State of Illinois
Illinois Department of Natural Resources

Masters of the Air

Illinois Department of Natural Resources

What are birds of prey?

Birds of prey, or raptors, are amazing animals. They have large eyes that face forward, powerful talons and a hooked beak. Their food includes amphibians, birds, insects, mammals and reptiles. Scientists recognize eight major groups of birds as "birds of prey."

Buteos (large hawks) fly on wide, slow-beating wings which allow them to soar and search for prey. They perch on tree limbs and fence or telephone posts.

Accipters (true hawks) have a long tail (like a rudder) and short rounded wings. When flying, they make several quick wing beats and then glide. True hawks are aggressive and very quick.

Ospreys can be recognized by wings that appear to be "bent," or angled, when they fly. Found near large bodies of water, they dive feet-first to catch fishes.

Falcons have long, thin, pointed wings, a short bill and a streamlined body. They can fly very fast.

Eagles are larger than hawks and have longer wings. Their bill is almost as long as their head.

Harriers fly close to the ground. Their wings form a small "v" during flight. These birds have a long, thin body with long, rounded wings and long legs.

Kites are medium-sized hawks with pointed wings. Their hooked beak helps them feed on their prey items, such as small mammals, reptiles and insects.

Owls can turn their head around 270 degrees. Fringed outer wing feathers allow for silent flight. Their wings are rounded, and the tail is short.

Find the following words in this puzzle:

beak	osprey	falcon
harrier	strong	predator
raptor	eyesight	tear
clutch	owl	soar
nest	talon	eagle

C	L	U	T	C	H	V	W	F	T
O	W	L	R	E	I	R	R	A	H
S	Q	B	U	R	Z	A	L	L	G
P	R	E	D	A	T	O	R	C	I
R	A	A	S	P	N	S	M	O	S
E	E	K	B	T	T	S	E	N	E
Y	T	G	N	O	R	T	S	F	Y
C	D	A	G	R	E	L	G	A	E

Illustrated by Clinton Johnston.

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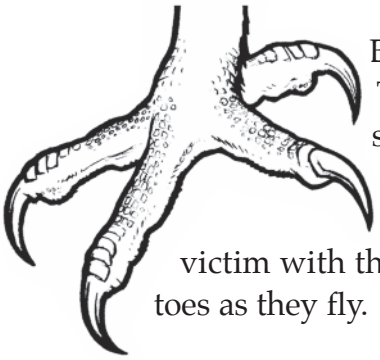
Amazing Adaptations

Birds of prey have special adaptations or "tools of the trade" that greatly enhance their hunting skills. They have excellent hearing, sharp talons and keen eyesight.

Ear openings on each side of the head behind and beneath the eyes provide birds of prey with excellent hearing. Their ears don't look like ours and are usually hidden by feathers. Some owls have ear tufts which are feathers that stick up over the ear and aid in directing sound into the ear holes. Owls and harriers also have a facial disk (round face) that helps funnel sound into the ear openings.



Birds of prey have a talon, or claw, on the tip of each of their eight toes. Talons are made of keratin and are extremely sharp. The downward-curved shape, sharpness and length of the talons make it difficult for these birds to walk. Strong leg muscles, strong toes and sharp talons provide the necessary weapons to obtain food. Some birds of prey can crush the vertebrae of their victim with their toes! Muscles and talons allow these birds to carry their prey with their toes as they fly.

Another adaptation that makes birds of prey efficient predators is keen eyesight. These birds have the best eyes in the animal kingdom. Not only can they see greater distances than humans, but their visual acuity (ability to see clearly) is eight times that of ours. Their eyesight is as sharp as that of a human looking through eight-power binoculars! As a result of its powerful vision, a red-tailed hawk can see a rabbit one mile away.

The eyes of birds of prey are so large that they have no room to move within their eye sockets. In order to see to the side, they must turn their head. They have a very long, flexible neck that helps them to turn the head almost backwards.

Activity: Ask a friend to hold an open book toward you. Stand in front of the book and back up until the words are hardly visible. Read two or three sentences of the book. Measure the distance (in feet) from you to the book. Multiply the distance by eight and move back that many feet from the book. Try to read the book again. If you had the eyesight of an eagle, you could still read the book clearly!

Natural Tools

The bird world contains an amazing variety of beaks. A bird's beak, or bill, is made of bone and is covered by a horny plate called keratin. In birds of prey, the tip of the beak is hooked, and the edges are sharp. The hooked beak is used to tear meat since most raptors, or birds of prey, eat prey too large to swallow whole. The upper beak of a falcon is notched. This "tooth" is used to break the neck vertebrae of its prey. Strong jaw and neck muscles help tear apart the prey.

Raptors have a soft, fleshy area, the cere, at the base of the upper bill. The cere is featherless and helps meat-eating birds keep the area around the bill clean. The cere is easier to clean than feathers.

At-Home Activity

Not all birds eat the same kinds of foods. Some birds are insectivores. They eat insects. Some are gramnivores, feeding on seeds and grains. Others are carnivores, or meat-eaters. There are other birds that eat fruits or a combination of foods. Try this experiment to see what foods the birds in your backyard prefer. Place cracked corn, bird seed, suet (fat), worms, raisins and scraps of meat in separate shallow dishes. Stand inside and watch birds coming to the feeding area. Record which birds eat each food. Be sure to clean up the food dishes (those without seeds) after a short time, especially if it's warm outside.

Make a Match

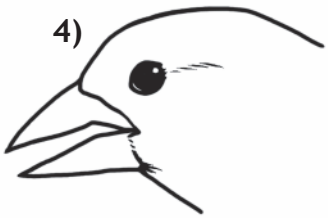
Birds perform many tasks using their beak as a tool. Draw a line to match each beak to its corresponding human tool. Then draw a line to the correct name of the bird.

1)

2)

3)

4)



A) straw

B) vise

C) scissors

D) forceps (tweezers)

E) bald eagle

F) ruby-throated hummingbird

G) American goldfinch

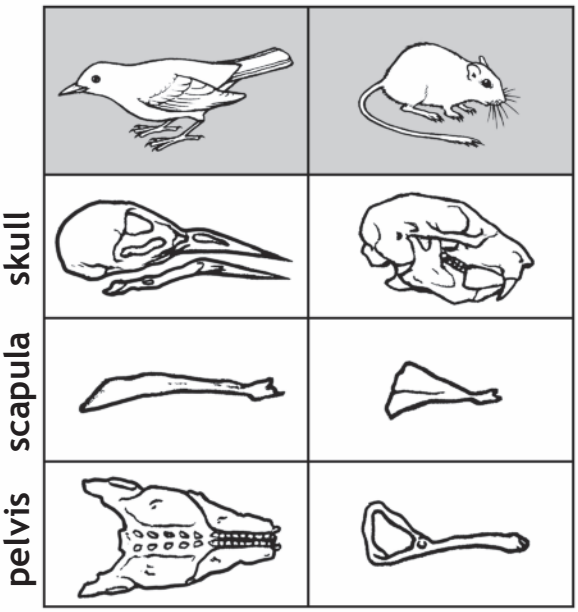
H) warbler

answers: 1 D H 2 C E 3 A F 4 B G

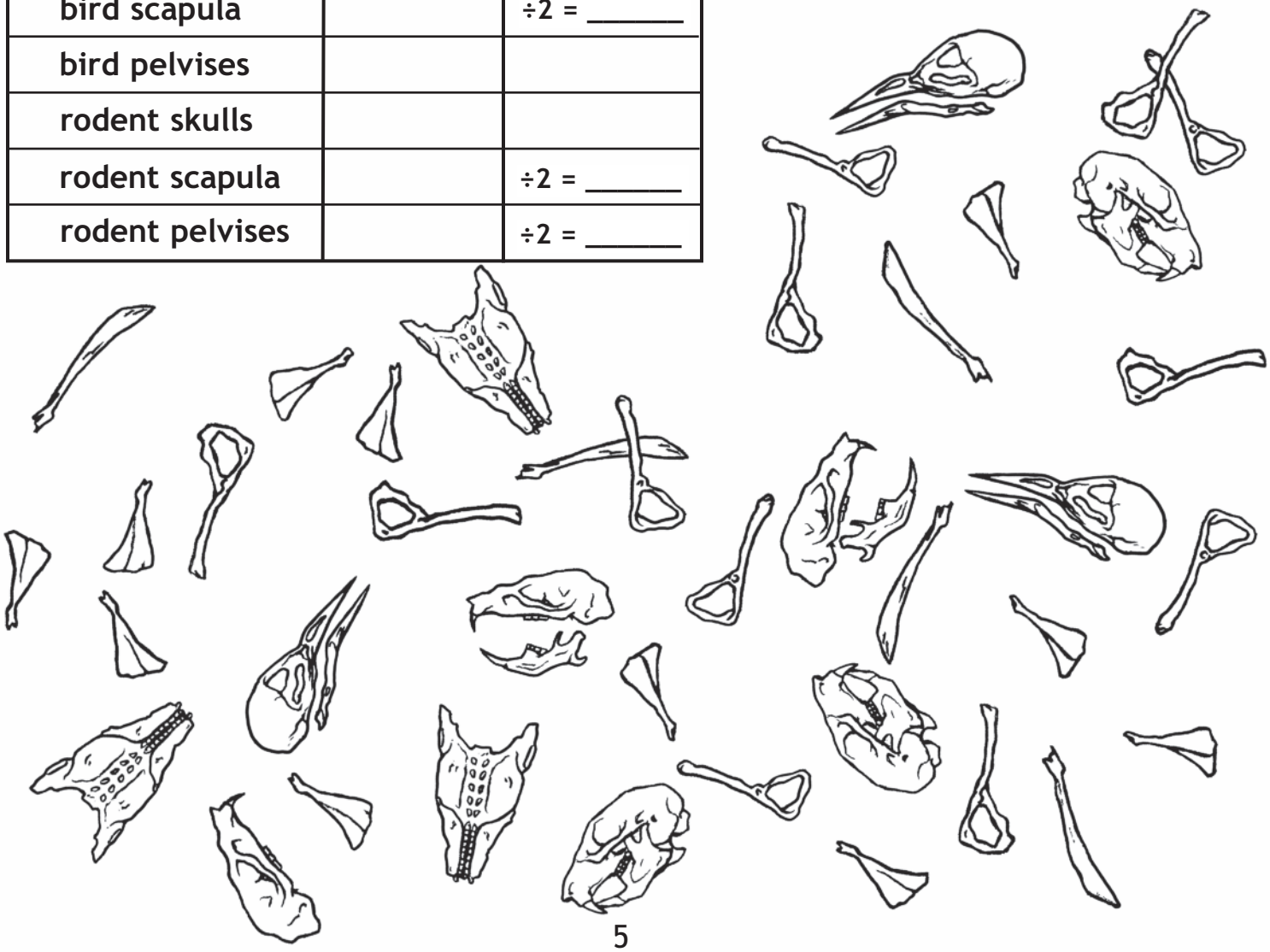
What did the owl have for dinner?

Did you know that you can determine what an owl has eaten by analyzing its pellet? An owl eats its prey whole or in big chunks. It cannot digest everything that it swallows. "Pellet" is a term for the bones, hair, shells and other items an owl coughs up. These parts cannot easily pass through the owl's digestive tract. To get rid of them, the owl removes them through its mouth.

The illustration below shows the bones from a pellet that has been picked apart for you. It is your mission to count the number of pelvises, scapula and skulls. Use the key to help you determine whether each bone belongs to a bird or rodent. Write these numbers in the table below to find out how many of each the owl had for dinner.

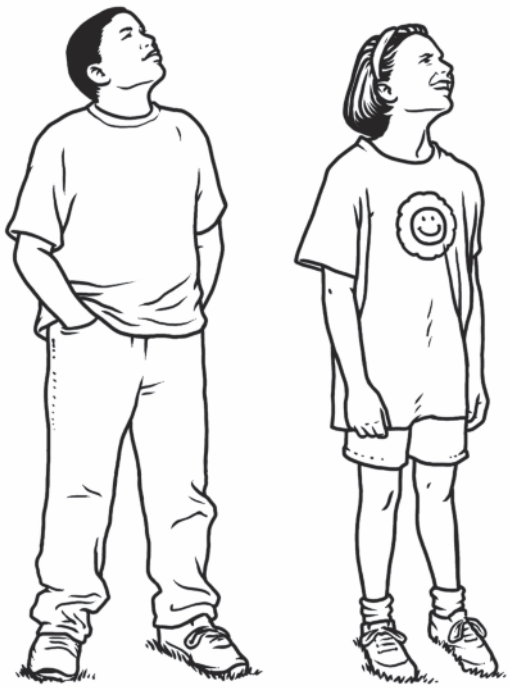


	# counted	# consumed
bird skulls		
bird scapula		÷2 = _____
bird pelvises		
rodent skulls		
rodent scapula		÷2 = _____
rodent pelvises		÷2 = _____



Soaring High in the Sky

Most people learn to identify birds by their size, color, song and the habitat they are found in. Since many raptors are seen high in the sky, some people learn to identify them by their silhouette, or outline. Take this quick reference guide with you on your next trip outside and watch the sky for raptors. *Can you become an expert birder and learn to identify raptors by their silhouettes?*



Do the Math

The eastern screech-owl beats its wings five times per second. If it takes this owl two minutes to leave its perch, catch a mouse and return to its perch, how many times does it beat its wings?

5 beats/second x
_____ seconds/minute = _____ beats/minute

_____ beats/minute x
2 minutes = _____ **wing beats while capturing the mouse**

Want to be amazed? Compare the number of screech-owl wing beats per minute to a ruby-throated hummingbird that beats its wings an amazing 5,000 times per minute!

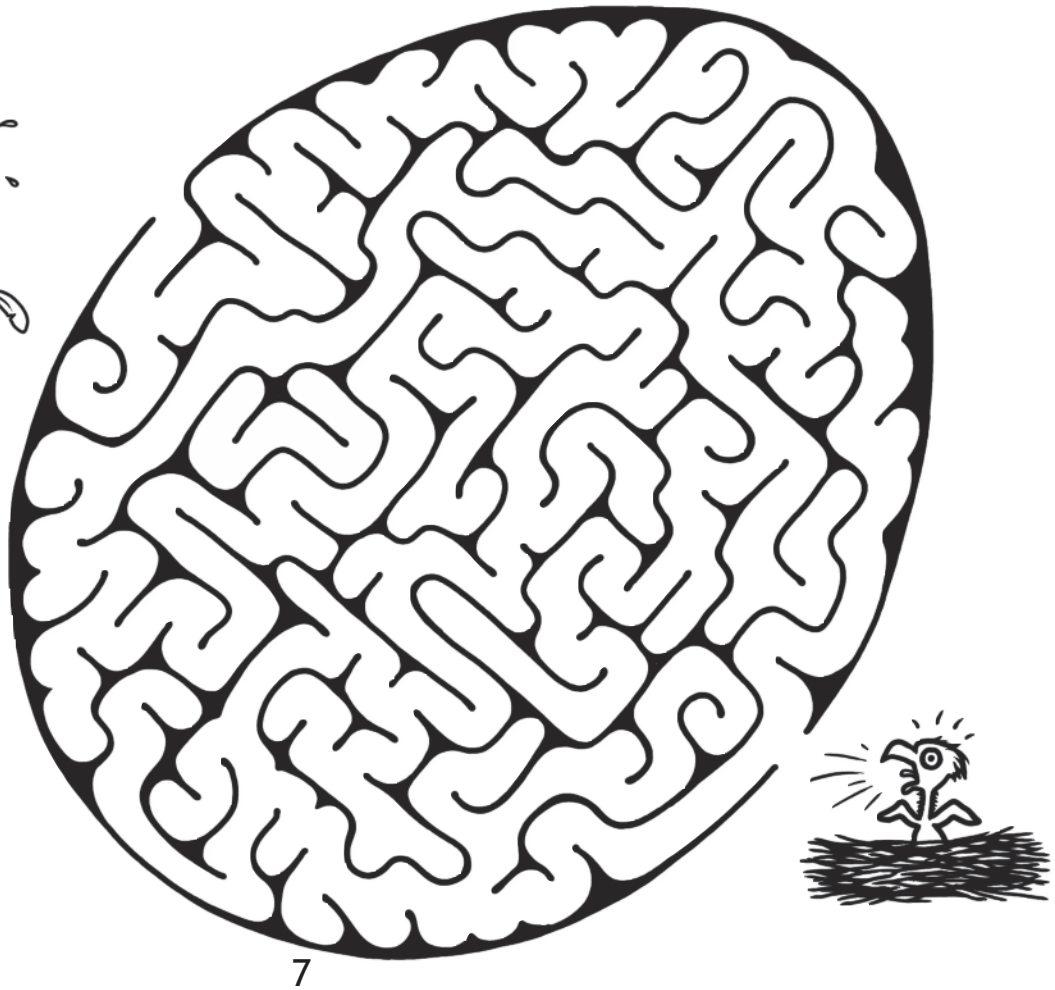
Nests and Eggs

Birds of prey have several types of nesting strategies. The peregrine falcon is an example of a species that does not spend any energy making a nest. It simply lays its eggs directly on a high bluff or window ledge of a tall building. The screech-owl and American kestrel use a tree cavity for a nest. The barn owl is appropriately named because it often uses a barn for a nest site. The males of many raptor species collect sticks, feathers, leaves and mosses that the female uses to construct the nest. Bald eagles reuse the same nest each year, adding branches, roots and cornstalks. One bald eagle nest eventually weighed one ton!

Eggs are amazing! They are strong enough to support the weight of the parent bird, who sits on the egg while the chick develops. Strong as they are, they must be thin enough for the hatchling to break out of the egg and join the world. The eggs of each bird species have their own special coloring and markings (like a fingerprint for a bird). The eggs of birds of prey have muted colors to help them blend in with their surroundings (camouflage).

The number of eggs laid in the nest is called the clutch. Clutch size is determined by nature and how many hatchlings can be successfully supported by the environment. The number can be increased or decreased by the presence or absence of food, shelter, space, water and competition.

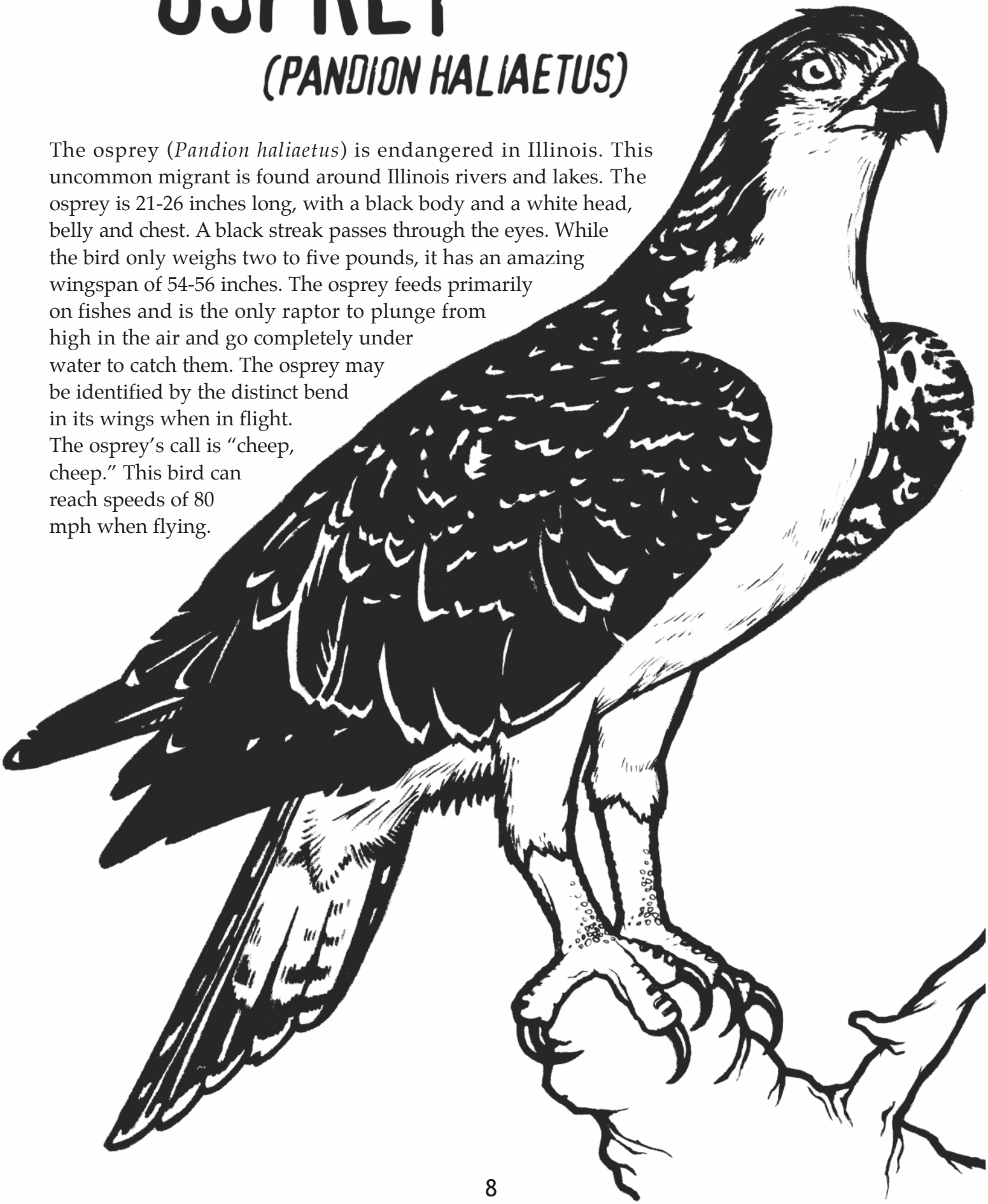
Please help the mother raptor find her chick!



OSPREY

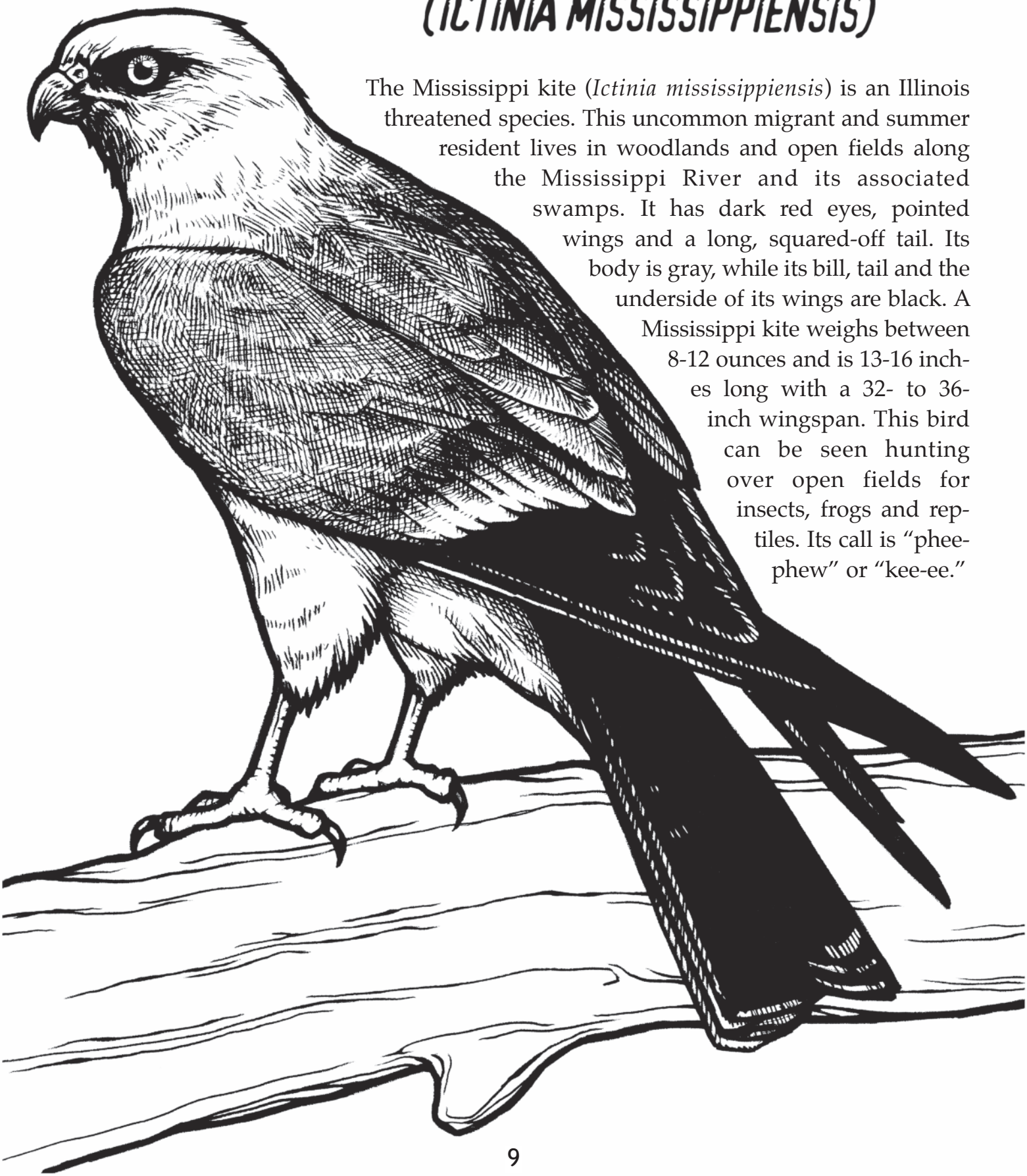
(PANDION HALIAETUS)

The osprey (*Pandion haliaetus*) is endangered in Illinois. This uncommon migrant is found around Illinois rivers and lakes. The osprey is 21-26 inches long, with a black body and a white head, belly and chest. A black streak passes through the eyes. While the bird only weighs two to five pounds, it has an amazing wingspan of 54-56 inches. The osprey feeds primarily on fishes and is the only raptor to plunge from high in the air and go completely under water to catch them. The osprey may be identified by the distinct bend in its wings when in flight. The osprey's call is "cheep, cheep." This bird can reach speeds of 80 mph when flying.



MISSISSIPPI KITE

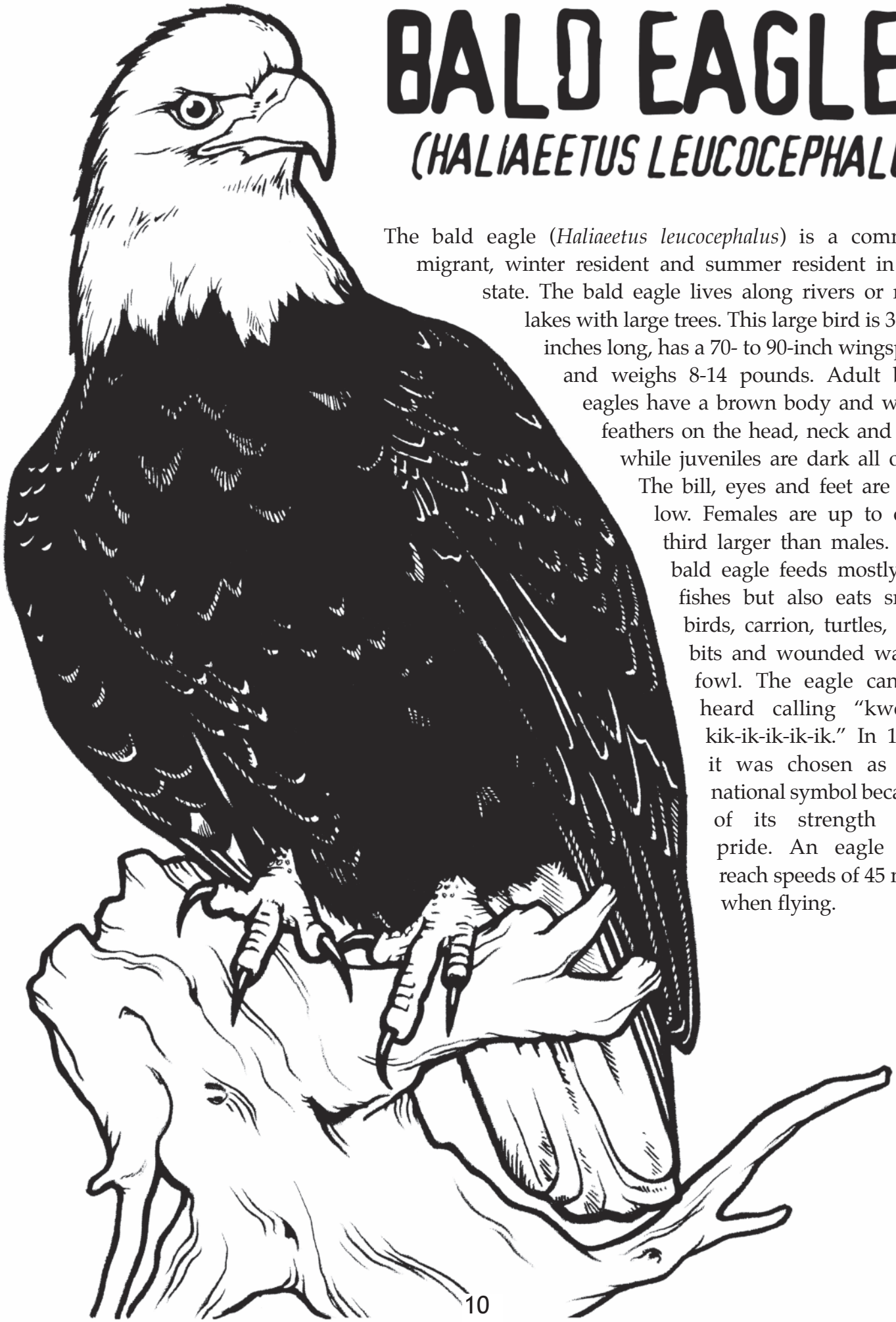
(ICTINIA MISSISSIPPIENSIS)



The Mississippi kite (*Ictinia mississippiensis*) is an Illinois threatened species. This uncommon migrant and summer resident lives in woodlands and open fields along the Mississippi River and its associated swamps. It has dark red eyes, pointed wings and a long, squared-off tail. Its body is gray, while its bill, tail and the underside of its wings are black. A Mississippi kite weighs between 8-12 ounces and is 13-16 inches long with a 32- to 36-inch wingspan. This bird can be seen hunting over open fields for insects, frogs and reptiles. Its call is "phee-phew" or "kee-ee."

BALD EAGLE

(HALIAEETUS LEUCOCEPHALUS)

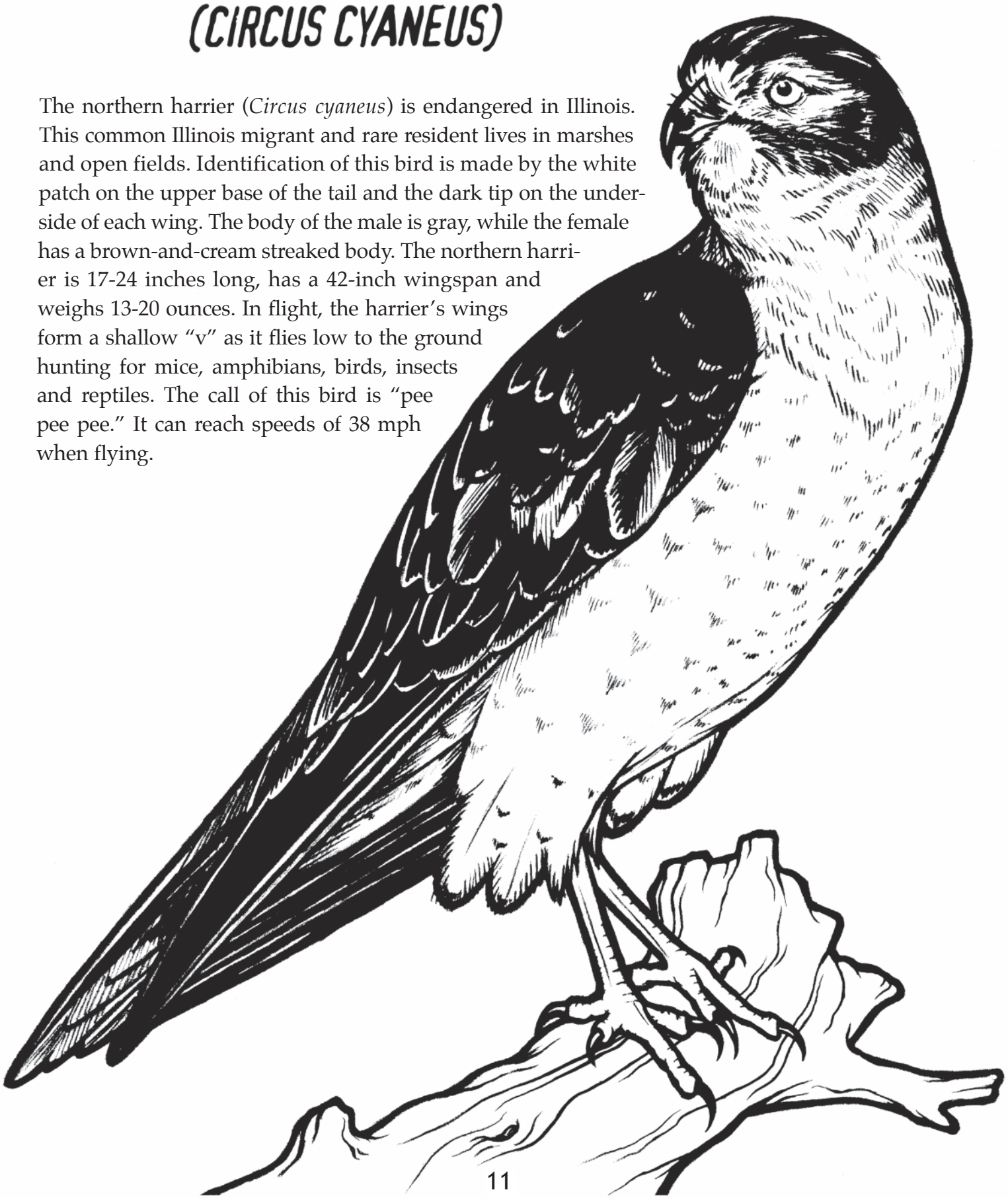


The bald eagle (*Haliaeetus leucocephalus*) is a common migrant, winter resident and summer resident in the state. The bald eagle lives along rivers or near lakes with large trees. This large bird is 30-41 inches long, has a 70- to 90-inch wingspan, and weighs 8-14 pounds. Adult bald eagles have a brown body and white feathers on the head, neck and tail, while juveniles are dark all over. The bill, eyes and feet are yellow. Females are up to one-third larger than males. The bald eagle feeds mostly on fishes but also eats small birds, carrion, turtles, rabbits and wounded waterfowl. The eagle can be heard calling "kweek-kik-ik-ik-ik-ik." In 1782, it was chosen as our national symbol because of its strength and pride. An eagle can reach speeds of 45 mph when flying.

NORTHERN HARRIER

(CIRCUS CYANEUS)

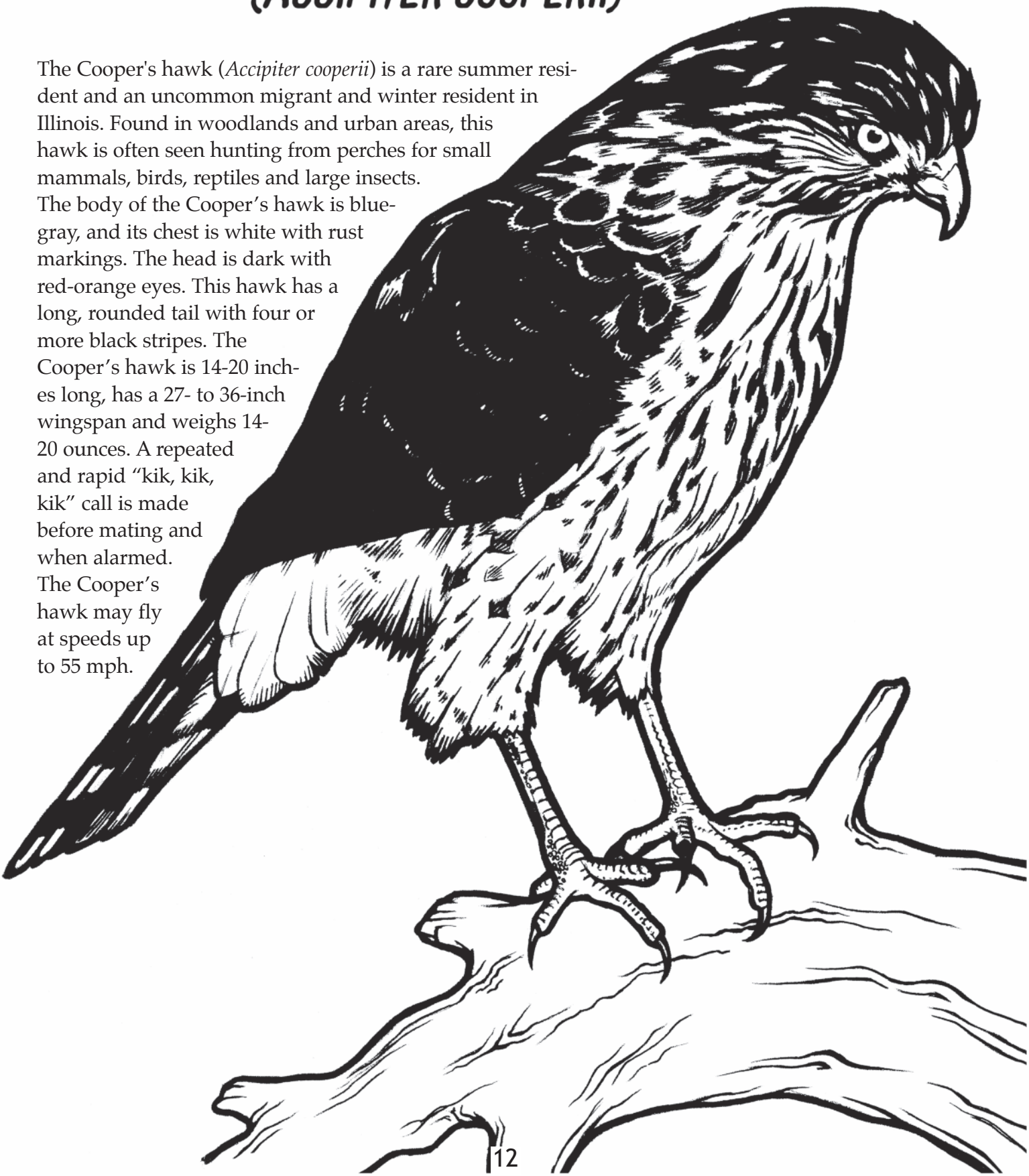
The northern harrier (*Circus cyaneus*) is endangered in Illinois. This common Illinois migrant and rare resident lives in marshes and open fields. Identification of this bird is made by the white patch on the upper base of the tail and the dark tip on the underside of each wing. The body of the male is gray, while the female has a brown-and-cream streaked body. The northern harrier is 17-24 inches long, has a 42-inch wingspan and weighs 13-20 ounces. In flight, the harrier's wings form a shallow "v" as it flies low to the ground hunting for mice, amphibians, birds, insects and reptiles. The call of this bird is "pee pee pee." It can reach speeds of 38 mph when flying.



COOPER'S HAWK

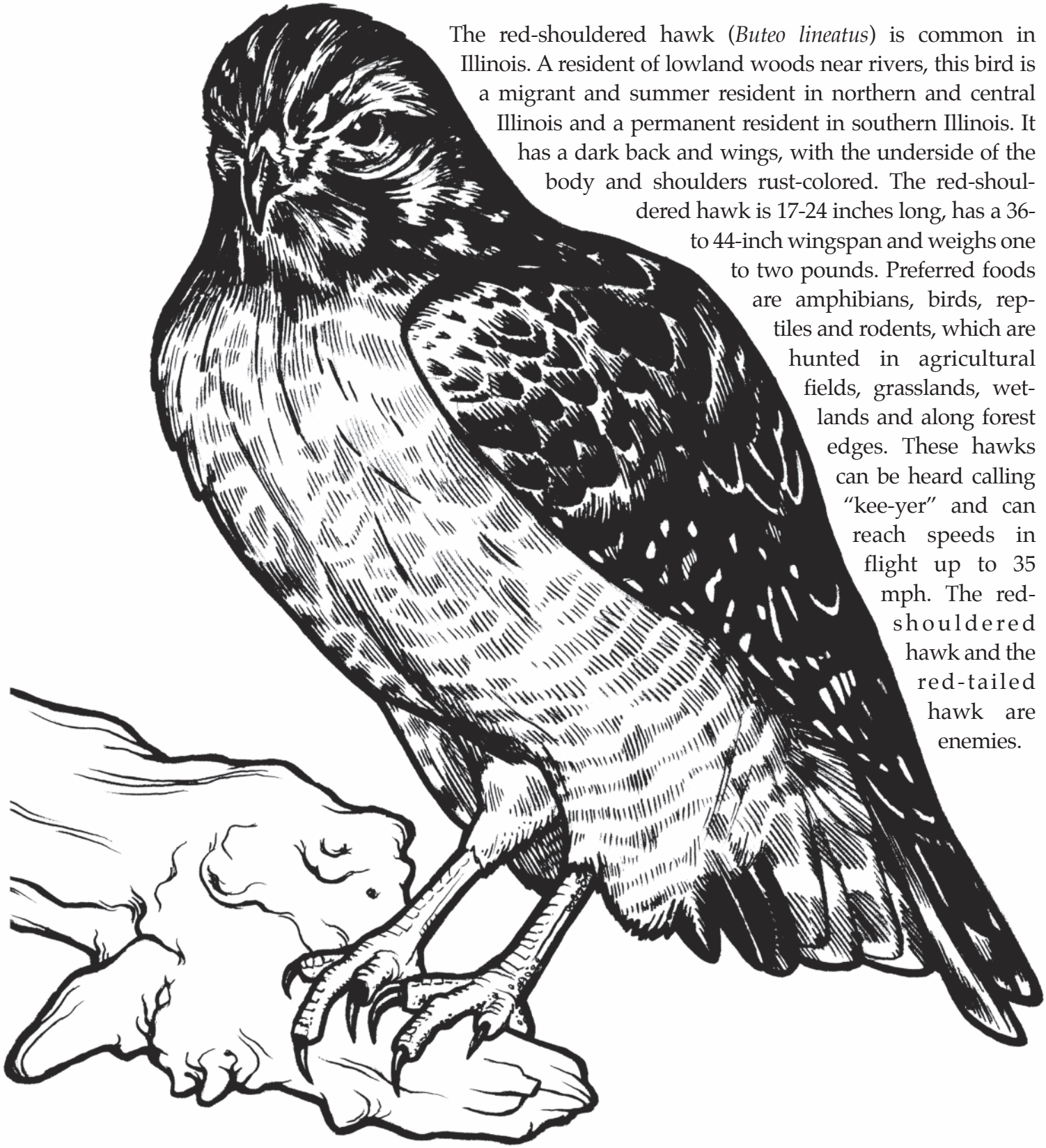
(ACCIPITER COOPERII)

The Cooper's hawk (*Accipiter cooperii*) is a rare summer resident and an uncommon migrant and winter resident in Illinois. Found in woodlands and urban areas, this hawk is often seen hunting from perches for small mammals, birds, reptiles and large insects. The body of the Cooper's hawk is blue-gray, and its chest is white with rust markings. The head is dark with red-orange eyes. This hawk has a long, rounded tail with four or more black stripes. The Cooper's hawk is 14-20 inches long, has a 27- to 36-inch wingspan and weighs 14-20 ounces. A repeated and rapid "kik, kik, kik" call is made before mating and when alarmed. The Cooper's hawk may fly at speeds up to 55 mph.



RED-SHOULDERED HAWK

(BUTEO LINEATUS)

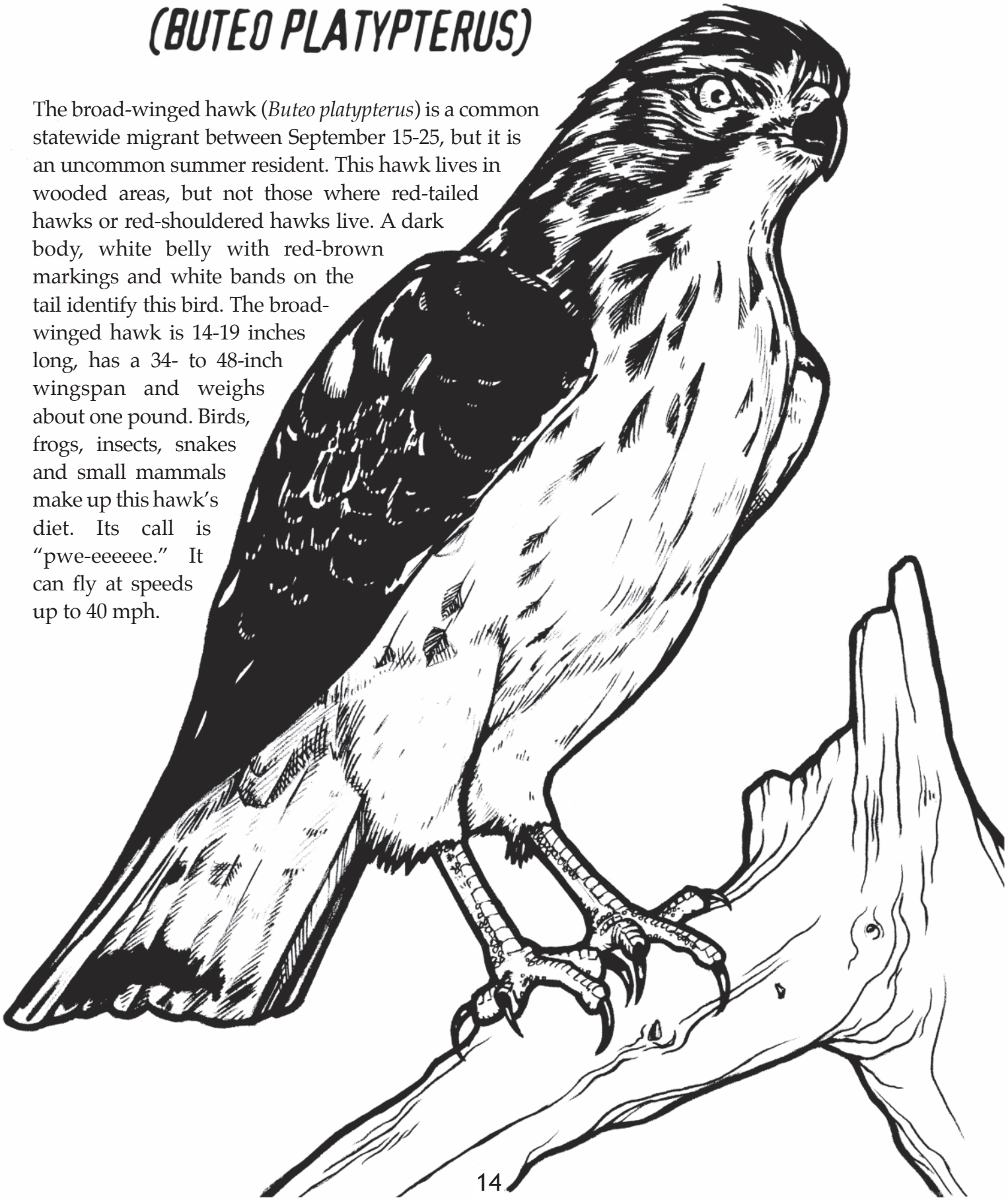


The red-shouldered hawk (*Buteo lineatus*) is common in Illinois. A resident of lowland woods near rivers, this bird is a migrant and summer resident in northern and central Illinois and a permanent resident in southern Illinois. It has a dark back and wings, with the underside of the body and shoulders rust-colored. The red-shouldered hawk is 17-24 inches long, has a 36- to 44-inch wingspan and weighs one to two pounds. Preferred foods are amphibians, birds, reptiles and rodents, which are hunted in agricultural fields, grasslands, wetlands and along forest edges. These hawks can be heard calling "kee-yer" and can reach speeds in flight up to 35 mph. The red-shouldered hawk and the red-tailed hawk are enemies.

BROAD-WINGED HAWK

(BUTEO PLATYPTERUS)

The broad-winged hawk (*Buteo platypterus*) is a common statewide migrant between September 15-25, but it is an uncommon summer resident. This hawk lives in wooded areas, but not those where red-tailed hawks or red-shouldered hawks live. A dark body, white belly with red-brown markings and white bands on the tail identify this bird. The broad-winged hawk is 14-19 inches long, has a 34- to 48-inch wingspan and weighs about one pound. Birds, frogs, insects, snakes and small mammals make up this hawk's diet. Its call is "pwe-eeeeee." It can fly at speeds up to 40 mph.



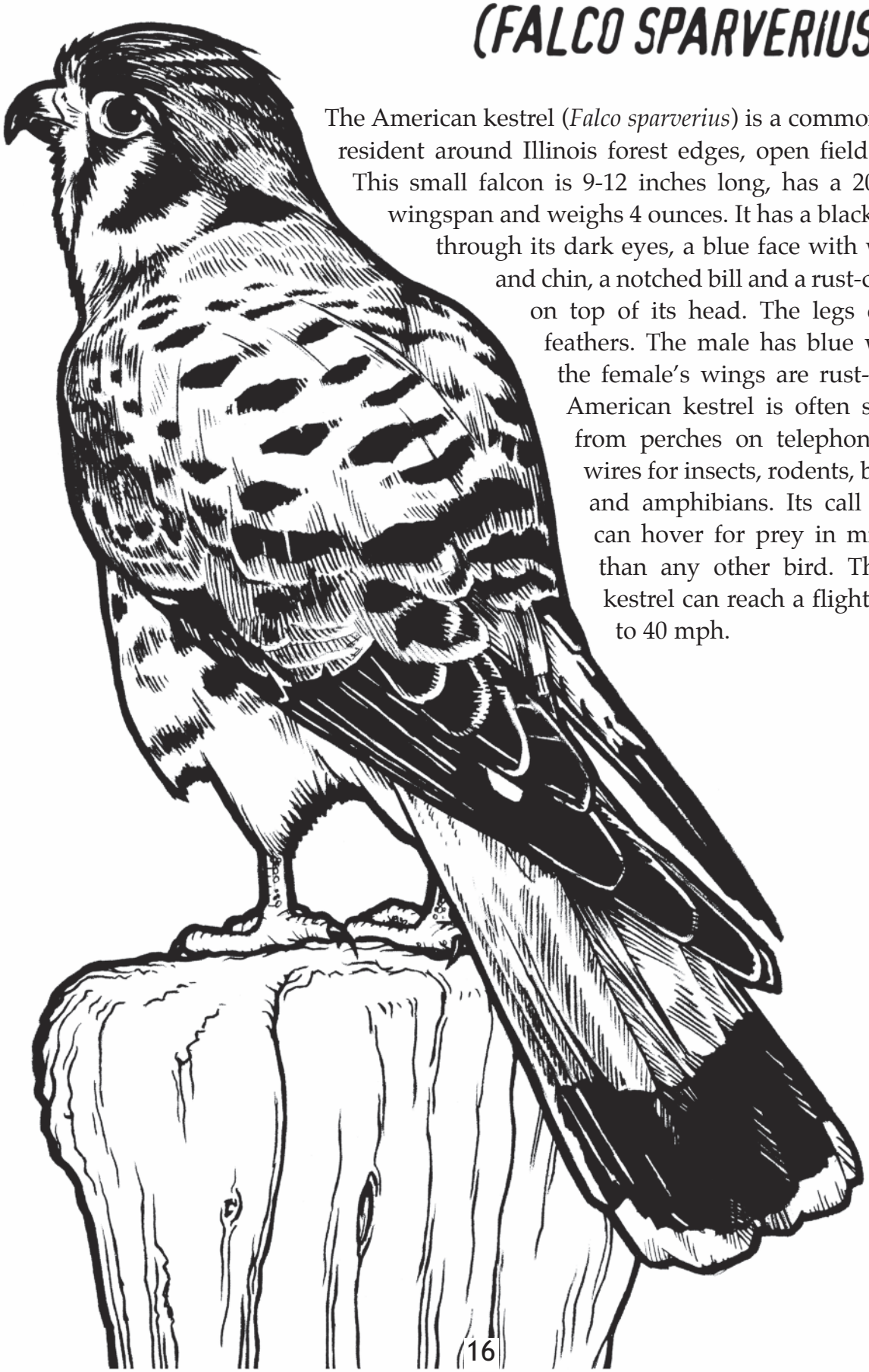
RED-TAILED HAWK

(BUTEO JAMAICENSIS)

The red-tailed hawk (*Buteo jamaicensis*) is a common migrant and summer resident throughout Illinois woodlands and open areas. This hawk has two color phases. Both have a rust-colored tail (developed after its second year), brown markings on the belly and brown eyes. "Light" hawks have a cream-colored chest, and "dark" ones have a brown chest. The red-tailed hawk weighs three to four pounds, is 19-25 inches long and has a 46- to 55-inch wingspan. Small mammals are its primary food, but it will also eat birds, insects, lizards and snakes. The call of this hawk is "keeeer-r-r." A red-tailed hawk beats its wings three to five times and then glides with the wings in a "v" position. This hawk can fly at speeds up to 40 mph.

AMERICAN KESTREL

(FALCO SPARVERIUS)

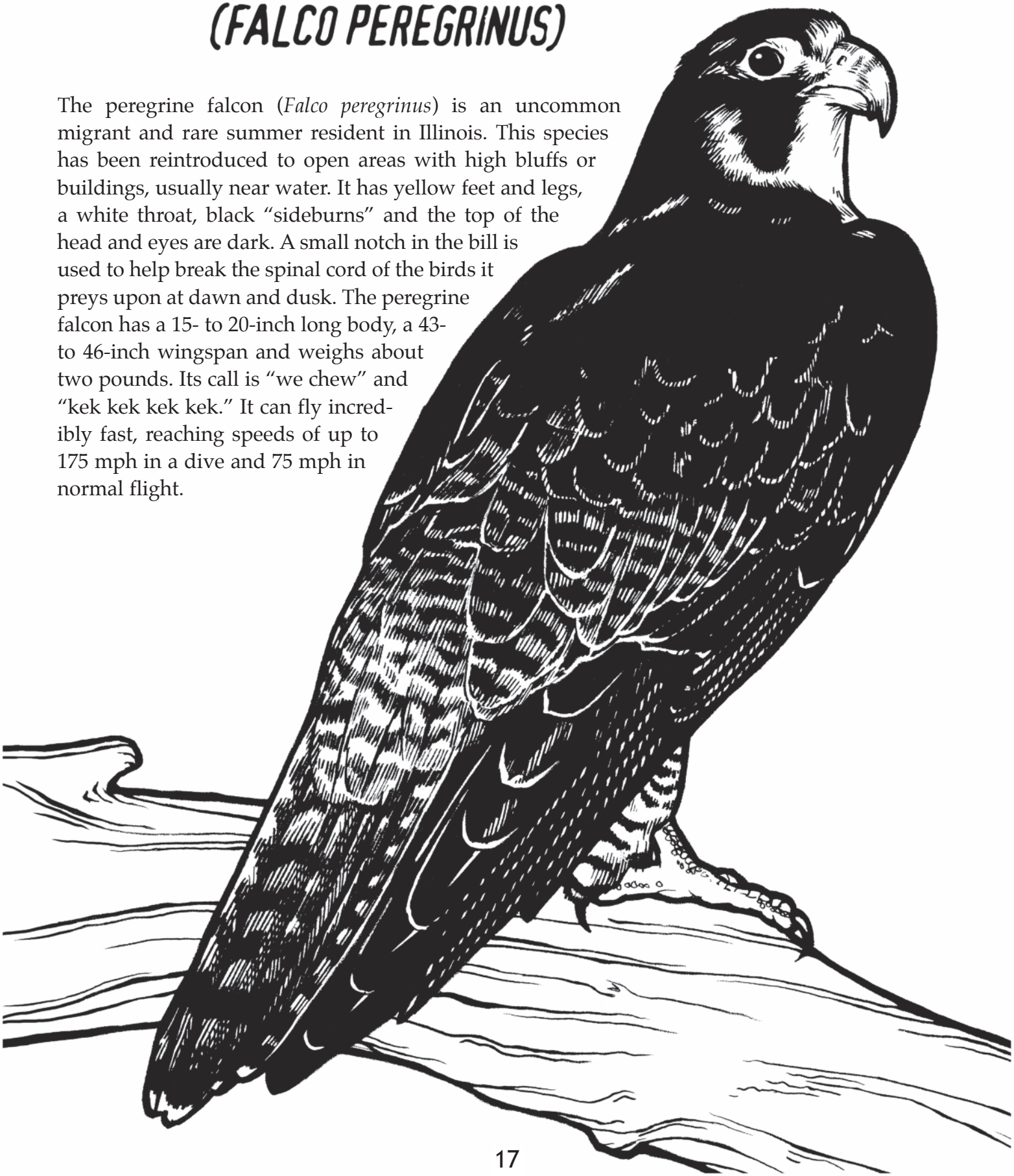


The American kestrel (*Falco sparverius*) is a common permanent resident around Illinois forest edges, open fields and parks. This small falcon is 9-12 inches long, has a 20- to 24-inch wingspan and weighs 4 ounces. It has a black vertical line through its dark eyes, a blue face with white cheeks and chin, a notched bill and a rust-colored patch on top of its head. The legs do not have feathers. The male has blue wings, while the female's wings are rust-colored. The American kestrel is often seen hunting from perches on telephone and fence wires for insects, rodents, birds, reptiles and amphibians. Its call is "killy." It can hover for prey in mid-air longer than any other bird. The American kestrel can reach a flight speed of up to 40 mph.

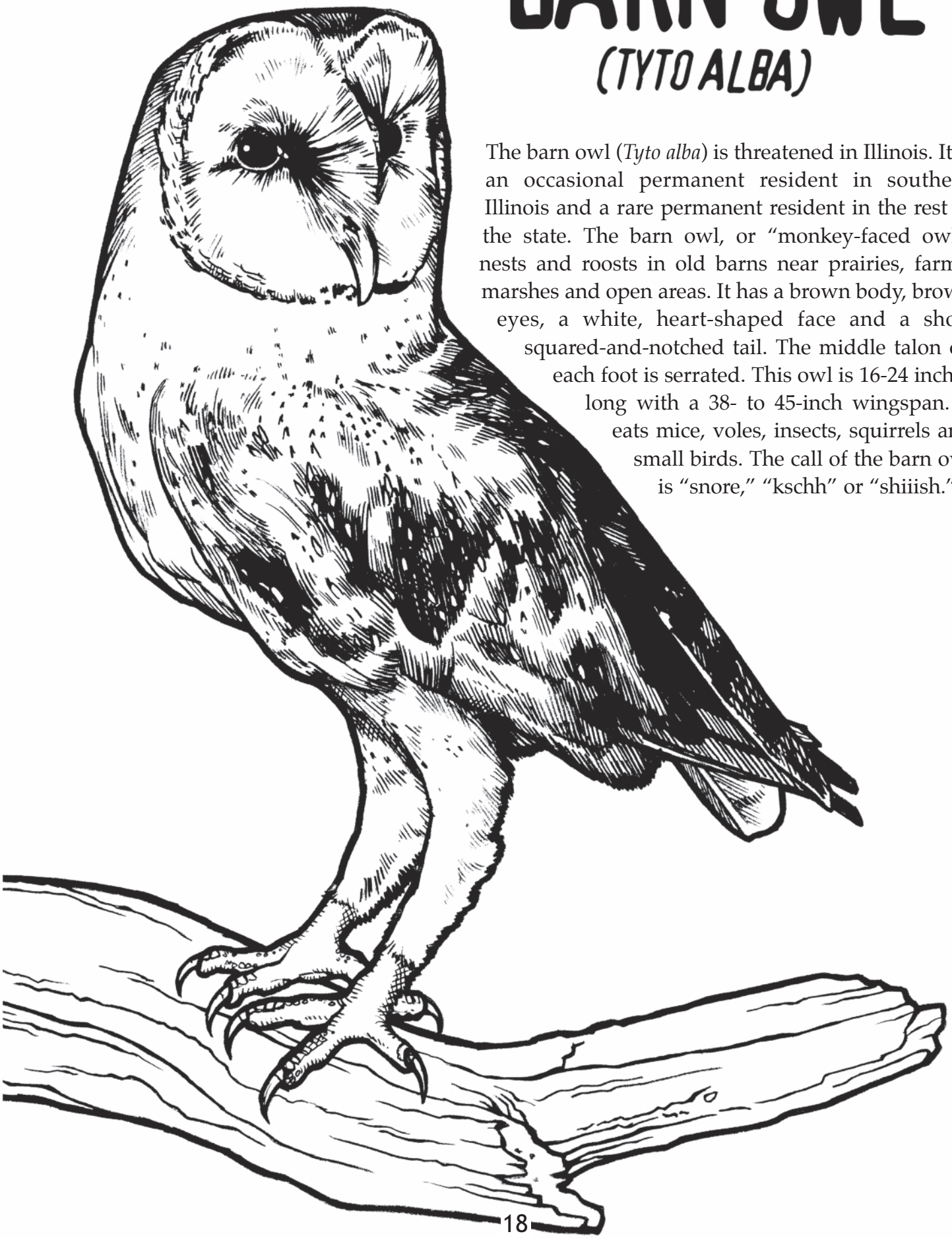
PEREGRINE FALCON

(FALCO PEREGRINUS)

The peregrine falcon (*Falco peregrinus*) is an uncommon migrant and rare summer resident in Illinois. This species has been reintroduced to open areas with high bluffs or buildings, usually near water. It has yellow feet and legs, a white throat, black "sideburns" and the top of the head and eyes are dark. A small notch in the bill is used to help break the spinal cord of the birds it preys upon at dawn and dusk. The peregrine falcon has a 15- to 20-inch long body, a 43- to 46-inch wingspan and weighs about two pounds. Its call is "we chew" and "kek kek kek kek." It can fly incredibly fast, reaching speeds of up to 175 mph in a dive and 75 mph in normal flight.



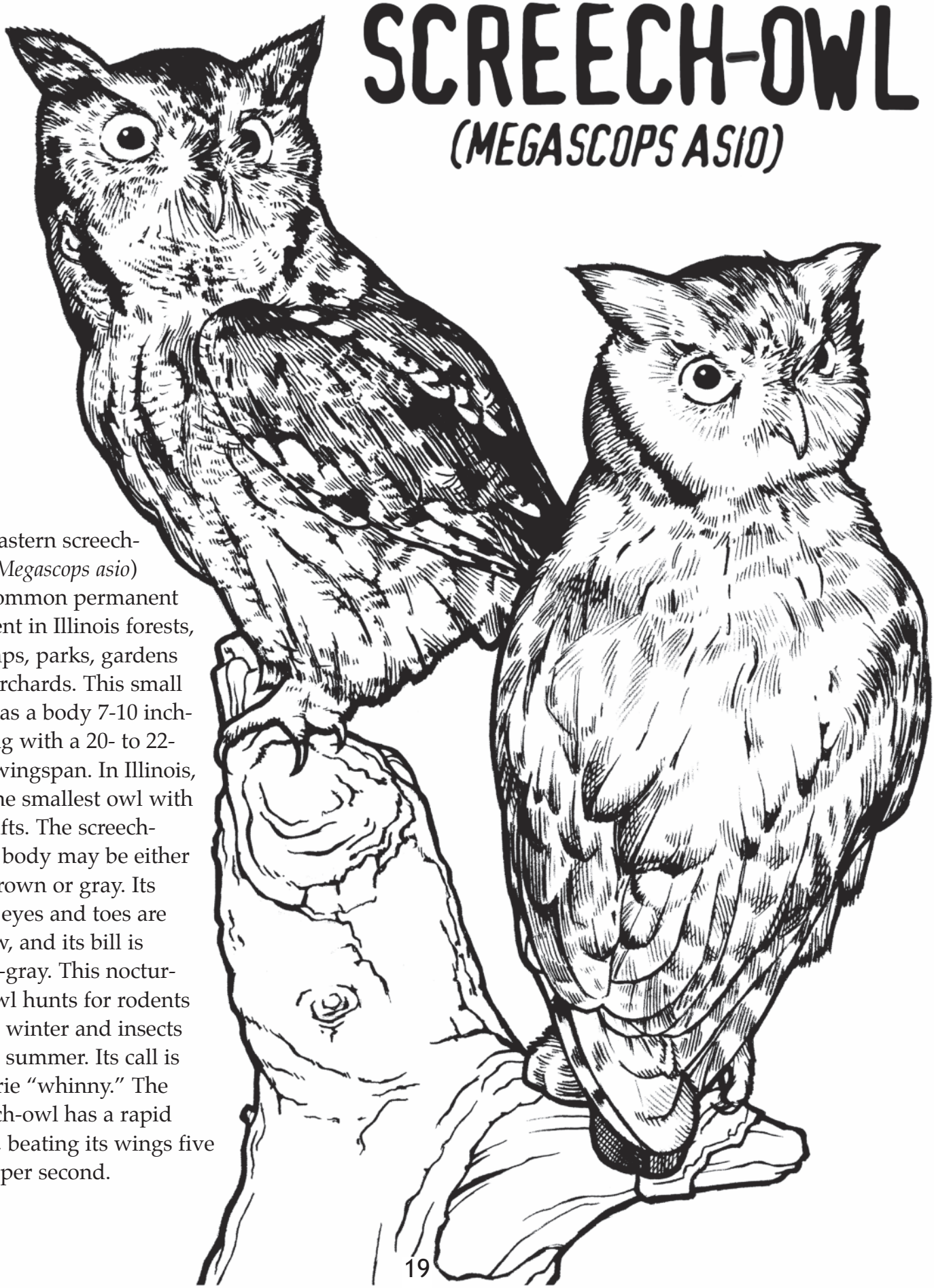
BARN OWL
(TYTO ALBA)



The barn owl (*Tyto alba*) is threatened in Illinois. It is an occasional permanent resident in southern Illinois and a rare permanent resident in the rest of the state. The barn owl, or "monkey-faced owl," nests and roosts in old barns near prairies, farms, marshes and open areas. It has a brown body, brown eyes, a white, heart-shaped face and a short squared-and-notched tail. The middle talon on each foot is serrated. This owl is 16-24 inches long with a 38- to 45-inch wingspan. It eats mice, voles, insects, squirrels and small birds. The call of the barn owl is "snore," "kschh" or "shiiish."

EASTERN SCREECH-OWL

(MEGASCOPS ASIO)

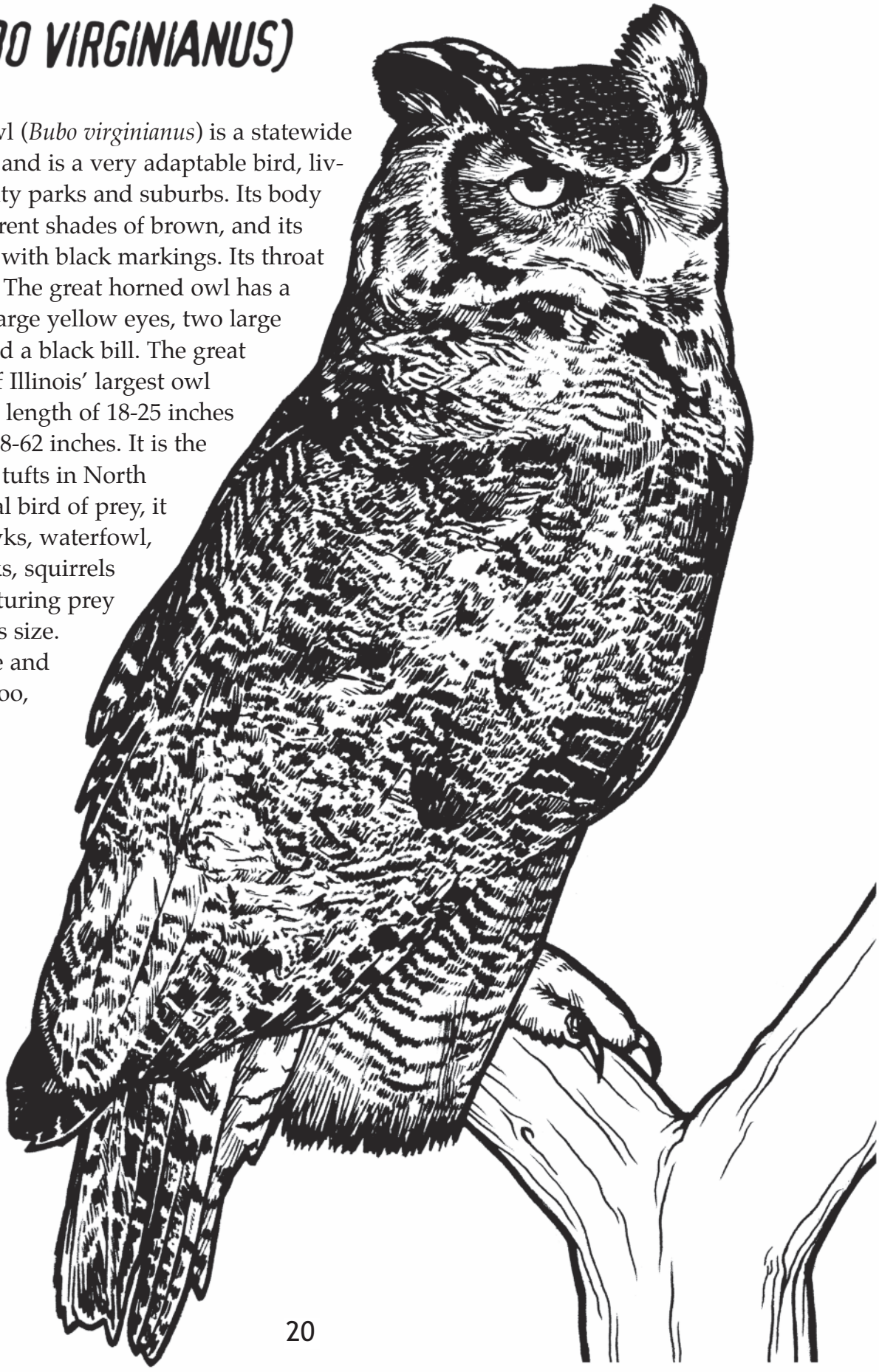


The eastern screech-owl (*Megascops asio*) is a common permanent resident in Illinois forests, swamps, parks, gardens and orchards. This small owl has a body 7-10 inches long with a 20- to 22-inch wingspan. In Illinois, it is the smallest owl with ear tufts. The screech-owl's body may be either red-brown or gray. Its beak, eyes and toes are yellow, and its bill is green-gray. This nocturnal owl hunts for rodents in the winter and insects in the summer. Its call is an eerie "whinny." The screech-owl has a rapid flight, beating its wings five beats per second.

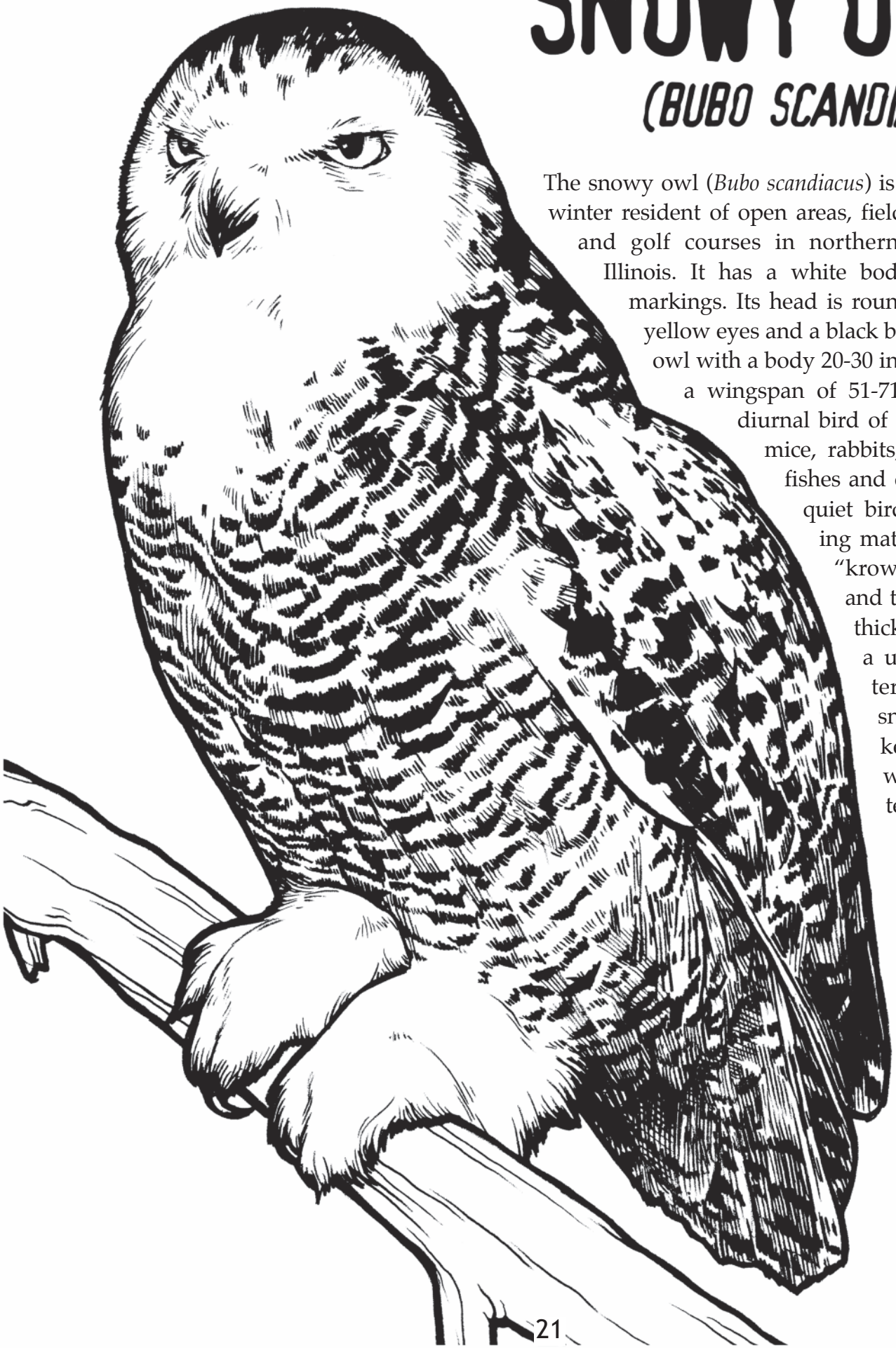
GREAT HORNED OWL

(BUBO VIRGINIANUS)

The great horned owl (*Bubo virginianus*) is a statewide year-round resident and is a very adaptable bird, living in woodlands, city parks and suburbs. Its body is spotted with different shades of brown, and its belly is rust-colored with black markings. Its throat and chest are white. The great horned owl has a flattened face with large yellow eyes, two large hornlike ear tufts and a black bill. The great horned owl is one of Illinois' largest owl species, with a body length of 18-25 inches and a wingspan of 48-62 inches. It is the largest owl with ear tufts in North America. A nocturnal bird of prey, it eats small owls, hawks, waterfowl, mice, reptiles, skunks, squirrels and voles, often capturing prey two to three times its size. The call of this fierce and aggressive owl is "hoo, hoo-oo, hoo, hoo."



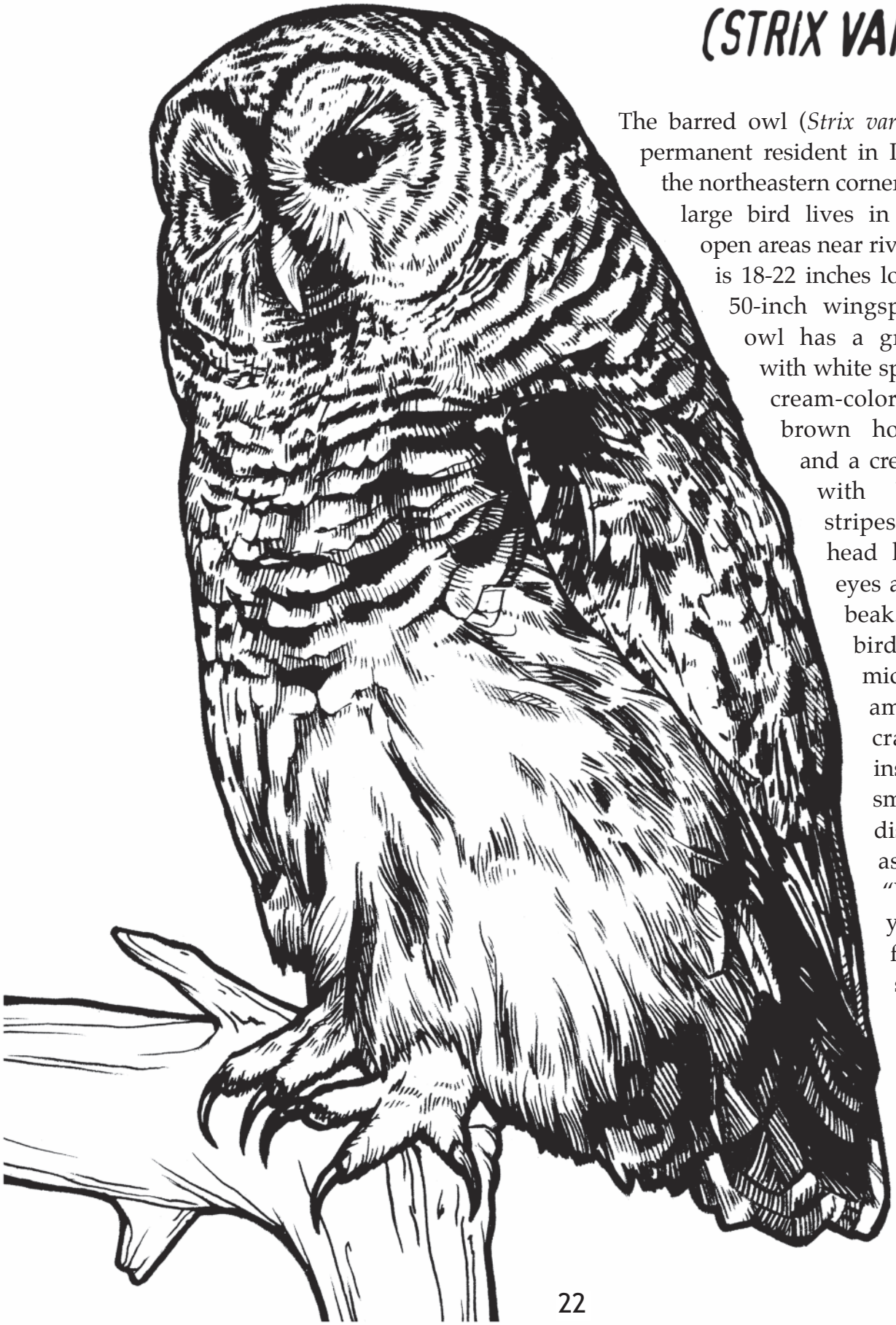
SNOWY OWL
(BUBO SCANDIACUS)



The snowy owl (*Bubo scandiacus*) is an occasional winter resident of open areas, fields, lake edges and golf courses in northern and central Illinois. It has a white body with black markings. Its head is round with bright yellow eyes and a black bill. It is a large owl with a body 20-30 inches long and a wingspan of 51-71 inches. This diurnal bird of prey feeds on mice, rabbits, voles, birds, fishes and carrion. It is a quiet bird except during mating. Its call is "krow-ow." Feet and toes layered in thick feathers are a unique characteristic of the snowy owl and keep its feet warm in arctic temperatures.

BARRED OWL

(STRIX VARIA)

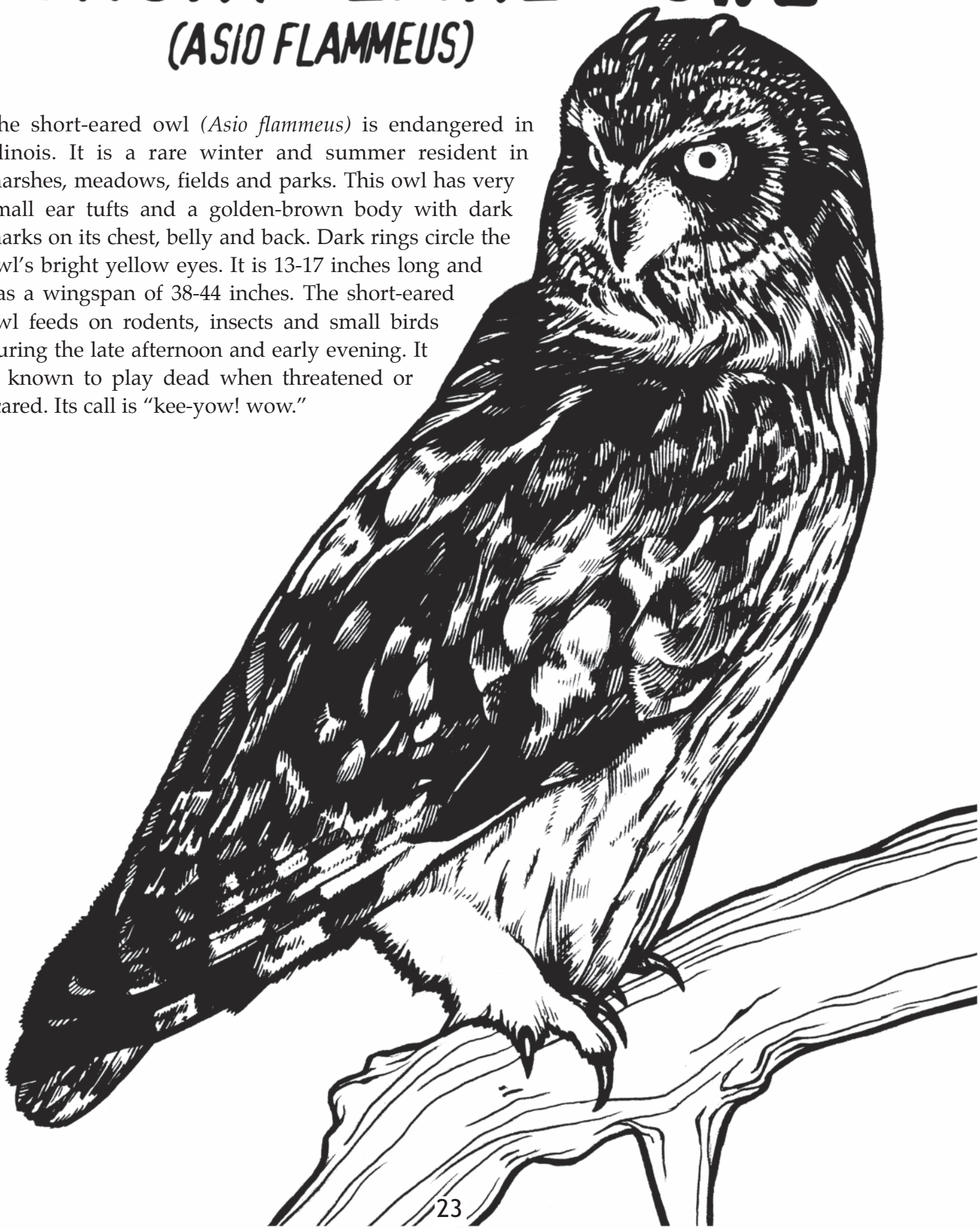


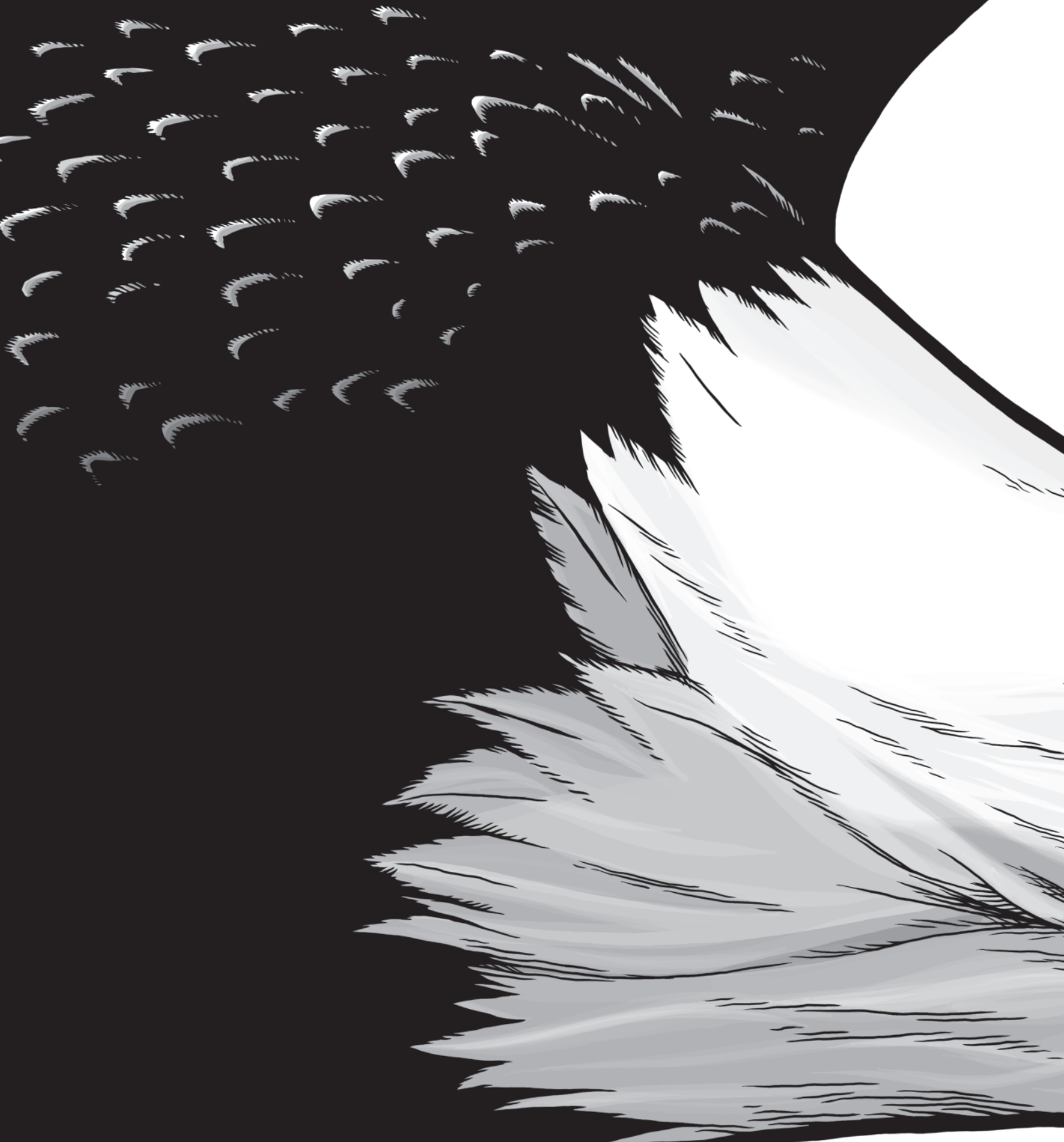
The barred owl (*Strix varia*) is a common permanent resident in Illinois, except in the northeastern corner of the state. This large bird lives in woodlands and open areas near rivers or swamps. It is 18-22 inches long with a 38- to 50-inch wingspan. The barred owl has a gray-brown body with white spots on its back, a cream-colored chest with brown horizontal stripes and a cream-colored belly with brown vertical stripes. Its rounded head has large brown eyes and a tiny yellow beak. This nocturnal bird prefers to eat mice, but it also eats amphibians, birds, crayfish, fishes, insects, reptiles and small mammals. Its distinct call sounds as if it is asking "Who cooks for you? Who cooks for you all?" On summer nights, it is often attracted to lights and campfires where it feeds on insects.

SHORT-EARED OWL

(ASIO FLAMMEUS)

The short-eared owl *(Asio flammeus)* is endangered in Illinois. It is a rare winter and summer resident in marshes, meadows, fields and parks. This owl has very small ear tufts and a golden-brown body with dark marks on its chest, belly and back. Dark rings circle the owl's bright yellow eyes. It is 13-17 inches long and has a wingspan of 38-44 inches. The short-eared owl feeds on rodents, insects and small birds during the late afternoon and early evening. It is known to play dead when threatened or scared. Its call is "kee-yow! wow."





Illinois Department of Natural Resources
Division of Education
One Natural Resources Way
Springfield, IL 62702-1271
217-524-4126
dnr.teachkids@illinois.gov • http://www.dnr.illinois.gov