

Virtual Creature Festival: Long-eared and Short-eared Owls

Who is calling in the dark? Let's get to know both the long-eared and short-eared owl.

Long-eared Owl

With long, prominent ear tufts that point straight up, there is no question about how the long-eared owl (*Asio otus*) got its common name. The combination of these pointy feathers and round eyes set against buff-colored facial discs make this owl look like it's in a perennial state of shock. However, actually getting a glimpse of that wide-eyed expression is a rare event because these birds live a very secretive life.



Long-eared owls are medium-sized, about 15 inches tall with a wingspan of about 3 feet. They are nocturnal hunters and their mottled feathers provide extreme camouflage. They roost in dense forests and tend to perch close to the trunk of trees making them appear invisible. At night, they leave the cover of the woods to patrol nearby fields and meadows.

They hunt on the wing and hover and dive to catch prey with their strong feet. They kill prey with a stabbing bite to the back of the skull and swallow their prey whole. They favor voles and field mice, but will eat bats, moles, rats, rabbits and whatever small mammals and birds they can catch. Like most owls, long-eared owls are stealth predators that can catch prey in complete darkness. They are silent flyers with fringed primary wing feathers and abundant downy body feathers adapted to muffle sound.

Long-eared owls are found over a large part of North America, but they migrate long distances between their breeding and non-breeding ranges. They breed in Canada and the very northern portion of the United States but can winter all the way to Central America. During the winter, where they are more abundant, they may roost in large flocks. They rarely breed in New Jersey but in the fall, they do migrate through the state on their way south. A small number stay as winter residents and even fewer stay to breed the following spring. They are designated a threatened species in New Jersey.

Because of their secretive nature, the best way to find these owls is by their [vocalizations](#). They are mostly silent except for breeding season when their whooping, barking, and sheep-like bleating sounds can be heard up to three quarters of a mile away. However, as the birds rarely breed in New Jersey, consider taking a trip to northern New England, western border states along the Canadian border, or Canada itself to hear them.

In New Jersey, one way to get a glimpse of a long-eared owl is to search the ground in winter in groves of evergreens in densely forested regions of the state. Like all owls, long-eared owls regurgitate two to three inch [pellets](#) that are oval clumps of undigestible fur, feathers, teeth, and bone. They expel one or two per day so if you find a number of these, you may be under a roost tree.

Long-eared owls mate in spring and do not make their own nests but take over abandoned hawk or crow nests. The female lays four or five eggs and incubates them for a month. After hatching, they stay in the nest for about another month before they begin branching (venturing out of the nest but not flying yet). When they fledge the parents continue to feed the young until the fall when migration begins.

Short-eared Owl

The short-eared owl (*Asio flammens*) was once a frequent nester in open wetlands in New Jersey. Its habitat includes open fields, marshes, and meadows. Draining of wetlands and urban development over the years has greatly reduced the places suitable for this now Endangered species.

They have rounded heads, but the “ear” tufts are difficult to see. Their coloring is mottled brown and buff above, with light feathers on the underside of the wings and belly. This owl is unusual in that during the breeding season it hunts during the day and night. In winter it prefers to hunt in low light conditions. Their broad, round tipped wings allow this bird to outmaneuver obstacles in its path or soar like a hawk over meadows and marshes. Their soaring capabilities help them scout for prey but also assist during make long migration flights in fall and spring.



Short-eared owl observed at Duke Farms
(photo courtesy of Thom Almendinger)

Short eared owls mostly breed in Canada but spend winters throughout the United States and Mexico. They are sometimes observed during the Christmas Bird Count at Duke Farms. There is ideal winter habitat for them at Duke as they prefer large open areas with wood lots, meadows, and fields with crop residue.

The diets of short-eared owls consist mostly of mice and voles. They also eat shrews, moles, lemmings, rabbits, bats, rats and muskrats. Not their favorite, but they will eat gulls and shorebirds in their marsh habitats. The population of the owls fluctuates in tune with the rise and fall in prey populations and where they spend the winter also depends on prey populations. When this owl catches its prey with its sharp talons, it usually uses its beak to decapitate the prey, then eviscerates it before swallowing it whole.



Short-eared owl in flight. Note the light coloring under the wings and on its belly. (photo courtesy of Thom Almendinger)

Short-eared owls are not as vocal as most other owls. The primary [call](#) is an extended series of hoots, given by males during courtship. They also call from the ground or from an elevated perch. Both males and females may bark, scream, or whine when defending the nest and offspring. Females sometimes utter a chickenlike cluck.



Short-eared owl chick courtesy of [Gauri Chauhan](#)

During courtship, males perform sky dances, which are aerial acrobatics accompanied by singing and wing-clapping. When it comes to nesting, short-eared owls are unusual in that they nest on the ground and they



build the nest themselves. They usually choose a slightly raised site like a hummock or knoll in a wetland or grassland and the female scrapes a bowl out of the ground which she lines with grasses and feathers. Clutch sizes can be small or large with the female laying between one and eleven creamy eggs. The incubation period is a little over a month and the babies stay in the nest up to three weeks after hatching. When they leave the nest they walk and run as they don't fly till a week or two later.

Short-eared owls will often have superb camouflage to help them avoid predators in grasslands and meadows. If pursued by a larger predator like an eagle, they may feign death. They will also give a broken wing distraction display when defending their nest and young.

More About Owls

In Old English, a sound like "oule" was used to identify these nocturnal birds. Sometime in the Middle Ages, the words hoole, howyell and owle, began to appear in written records. All of them attempted to name the night birds by their vocalizations. Not an easy task as owls have distinct [calls](#) that are unique to each species.

Most owls are night hunters and use their extraordinary vision and acute hearing to locate their prey. Owl [eyes](#) are tube shaped and so large there is little room for muscles inside their eye sockets. Though they can't move their eyes from side to side, they are able to rotate their heads 270 degrees to compensate. Their necks are so flexible it gives the illusion they can turn their heads all the way around in a complete circle. Their large eyes allow more light to enter the pupil to help them see in the dark. An owl's distance vision is so incredible that if it could read, it would be able to make out they type on a newspaper by the light of a candle from a mile away. However, they can't really see things up close very well and depend on hair like feathers on their beaks and feet to feel their food.



Long-eared owls at Duke Farms (photo courtesy of Thom Almendinger)

Owls have the best hearing of all birds, but the feather tufts that look like ears on top of some owls' heads have nothing to do with it. Their [ears](#) are actually located on the sides of their heads and hidden by feathers. Owls have flattened facial disks that funnel sound to their ears so that they can detect even the slightest noise like a mouse stepping on a twig. The ear openings are placed so that one is higher than the other and have feathers that funnel sound into them too, like cupping hands behind your ears. This arrangement allows sound to reach each ear at a slightly different time and helps the owl pinpoint where the sound is coming from.

Owls have special adaptations like wide wings and fluffy feathers that allow them to fly silently. Soft comb serrations on the wing feathers and frayed edges on the tips of the tail feathers break the air flow and muffle sound. Like stealth bombers they swoop down to the ground and seize and sever the spines of rodents and small mammals with their powerful feet and talons.

Small prey like mice are swallowed whole while larger prey are shredded with their hooked beaks. Owls digest the soft body parts but cannot dissolve bones, fur, teeth, and claws. This waste matter is regurgitated in the form of densely packed small pellets. Owl [pellets](#) found at their roosting sites can be dissected to gain insight into owl diets.

There are eight owls that occur in New Jersey, some are year-round residents, and some are just winter visitors. The great horned owl and screech owl are common and doing well in our most densely populated state, but the short-eared owl, the long eared owl, barred owl, saw-whet owl, barn owl and snowy owl are endangered, threatened or rare in the state for a whole host of reasons. Habitat loss, forest fragmentation, pesticide use, land use change, and human disturbance have taken their toll on so many vulnerable wildlife populations, including our owls.

Climate change is a clear and present threat that scientists are only just beginning to fully understand. Wild swings in weather patterns, severe storms with extreme winds that blow down nest trees and cause both juvenile and adult mortality, extended periods of drought that dry up water sources, kill trees and depletes prey are just some examples of the unfolding climate crisis. Fires, floods, and famine are the harsh realities facing owls and all wildlife in the world today.

Although owls are protected by state and federal laws, their future status is uncertain. We can only hope that they will thrive and continue to enrich our lives.

Activity: Investigate the Importance of Owl Ears in Locating Sounds*

In this experiment, you will test how two ears help locate where a sound is coming from and how cupping ears with hands affects ability to hear sounds. This will simulate how an owl's ears help them hear where prey is located. Two people are needed to do this activity.

Materials: Sheets of paper (preferably scrap paper to avoid waste)



Long-eared owl [ear](#) opening
(photo courtesy of International Owl Center)

Most nocturnal owls have two [ears](#) surrounded by feathers that are asymmetrical, with one higher than the other. The asymmetry helps owls locate sounds better than our symmetrical ears and the feathers that surround the openings can also be manipulated to help funnel sound into them and to magnify that sound. When a noise is heard, the owl is able to tell its direction because of the miniscule time difference in which the sound is perceived in the left and right ear. For example, if the sound is coming from the left of the owl, the left ear would hear it before the right ear. Owls can detect a left/right time difference of about 0.00003 seconds (30 millionths of a second!)

The owl then swivels its head to the left, so now the sound arrives at both ears simultaneously. By turning its head and listening, the sound gets funneled by the facial discs (which act like radar dishes) into both ears and now arrives at both ears at the same time. It then knows when the prey is right in front of it. Even in pitch black darkness the owl can find its prey and pounce.

We don't have asymmetrical ears so we can't hear the same way an owl does, but we can test how to locate where a sound is coming from with this listening activity.



- One person will close their eyes and count to ten out loud. This person is the owl. While this person is counting out loud, the second person (prey) will walk to a place in the room (or outdoor space) and crumple a paper to make loud rustling noises with it. With eyes still closed, the owl (person counting) will stop counting at ten, then be silent and quietly listen for the sound of rustling paper. When they hear it, they must point to the rustling sound location, turn their head towards it and open their eyes. Was the owl able to pinpoint the location of the sound (prey)?
- Repeat the activity, but this time the person with the paper (prey) will change her location while the owl counts out loud to ten. This time she will make the rustling a lot softer. Can the person with closed eyes (owl) still find the location of the sound by listening?
- Now repeat the last step, but this time have the owl (with eyes still closed) cup their hands behind their ears while the paper rustles softly. Find the sound. Then listen without hands cupped. Is the sound louder or quieter when hands are cupped behind the ears? The cupped hands act like the feathers around an owl's ears as well as facial discs to funnel sound and makes it sound louder.

[*This activity adapted from Four Winds Nature Institute](#)

Test Your Knowledge

1. How do owls funnel sound to their ears to help them locate prey?

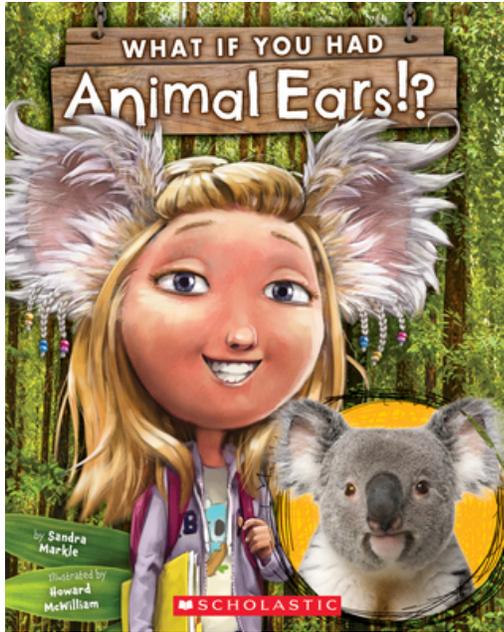
Answer: By turning the feathers around the ear openings, similar to cupping hands and turning their head so the facial discs can also funnel sound into the ear openings.

2. What other adaptation of nocturnal owl ears help them hear so well?

Answer: They are positioned asymmetrically.

Additional Resources

- [Short-eared Owl Facts](#)
- [All About Birds: Long-eared owls](#)
- [All About Birds: Short-eared owls](#)
- [Owl Ears](#)
- [17 Owl Facts](#)
- [Everything you want to know about owls: The Owl Pages](#)
- [Climate change and impact on spotted owls](#)
- [Snowy Owls and Climate Change](#)
- [More Science activities about owls](#)
- [Tips for teaching about owl pellets](#)
- [Fun video for kids that explains all about owl pellets: Owl Pellets; Science Explosion](#)



Scholastic publications are known for their appeal to younger audiences, and **What If You Had Animal Ears** is no exception.

If you could have any animal's ears, whose would you choose? What if you woke up one morning and your ears weren't yours? **What If You Had Animal Ears** explores what would happen if you looked in the mirror and saw an animal's ears instead of your own! Readers can discover what it would be like if you had these special ears, what the ears enable the animal to do and important aspects of these adaptations. Included are some animals that might be familiar and some new ones, too: Jackrabbit, Tasmanian Devil, Eurasian Red Squirrel, Koala, Okapi, Townsend's Big-Eared Bat, African Elephant, Great Horned Owl, Philippine Tarsier, Serval, and the Meerkat. The book also has information about the human ear and how to keep your ears healthy.

[Click here to hear Sandra Markle's book read aloud.](#)

For discussion or for future research, consider posing questions like these:

What animal ears would you select and why? What if animals switched ears? What would the new animal look like and be able to do? How would this impact its survival? Select a native NJ animal and explain the features of the ears. Are they especially suited to the environment? How?

These discussions would be enhanced by original illustrations and students of all ages might enjoy doing them. Students may also enjoy creating their own fictitious animal with some sort of superpower ears!

New Jersey Student Learning Standards – Science

This lesson could be used in third grade, and others, when addressing heredity and the inheritance of traits.

- **3-LS3 Heredity: Inheritance and Variation of Traits** - Students who demonstrate understanding can: **3-LS3-1.** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. **3-LS3-2.** Use evidence to support the explanation that traits can be influenced by the environment.
- **Disciplinary Core Ideas LS3.A: Inheritance of Traits** - Many characteristics of organisms are inherited from their parents. (3-LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2) **LS3.B: Variation of Traits** - Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2)

For more ideas on how teaching and learning about long eared owls and short eared owls can be integrated into your lessons about climate change or other interdisciplinary topics, contact Kate Reilly, Manager of Education, Duke Farms at kreilly@dukefarms.org