud raspy hisses and snores.

Barn owls nest in barns, church towers, hollow trees, cliff ledges and rock crevices, old buildings, silos, ventilation shafts, and clay embankments. Although barn owls generally do not build a nest, the female may shred her own regurgitated pellets to form a simple nest on which to lay her eggs. They usually nest in March, April or May and lay from 2 to 18 eggs (generally four to seven) at two- to three-day intervals. Incubation takes about 33 days. Some pairs will initiate nesting in fall months. During nesting, barn owls may catch dozens of mice and voles and store them at the nest site until the eggs begin hatching.

After the eggs hatch, both parents feed the young. Nestling barn owls can eat their weight in food every night. Young leave the nest 7 to 10 weeks after hatching, after flight feathers have developed.

Barn owls hunt open fields, flying low over the ground in search of prey. Ornithologists studied 200 disgorged pellets from a pair of barn owls that nested in a tower of the



barn owl

Smithsonian Institution Building in Washington, D.C. The pellets contained 444 skulls, including those of 225 meadow mice, 179 house mice, 20 rats and 20 shrews—all caught in the city. Other studies have confirmed mice and shrews as this owl's main prey items. Small birds, insects, flying squirrels and rabbits occasionally are taken.

The Pennsylvania Game Commission has been working with private landowners to protect barn owl nesting sites and study these charismatic birds. Recent studies have revealed that Pennsylvania owls migrate to other states sometimes hundreds of miles away.

Eastern Screech-owl (*Megascops asio*)

The screech-owl is the only small Pennsylvania owl with ear tufts. It is under 10 inches long and males may be as small as 6.5 inches long, with a 19-inch to 24-inch wingspan and a 5 to 7 ounce body weight. The species is dichromatic, i.e. exhibiting two color phases—gray and red—independent of age or sex, consistent from first plumage to old age and frequently found in a single brood. Gray phase birds are a dappled brownish-gray; red phase individuals are chestnut-red, also dappled. The pale breast and belly are streaked with dark gray or chestnut, depending on the color phase. In Pennsylvania, the gray phase is more common than the red phase.

A screech-owl's call is termed a "quavering whistle," "mournful wail" or "long, descending whiny with tremolo, repeated at irregular intervals" (*huhuhuhuhu*, etc.). This can be heard in spring and then again in late summer after the young leave the nest.

Screech-owls nest in unlined cavities of hollow trees, in abandoned holes of flickers and pileated woodpeckers and even in larger birdhouses. In March or April, the female lays four to five eggs; incubation takes about 30 days. After hatching, young remain in the nest for one month.

The screech-owl's diet is quite varied, perhaps the most varied of any North American owl, and includes many kinds of small animals. Large insects such as grasshoppers, katydids, moths

and beetles, mice, shrews, rats, squirrels, rabbits, small birds and medium-sized birds like blue jays and northern flickers, crayfish, frogs and flying squirrels form the screech-owl's diet; most non-insect food is taken during winter. Screech-owls hunt from a branch using a sit and wait strategy, pouncing on prey from above. It sometimes catches its meal on the wing and is capable of snatching aquatic prey, like tadpoles, from the surface of shallow water. Common in Pennsylvania, they live in a variety of wooded habitats where tree cavities are available, although it is less common, even rare, in large, contiguous blocks of mature forest. The eastern screech-owl inhabits farm woodlots, orchards, wooded cemeteries and city parks, stream edges and wooded residential areas of towns and cities. Some screech-owls live in wooded backyards especially where there is a large birdhouse provided. Breeding Bird Surveys have indicated a statewide population decline of 20 percent between the first *Atlas of Breeding Birds in Pennsylvania* period (1983- 1989) and the second atlas period (2004-2009). West Nile Virus may have contributed to the steep drop in screech-owl numbers in Pennsylvania since the accidental introduction of the virus in 1999. This disease is a significant mortality factor for this owl, and it remains to be seen how well the species develops resistance.

Great Horned Owl (*Bubo virginianus*)

This large owl is sometimes called the tiger of the air. It is an adept aerial predator with powerful talons capable of crushing the spinal column of prey larger than itself. The great horned owl weighs up to 3.5 pounds, is 19 to 24 inches in length and has a wingspan range of 3 feet to nearly 5 feet. Females are slightly larger than males. A great horned owl has soft brown plumage above, mottled with grayish-white; undersides of light gray barred with dark; a "collar" of white feathers on the upper breast; a rust-colored face; and prominent ear tufts, the so-called horns, up to 2 inches long. Great horned owls are often mobbed by crows and other birds because of their predatory habits. The great horned owl is the night-time equivalent of the red-tailed hawk (*Buteo jamae*).

The great horned is known as the "hoot owl" for its call, three to eight (usually five) deep, booming, uninflected hoots: *hoo-hoo-hoo hoo*, given in a pattern somewhat like a Morse code message and has great carrying power. The hoot of the larger female is higher pitched than that of the male due to her smaller syrinx. These owls hoot to stake out territory and as part of the species' mating activity. The courtship of great horned owls extends from fall into early winter, providing many nights of hooting serenades with pairs dueting in synchronized hooting sessions. In Pennsylvania, nesting females are on eggs in February and early March and occasionally as early as late January. After fledging, the young owls beg from their parents with a high-pitched call that sounds somewhat like a barn owl's call, but less raspy. These night-time barking calls are sometimes given from prominent posts like tree tops and utility poles.

Great horned owls are believed to mate for life. They nest in abandoned squirrel, crow, heron or hawk nests, tree cavities

great horned owl



or hollow stumps and are the earliest nesters of all owls. A mated pair cleans debris from an appropriated nest, and the female then partly lines a central hollow with feathers. She lays two or three eggs at several-day intervals, usually in February, and may temporarily get covered with snow while incubating.

Great horned owls, especially incubating or brooding pairs, defend nests and young viciously and have even attacked humans who got too close. Great horned owls are intolerant of other owls near their nests or inside their territories. Eggs hatch in about a month; nestlings are downy-white and helpless. The young cannot fly until they are almost three months old and contour feathers have grown.

Great horned owls prey on opossums, rabbits, rats, mice, voles, geese, herons, domestic poultry, grouse, squirrels, other owls and hawks, foxes, skunks (this species' defensive spray apparently does not deter the great horned owl), domestic cats, weasels and muskrats. It is able to tear meat with its hooked beak. Generally, they are "perch and pounce" hunters that sit in a tree or prominent post and attack prey from above. They occasionally scavenge on carcasses.

The great horned owl is more commonly found across the state than any other owl. This species has a very wide tolerance for climatic conditions, living in habitats ranging from boreal forests to dry grasslands and deserts. In Pennsylvania, it is found in a variety of habitats from urban parks and cemeteries to large forest tracts. It prefers

forest edges, open mature woods and agriculture land with woodlots. The species ranges over most of North America, south into Central America and portions of South America. There has been a perceived drop in its population in recent years as measured by Christmas Bird Counts and Breeding Bird Atlases. This owl is susceptible to West Nile Virus and may have suffered a set-back due to this disease.

Snowy Owl (*Bubo scandiacus*)

Rare and irregular visitors to Pennsylvania, snowy owls show up mainly from November to January in response to food availability on the arctic tundra. Prey abundance, namely, a large lemming population during the breeding season, allows snowy owls to rear higher numbers of young in some years. Scientists believe that as this primary food source decreases, large numbers of snowy owls irrupt south in winter to southern Canada and northern United States seeking areas with abundant prey. Population crashes of lemmings and hares, and the accompanying owl irruptive events, usually occur at 4- or 5-year intervals. Immatures, which are darker in color, go farther south than the adults.

Plumage of the snowy owl is white barred with grayish-brown; its feet and legs are heavily feathered. Full, soft feathering keeps the bird warm during periods of inactivity between winter hunting forays.

snowy owl



The snowy owl is as large as the great horned owl, with a 24-inch body length, 60-inch wingspan and body weight up to 5 pounds (by weight, the largest owl in North America). It is a bird of wide open, treeless, spaces which resemble its tundra home. In Pennsylvania, it may be found on an elevated perch overlooking open fields, airfields, reclaimed strip mines, the shorelines of open rivers and lakes or along broad highway corridors, and beaches. It often perches on a fencepost, raised hill, hay bale, silo, grain elevator, or building to look for its primary prey of small mammals such as mice, voles, rabbits and rats, but also will take birds and fish as opportunity presents itself. Unlike most owls the snowy owl is diurnal, hunting throughout the long summer days on its Arctic breeding grounds. In Pennsylvania, the snowy owl continues these habits and hunts during the day. It does not call south of its arctic breeding grounds.

Barred Owl (*Strix varia*)

The barred owl is a large bird of the deep woods which includes forest swamps, riparian forests as well as upland forest habitat. It has a rounded head, no horns and brown eyes (it is the only brown-eyed Pennsylvania owl except the barn owl; all others have yellow eyes). The barred owl ranges over the eastern United States but has expanded north and west into the boreal forests of western Canada and south to northern California. The barred owl is closely associated with large unfragmented forest tracts, particularly mature forests with large trees for nesting cavities. It prefers to nest in mixed deciduous and conifer woodlands and is strongly associated with eastern hemlock. It often occurs in the same high-quality and large-scale contiguous forests as the red-shouldered hawk (*Buteo lineatus*).

A barred owl weighs up to 2 pounds, with a 44-inch wingspan and body length up to 20 inches. It has gray-brown plumage with white spots on the back; whitish or grayish underparts are barred with buff or deep brown, the barring crosswise on the breast and lengthwise on the belly.

The barred is the most vocal of Pennsylvania's owls. Its hoots are more emphatic than those of the great horned owl,

barred owl



long-eared owl



but not as deep or booming. The barred owl's call is eight accented hoots, in two groups of four hoots: *hoo-hoo-hoo-hoo ...hoo-hoo-hoo-hooaw* (described as "Who cooks for you, who cooks for you all?"). It usually calls early in the night, at dawn, and occasionally on cloudy days.

Barred owls almost always nest in hollow trees, laying anywhere from one to five eggs that hatch in 28 to 33 days. Pairs may show strong attachment to the same nest area, returning year after year. They are generally permanent residents where they nest.

Long-eared Owl (*Asio otus*)

The long-eared is one of the most efficient mouse-catchers of the Pennsylvania owls. It is also one of the rarest breeding birds in the state and listed as threatened in the state. The State Wildlife Action Plan considers the long-eared owl a "High Level Concern" species and its population trends appear to be declining as it was found in less than one percent of the

total number of blocks surveyed during Breeding Bird Atlas projects. This slender, crow-sized owl has long wings which make it appear larger in flight than it actually is; a long-eared owl has about a 15-inch body length, up to 40-inch wingspan and weighs about 11 ounces. This secretive and uncommon Pennsylvania resident gets its name from two prominent ear tufts.

While it looks a bit like a small version of the great horned owl, the long-eared can be told from its larger relative by a streaked belly—rather than barred—and closer-set ears. The long-eared owl is only about one-fifth the bulk of a great horned owl. Conversely, the long-eared owl is much larger and has a slimmer profile than the other “eared owl,” the eastern screech-owl. Like the great horned owl, the long-eared owl has a rusty face and grayish-brown plumage. However, the long-eared owl also has streaks continuing down its belly while the great horned owl lacks these streaks and the short-eared owl’s streaks are confined to the chest. The long-eared owl’s call is a low, moaning, dove-like *hoo, hoo, hoo* repeated every three seconds or so. They also have many other sounds including whistles, whines, shrieks, and bill snaps.

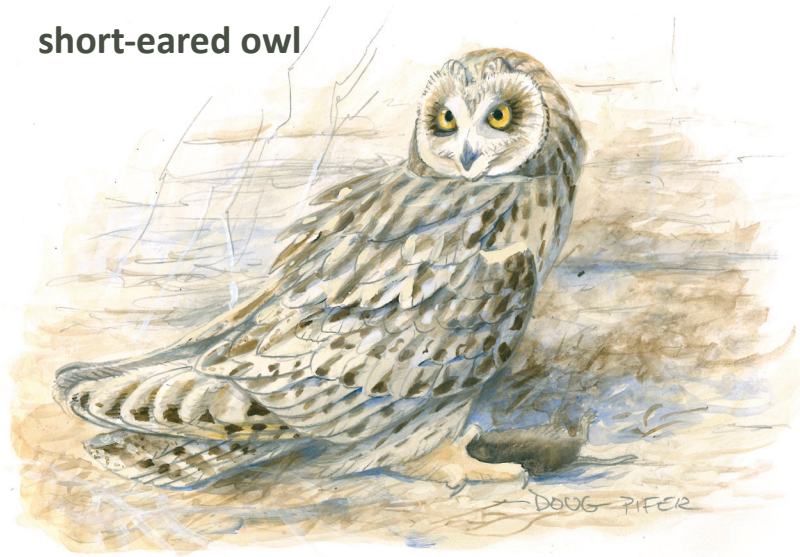
Long-eared owls usually are associated with a curious blend of habitats. Paradoxically, they nest in wooded areas but usually forage in open country. Their home is a mix of woodland, fields, and wetlands. Long-eared owls generally nest in dense evergreen conifers, frequently in old crow or hawk nests. They forage in fields, meadows, open woods, wetlands, and edges nearby. This also is true in winter when they roost in dense conifer tree groves, often communally. Females lay three to eight (normally four to five) eggs. Only the female incubates; incubation period is 26 to 28 days, and the oldest owlet may be 8 to 10 days old when the last egg hatches.

Long-eared owls feed mainly on mice, voles and shrews, occasionally taking birds, insects and frogs. They are more strictly nocturnal than Pennsylvania’s other owls. Prime habitat is a mix of woodland, fields and wetland; dense vegetation or dense groves of conifers for nesting and roosting adjacent to open woodland, fields, meadows or wetlands for foraging. They may also be found in extensive forests with areas of open understory and short ground cover for foraging. This species often will “freeze” in a cryptic pose right next to a tree trunk to avoid detection. Long-eared owls are sensitive to disturbance at their nests and winter roosts. It is best to view these nesting owls at a distance so as not to disturb them.

Short-eared Owl (*Asio flammeus*)

Also called the marsh owl, the short-eared owl visits Pennsylvania mainly in winter and is a rare breeding bird that is considered endangered in the state. It is a crow-size owl (body length 13 to 17 inches, weight 15 ounces) with long wings (up to a 42-inch wingspan). Its upper plumage is streaked and buff-brown, with large buffy areas on the upper wing surfaces; the breast is pale, boldly streaked with brown. The short-eared owl’s ear tufts are small and hard to see, but its ear openings are large and its hearing excellent.

short-eared owl



The short-eared hunts during the day and at night and is especially active at dusk and dawn in winter. It hunts over open country, and its irregular, flopping and floating flight resembles that of a nighthawk or large moth. The short-eared owl is a fairly silent owl but occasionally sounds an emphatic, sneezy bark, *keaw, keaw*, or a hooting call described as *boo, boo, boo*. Their courtship flight is a spectacular sky dance with the male diving, looping, and swooping while calling in sight of a prominently perched female.

At winter’s end, most short-eared owls leave Pennsylvania and head north. Pennsylvania is at the southern edge of the owl’s North American breeding range. Some remain in Pennsylvania to breed in extensive grassy areas scattered throughout the state. In recent years they have been found nesting on reclaimed strip mines in western and central Pennsylvania. Short-eared owls nest on the ground, sometimes in colonial groups. The female excavates a slight bowl-shaped depression in the earth or sand. The nest is sparsely lined with grasses, weed stalks and feathers. Bushes or clumps of weeds often hide the nest. The female typically lays four to seven eggs and incubates them about 21 days until they hatch.

Small mammals, especially voles and mice, are the primary prey of the short-eared owl. It also preys on shrews, rats and small birds. This owl may utilize an elevated perch where available but mainly hunts by flying low over the ground, sometimes hovering, and then pouncing on its prey. They seem to take “the night shift” in the same areas where northern harriers hunt during the daylight hours, sometimes skirmishing with these hawks or other owls. The short-eared owl depends mainly on its sense of hearing to locate prey and is able to catch its quarry unseen under snow cover and grass. This owl is found in open country and inhabits reclaimed strip mines, uncut grassy fields, large meadows, the grass margins of airports, and marshes and bogs. They generally roost in trees, sometimes in large groups and occasionally with long-eared owls.

Northern Saw-whet Owl (*Aegolius acadicus*)

The tiny saw-whet owl is one of the state's most charismatic birds. With a body length of 7 to 8 inches and an 18-inch wingspan, the saw-whet is the smallest Pennsylvania owl. Its plumage is dull chocolate-brown above, spotted with white, and its undersides are white spotted with dark reddish-brown. Juveniles are a rich chocolate-brown over most of their bodies. This species has no ear tufts.

The saw-whet's call is a mellow, whistled note repeated mechanically, often between 100 and 130 times a minute: *too, too, too, too, too*, etc. This sound suggests the rasping made when sharpening a saw—hence the bird's name. The saw-whet is nocturnal and seldom seen. By day, it roosts in young, dense hemlocks, junipers, or other dense vegetation.

Saw-whet owls are believed to breed in March and April; they nest in natural cavities or deserted woodpecker and squirrel holes, hollow trees or stumps and nesting boxes. Females typically lay four to six eggs that hatch after 21 to 28 days. Immatures leave the nest after about a month. The saw-whet's primary food is woodland mice, particularly deer mice and white-footed mice. Saw-whets also will feed on insects, voles, shrews, and small birds. In turn, they are preyed upon by larger owls like great horned owls and barred owls. Saw-whets tend to stay fairly low in the forest, approaching any human visitor from a low elevation where they are difficult to spot in the dense foliage.

In Pennsylvania, the northern saw-whet owl is found in highland deciduous and mixed forests and is most abundant in coniferous forests and mixed forests with a thick understory such as those with blueberry, mountain laurel, and rhododendron stands. This species nests primarily in the northern part of the state, but also in mountainous forests near the Mason-Dixon line. Winter roost sites are often in dense stands of junipers (red cedars) or other tightly vegetated evergreen conifers and vine tangles. Breeding season surveys (called "toot routes") have revealed that the saw-whet is fairly widely distributed in the mountain forests of the state. There is on-going research on its migration into and through the state by bird banders (called "owl-netters").

northern saw-whet owl

