MAMMALS OF IOWA Field Guide

IOWA STATE UNIVERSITY Extension and Outreach



Acknowledgments

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Species Account Features

Icons provide a quick reference for the diet, activity period, wintering strategy, and special protection status of each species.

Winter Strategy



Active Active throughout the winter



Hibernates Hibernates in Iowa through entire winter.



Intermittent Intermittently active through periods of

either restricted activity or torpor during winter.



Migrates Migrates out of Iowa for winter

Activity Period

Diurnal

Most active during daytime periods, inclusive of dawn and dusk.



Nocturnal

Most active during nighttime, inclusive of dawn and dusk.



All Hours Active during different times throughout the dav.

Diet

Carnivore Eats mostly animalbased diet





Insectivore Eats mostly insectbased diet

Omnivore

Eats a mix of plants and animals.

Status





Conservation Concern

Concern for population but less than threatened or endangered.

Game



No Status No status as a dame species and no concerns for the population.

Range maps show the likely distribution of species in the state based on records and expert opinion.



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Present - Suitable habitat exists for very common species and/or the species has been recently documented in the county.

Probable - Suitable habitat exists in the county and the species is relatively common elsewhere, even though there is no recent documentation of occurrence.



Possible - Suitable habitat is present in the county but the species is less common elsewhere and there is no recent documentation of occurrence. Includes likely migration locations for bats.

Absent - No modern records exist for the species in the county and it is not thought to occur there.

Tracks on each page include a front and hind print and are scaled to the actual size of the species' track that would be found in the field (unless otherwise specified).



Mammals of Iowa

lowa has a rich diversity of mammals, ranging in form and function from the one third-of-an-ounce western harvest mouse which summits blades of grass to eat seeds in lowa's prairies to the over 1,000 pound bison whose diet shapes the community of grasses on which it grazes. Our fellow mammals enrich the lives of lowans from city lots to rural farmsteads. Few sights rival that of a flight of bats at dusk on a warm summer evening, the passing flash of a gray fox in the headlights on a night drive, or the beauty of a herd of snow-covered white-tailed deer on a winter day. This guide was written to capture that beauty and tell the stories of lowa's mammals.

lowa hasn't always been home to the diversity of mammals as it has today. Unregulated exploitation of wildlife across the state following European settlement and the industrial revolution made many mammals that were once common and revered by Native Americans rare or fully erased from Iowa's rolling hills. The list of species driven to complete or functionally complete extinction in Iowa is long and includes black-tailed prairie dogs, pronghorn, bison, beaver, river otter, bobcat, elk, white-tailed deer, wolves, mountain lions, and more.

lowa's landscape has drastically changed since Lewis and Clark rowed up our western border in 1804. The industrial revolution of the late 19th century carried into the 20th century, transitioning millions of acres of tallgrass prairie into pastures and grain fields. The harvest of wild mammals for furs and meat went unchecked and unregulated, supplying burgeoning markets in regional cities like St. Louis and Chicago, as well as an insatiable global demand. Bison found themselves in the cross hairs of feuds between Native Americans and European settlers. Predators like wolves and mountain lions were persecuted in the name of livestock husbandry and human safety. The end product was an lowa transformed and homogenized, optimized for economic enterprises on some of the richest soils in the world but erasing the cultural and ecological features that made the state unique and gave birth to those soils.

Fortunately, around the turn of the 20th century, voices started to emerge and advocate for the protection of both lowa's wild mammals and wild places. Most famous among these was Burlington, lowa native Aldo Leopold, who wrote about the relation of people to all wild things, famously capturing evolving societal attitudes towards mammalian predators in his essay "Thinking Like a Mountain". The rapid ecological changes in lowa and elsewhere compelled Leopold and his contemporaries to build the societal infrastructure that would emerge over the 21st century as an effective engine for ecological restoration and improved land stewardship. Iowa's Conservation Commission, the predecessor to today's Department of Natural Resources, went to work restoring some of the species lost in Iowa's earliest years, eventually being joined by a wide network of professional and amateur wildlife



lowa DNR releasing river otters for reintroduction to inland rivers as part of a program during the late 1980-90s.

lowa DNR

enthusiasts in nonprofit organizations, county conservation boards, and federal agencies equipped with formal skills and education earned at the state land-grant institution and elsewhere.

The mammals we find in modern lowa are the product of the cumulative efforts of these motivated conservationists who, through a combination of harvest regulations, habitat restoration, and strategic releases, put many of the missing pieces of lowa's wild mammals back in place during the 20th century. By 1953 there were enough white-tailed deer in lowa to lift a 55-year prohibition on their hunting; today tens of thousands of lowans annually participate in white-tailed deer hunting. River otters slowly recolonized the border rivers of the state until a peculiar deal was met with Louisiana to transplant otters from the bayou to lowa's interior rivers during the 1980s and 1990s. River otters are now found in every lowa county. Comparable gains have been made

with bobcats, beavers, muskrats, and many others. Despite the conservation successes of the last 100 years, many of Iowa's wild mammals still face challenges, leaving the prospects for some species like the spotted skunk or Indiana bat in question.

Today we routinely find 57 species of mammals in the wild in Iowa and these species comprise the majority of the space in this guide. The status of these species varies, from highly abundant and adaptable deer mice or raccoons to species endangered with extinction like the Indiana bat. An additional twelve species are occasionally encountered in Iowa. Bison and elk are found in captive facilities where biologists use their feeding behaviors as a tool to manage native prairies and teach Iowans about our ecological heritage. Thus, 71 species of mammals, plus one – humans – are still found in Iowa's wild places.

This guide tells their story.



Bison were once common on lowa's prairies but today are only found on reserves for land management and education.

What is a mammal?

Mammals have roamed the earth for a very long time in one form or another, stretching back almost as far as dinosaurs — between 160 and 225 million years. Since their evolution, mammals have differed from other groups of animals in some important ways that help define them. As a general rule mammals have hair or fur, give live birth rather than lay eggs, make milk for their young, and go through two sets of teeth in their lifetime. We can find mammals that stray from these rules (though all mammals do feed their young milk), so the true test of a mammal with shared evolutionary history is the presence of three middle ear bones, the incus, malleus, and stapes, as well as a lower jaw that is only a single bone.

Despite that which unites them, the approximately 5,500 species of mammals in the world today come in an incredible array of sizes, shapes, and lifestyles. The difference in weight between the smallest mammals (tiny bats and shrews) and the massive blue whale is actually greater than that between a child's metal toy car and a fully loaded semi and trailer. Some fly, some run, some swim, some dig tunnels underground. Some climb trees and some dwell on cliff faces. Some mammals are incredibly attentive parents, while others provide little more than milk. Some form large groups that work toward common goals while others live almost entirely alone.

lowa's mammalian family tree

The diversity of mammals in lowa can be captured in a family tree as shown to the right. Scientists attempt to understand the relationships between species by placing them within a nested hierarchy. The more nodes two groups have in common the more closely related they are, while more distantly related groups share fewer nodes. Here we have provided the taxonomic orders (vertical) and families (horizontal) of mammals found in lowa. Unlabeled nodes represent additional relationships between the Class (Mammalia), Order, and Family shown. Each member of a family found in lowa is identified with its silhouettes from the diagram on pages 8 and 9.



Mammals of Iowa

lowa's lands and waters

The geological, cultural, and ecological history of lowa's landscape has created a diversity of habitats for mammals throughout the state. Ecologists break the state into six primary physiographic regions that share similar topography and ecosystems. Some of lowa's mammals are restricted to certain regions, while many find suitable habitats across the state. This map of those regions and lowa's 99 counties can aid interpretation of the range maps on each species account to help understand patterns of distribution in lowa.



Scaled Comparisons





Mammals of Iowa

Virginia Opossum Didelphis virginiana

Opossums are the only marsupial native to the United States. Perhaps best known for playing dead when danger threatens, opossums lay motionless with their mouth open and drool conspicuously until the threat passes. In addition to being the only marsupial, they also have 50 teeth, the most of any mammal in the U.S.



AdobeStock.com, Nicolase Lowe



The body size of an adult opossum is generally similar to that of a house cat. However, they most closely resemble a giant rat in appearance because of their rounded ears and lightly haired tail. The rest of their body is covered in longer guard hairs that are gray to black in color, while their underfur is lighter in color and is more buff or cream colored. Their tracks in mud or snow are distinct because their gait is often pigeon-toed inward. The front toes are spaced apart widely, while their rear feet contain an opposing digit that resembles a thumb.

Habitat

The natural habitat of opossums is forests and woodlands. However,

they have also adapted to living in areas of mixed habitats of agriculture,

urban areas, and abandoned buildings. Opossums don't have well defined territories. Instead, they typically wander in search of food, shelter, and mates.

Breeding behavior

Female opossums can have two litters per year. The first litter is often in late February and the second litter is in May or early June. Gestation is only 12-13 days. Opossums give birth to between seven and 21 young that are blind and hairless; however only some are able to journey up into the pouch and nurse, so the average litter size ends up around 7-9 young. Upon birth, the young climb into the mother's pouch and latch onto a teat for up to two months until their eyes open. After that the young move around more but still cling to their mother's back during travel until three months of age. When the young are about 100 days old they are on their own and the family disbands.

Diet

Opossums are omnivores that feed on a wide variety of plant and animal matter. This typically includes worms, grubs, insects, birds, bird eggs, amphibians, reptiles, small mammals, and carrion.



Eastern Cottontail *Sylvilagus floridanus*

One of our most familiar and common mammals in lowa, cottontails have adapted well to living alongside humans and our modified landscapes. Iowa is likely home to more eastern cottontails. today than prior to European settlement. These rabbits live in every state east of the Rocky Mountains, and stretch from southern Canada through Mexico and Central America. Although capable of living for several years, survival rates are very low, with few animals living more than one year. Most members of a local population are the young of that year. Rabbits are nocturnal, although their activity peaks near sunset and sunrise.



AdobeStock.com, Steve Byland



The smaller and much more common of the two species of rabbits and hares in Iowa. Cottontails are greyish or brownish above and white on the undersides, with the eponymous white tuft of a tail. Adults average about two pounds.

Habitat

Eastern cottontails have wide habitat preferences and are capable of living in forests, grasslands, parklands, pastures, farmsteads, yards, and even urban and industrial areas. Shrubs or brush piles are important shelter, although rabbits will also take refuge under debris, machinery, or even air conditioning units.



Breeding behavior

Rabbits are slightly more involved parents than their jackrabbit cousins, in part because young are born with their eyes closed and able to only crawl for the first few days. They are not overprotective parents, however; mothers only visit the nest once or twice a day for quick nursing bouts, leaving the young alone for hours at a time. Nests are small (4-6 inches on a side) and often lined with leaves, grass, or even fur pulled from the mother herself. Three to six young are born per litter, with 4-6 litters possible between early spring and early fall. Breeding season seems to be limited by climate, and warm years yield longer reproductive seasons and more litters. Gestation is roughly 30 days, and young leave the nest after about two weeks. Females can bear young the same season they are born.

Diet

Their diet is almost entirely herbivorous with little, if any, non-plant matter eaten. Cottontails eat a wide variety of broadleaf plants and grasses during the growing season and readily shift to browse bark and twigs during the winter. If populations are large enough, browse may be taken at any time of the year. Cottontails are capable of damaging shrubs or trees by eating bark or clipping new growth. Rabbit clippings can be distinguished from deer damage by the angle and sharpness of the cut; rabbit nips will almost always be sharp and at 45° angle, while deer browse is flatter and shows evidence of tearing rather than snipping.

White-tailed Jackrabbit Lepus townsendii

One of our fastest animals. jackrabbits are capable of running up to 35 miles per hour while covering up to 15 feet per bound. They are among the most solitary of rabbits and hares Jackrabbits initially may have expanded their range from the northwestern part of the state into much of lowa during settlement in response to cultivation of the prairie. However, as row crop cultivation intensified and small grains and grassland areas in the state declined during the 20th century, the population and range in lowa has shrunk. Today, jackrabbits are classified as a species of conservation need in lowa. Like the cottontail rabbit, the jackrabbit is considered nocturnal in that it is least active during the day but, as with many mammals, they show a crepuscular tendency and are most active at dusk and dawn



Tom Koerner, USFWS (large photo) and Sergei Scurfield, Calgary, AB (small photo)



Much larger than eastern cottontails, this hare also has longer ears and longer legs. White-tailed jackrabbits are yellowish to grey/brown on their backs, with white or pale grey undersides. In the northern parts of its range (including lowa) they will molt to all-white in the winter. Their tails are always white and the tips of the ears are black, regardless of the time of year.

Habitat

White-tailed jackrabbits are creatures of open grasslands, avoiding timber in all but the harshest of winter weather. Today their range is highly restricted and scattered in Iowa because of the loss of grassland and small grain habitats where they once thrived.

Breeding behavior



Hares, in general, are among the most hands-off of mammal parents. Nests are often little more than scratched out depressions. Three to six young are born fully furred with eyes open and capable of moving immediately. Mothers do not tend to their young and only return for a few minutes once or twice a day to nurse until they are weaned after one month. Breeding begins in late February and will continue until early fall, and as many as four litters may be born in a season, although this is limited by climate and environmental conditions.

Diet

Their diet is almost entirely herbivorous. They eat primarily grasses and broad-leaved plants depending upon season and availability, with a lesser amount of browse (woody plants), although the importance of shrubs (mostly bark and buds) increases in the winter. They are capable of damaging shrubs or trees, but their scarcity limits their impact.

Thirteen-lined Ground Squirrel *Ictidomys tridecemlineatus*

A common sight along roadways and in pastures, this grassland ground squirrel—colloquially known as "squinnies" in Iowa-has adapted to lowa's agriculture better than its larger cousin the Franklin's ground squirrel. Like other ground squirrels, the thirteen-lined is a classic hibernating species and actually spends more of the yearover 200 days—in hibernation than awake and active Adults enter hibernation in August or September and emerge around April. Females may stay out longer into the fall than males, and young of the year may remain active after adults have entered hibernation



True to its name, the thirteen-lined ground squirrel has a series of lines running down its back. In build, it looks like a small squirrel that has lost its fluff; the tail is thin and its body fur is short. It can be distinguished from the state's other striped ground squirrel—the eastern chipmunk by the number of stripes and its elongated body. Thirteen-lined ground squirrels have a habit of sitting on their haunches to look around and this alone is enough to identify it while speeding past its roadside habitats.

Habitat

A creature of the prairie and other grasslands, they have adapted well to pastures, hayfields, ditches, and overgrown fencerows. Studies have shown that they actually prefer shorter grass and do well on golf courses, grazed pastures, and mowed roadsides.

Breeding behavior

Breeding takes place in April or May, and a large litter of young (5-9) is born after a four-week gestation. In the southern portion of its range, thirteen-lined ground squirrels may have a second litter, but it is not known if they manage this in lowa. Young acquire adult coloration after three weeks and are fully weaned by four weeks, after which they move away from their birth burrow and establish their own home ranges. Studies have shown as many as 80-96 percent of young squirrels die before entering their first hibernation.

Diet

Thirteen-lined ground squirrels eat insects, seeds, grass, flowers, and fruits. Their diet shifts throughout the season as different foods become available. Grasshoppers and caterpillars are very important and preferred foods and there is some evidence that thirteen-lined ground squirrels may play a regulatory role on grasshopper populations. They have also been observed eating small birds and other small mammals opportunistically.



Franklin's Ground Squirrel Poliocitellus franklinii

A formerly common ground squirrel in the state, Franklin's have not fared well with the loss of native prairie, experiencing large declines across the United States, although they can still be locally abundant. In lowa they have been especially hard-hit and are now a species of conservation need in lowa, with fewer than 20 verified sightings this century.



This is lowa's mid-sized ground squirrel, larger than the thirteen-lined, but much smaller than the woodchuck. Like other ground squirrels it looks like a small squirrel that has lost its fluff, the tail is thin, and its body fur is short. Ears are also smaller than tree squirrels. Head and tail are grey interspersed with black, "salt and pepper," while the main body is brown speckled with black.

Habitat

Franklin's is the least social of the ground squirrels, preferring to live alone during the warm months, but several individuals may share a burrow during the long hibernation (August-April). Franklin's ground squirrels have not adjusted to the loss of native prairie as well as



thirteen-lined ground squirrels, and the species is rare in Iowa as a result. They prefer thick vegetation, either in well-developed prairies or in meadows bordering marshes or wooded areas. They have been known to raid gardens (they have an affinity for shell peas) and to girdle shrubs and trees when other food is scarce.

Breeding behavior

Breeding takes place after females emerge in the spring, and may last until early June. As few as two and as many as 12 young are born after a four-week gestation. Like all squirrels, young are born blind and naked. Fur begins to appear after two weeks, and young are weaned at about a month old.

Diet

Diet shifts throughout the season as different foods become available. Vegetation such as roots and new shoots are very important in the spring, shifting to buds, leaves, blossoms, and insects during the summer, and fruits and seeds during late summer. Like many squirrels, Franklin's ground squirrels will eat animal matter when they can, and have even been seen eating ducklings as well as eggs, small rodents, and frogs. Along with insects, this animal matter may account for up to a quarter of the squirrel's summer diet.

Woodchuck Marmota monax

Also known as a groundhog or whistlepig, the woodchuck is actually a ground squirrel in the same genus as the alpine marmots. Woodchucks are solitary and territorial, males and females only come together to breed. Woodchucks are ground squirrels, but they can, and do, climb trees.



AdobeStock.com, Gerald Marella



Aside from the beaver, this is lowa's largest member of the rodent family, and can be readily identified by its large size and stout body. Woodchuck coloration can vary across the body, with shades of grey and red-brown underneath, brown and black above, shades of orange here and there, with an overall brown appearance. Longer hairs may be tipped with white, giving them a grizzled look. Ears and eyes are obvious, although not large, as one would expect of a burrowing creature. The tail is dark and shorter than that of its tree-dwelling cousins.

Habitat

Woodchucks graze in open meadows and pastures, but may prefer to hibernate in wooded areas. Left alone, woodchucks are often found



living among rural farmsteads and suburban lawns, sometimes under buildings. Woodchucks often maintain separate winter and summer burrows, with hibernation burrows in more protected areas and summer feeding burrows in open areas. These burrows often contain a dead-end chamber used for defecation and urination.

Breeding behavior

Woodchucks breed once a year, in early spring soon after emerging from hibernation. Three to four young are born after a month of gestation in underground dens. Babies are born naked and helpless, but are able to emerge from the den for short periods at about 5-6 weeks. Woodchucks do not reach adult size until the fall of their second year, when they are about a year and a half old. Woodchucks can live 4-6 years, although many are killed by predators before then.

Diet

Almost entirely vegetarian except occasional consumption of insects as they graze, woodchucks eat a wide variety of plants, as many gardeners have learned to their dismay. Among wild plants, clover is a noted favorite.

Eastern Chipmunk *Tamias striatus*

A ground-dwelling squirrel, the eastern chipmunk is also very capable of climbing trees. A frequent visitor to bird feeders, this chipmunk is a classic cheek stuffer and can fit hundreds of seeds in its cheek pouches, causing its head to look twice as large as normal. Although adult chipmunks can live eight or more years, they are a common prey item, and many do not survive to their first birthday.



AdobeStock.com, Nialat



Status

As the only chipmunk and smallest ground squirrel in lowa (southern flying squirrels are about the same size, but weigh even less) the eastern chipmunk can be readily identified by its red rump and stripes. The reddish-brown fur on their back and sides is broken up by five black stripes and two white ones.

Habitat

A deciduous woodland species that is also at home in bushy habitats, chipmunks prefer habitats with crevices for hiding and structures like posts, rocks, or brush piles that allow them to gain some elevation for observation and vocalization. Chipmunks can survive well in suburban habitats and farmyards if sufficient escape cover exists.

Breeding behavior

Chipmunk populations breed twice a year, once in late winter to early spring, and again in early to mid-summer. A female may breed in either period or in both, although this is strongly influenced by weather and food. The situation in lowa is variable, but two breeding periods are likely. After a month gestation, between four and five tiny young are born naked and blind. Young begin leaving the nest to forage during their second month and reach adult size by the end of their third month.

Diet

Like most squirrels, chipmunks are omnivores, but depend quite strongly on seeds, nuts, and acorns, which they store for winter in caches. Chipmunks will also eat insects, fungi, and smaller vertebrates like mice, frogs, and snakes. They happily visit bird feeders to eat grain spilled on the ground, or even climb to platform feeders.





Fox Squirrel *Sciurus niger*

Our largest and most widespread tree squirrel, the fox squirrel is a familiar sight to most lowans. Fox squirrels are not territorial. While many may live together in an area, they are not social and most squirrel nests—tangled bunches of leaves and twigs high up in trees are occupied by only a single animal, or a mother and her young. Squirrels are a common sight during the daylight hours, but are most active in the 2-3 hours following sunrise and preceding sunset.





Some adult fox squirrels can weigh up to 2.5 pounds. They have a large, bushy tail which helps with balance while climbing and running along tree branches. Their fur is grizzled grey and black on the back with orange shading to buff on the undersides. All black forms, as well as mottled white forms, are genetic variants and can be locally abundant. Black squirrels are caused by an overproduction of the color pigment melanin, while white squirrels would result from a decreased amount.

Habitat

Fox squirrels are creatures of woodlands, but generally prefer smaller and more open woodlands than grey squirrels. They do best in woodlands with hard mast producing trees like oaks and walnuts, but



can be found in isolated woodlots. Fox squirrels are also found in wooded riparian areas, parks, and urban areas. They make their homes in trees, either in cavities or in nest balls of leaves and twigs wedged into branches. These nests, called dreys, are readily obvious when the leaves have fallen, and are a sure sign of squirrel activity.

Breeding behavior

Females normally begin reproducing the year after their birth, and may live to reproduce for ten years or more, although most live only 3-5 years. Fox squirrels can breed at any time of the year, but they are most active in early winter and late spring through summer. Most females only breed once a year, and may not breed every year, with fewer animals reproducing when food is scarce. Gestation is 45 days and litters normally produce two or three pups. Young are born with claws but without fur, which begins growing after about three weeks. They begin weaning at two months, and are normally done by three months.

Diet

The bulk of a fox squirrel's diet is seeds and nuts. They will also eat other vegetation and will opportunistically eat insects and bird eggs, although animal protein is only a minor component of their diet. Acorns are a preferred food, and corn can be an important part of their diet, especially in late fall. Squirrels will also readily visit bird feeders. Fox squirrels are scatter hoarders, and hide or bury acorns and nuts throughout their home range. Where many individuals live in the same area, each squirrel may have its own exclusive area in which to hide food to minimize loss to its neighbors. Fox squirrels appear to find their buried food by smell, rather than memory.

Gray Squirrel *Sciurus carolinensis*

Slightly smaller than the fox squirrel, the gray is nonetheless a large, readily seen squirrel. Less common in Iowa than its cousin. the gray squirrel prefers larger, denser forests than the fox squirrel. They are most frequently found in the eastern portion of the state, although they have the potential to be found in good habitat everywhere but the northwest region. Like other tree squirrels, grey squirrels can rotate their back feet to point behind them, allowing them to go down trees head first or hang upside down on bird feeders. Like the related fox squirrel, grays also make their homes in tree cavities or build leafy dreys. Unlike many of lowa's mammals, squirrels are active during the day, with a peak of activity in the hours after sunrise and before sunset.



Laura Perlick, U.S. Fish and Wildlife Service



About 20 percent smaller than the fox squirrel, the gray is also distinguished by its gray coat and white undersides. Melanism—an overabundance of the pigment that gives animals dark colors—is common in this species, and all-black individuals can be locally common.

Habitat

Gray squirrels are creatures of mature hardwood forests in lowa, preferring larger, denser forests with more ground cover than the open habitat preference of fox squirrels. They do best in woodlands that contain hard mast producing trees like oaks and walnuts, and also have other foods that can be stored for the winter. Gray squirrels are also



found in parks and urban areas, and may reach higher densities in these habitats than in more natural settings.

Breeding behavior

Females normally begin reproducing the year after their birth, and may live to reproduce for eight years or more, with most living only half of that time. Gray squirrels breed during the winter and early summer. More females breed during good food years, and fewer during poor food years. In exceptionally poor years an entire population may forgo bearing young. Gestation is 44 days, and litters normally produce two or three pups. Young are born with claws, but without fur, which begins growing after about three weeks. Young begin weaning at two months, and are normally done weaning by three months.

Diet

Gray squirrels eat a large variety of nuts, flowers, fruits, and seeds. They will also eat insects and bird eggs opportunistically. Like fox squirrels, gray squirrels are scatter hoarders, and will bury nuts throughout their home range, rather than in discrete locations like chipmunks.



Red Squirrel *Tamiasciurus hudsonicus*

The smallest and least common of our day-active tree squirrels, this pine-loving species is not common in lowa. Red squirrels are small in stature, but large in attitude, and they can chase off their larger cousins from feeders. This outsize attitude carries over to other species as well, and red squirrels are well known for "chewing out" humans who get too close with their monotonous chattering call. They are also known as pine squirrels.



Donna Dewhurst, U.S. Fish and Wildlife Service







True to its name, the red squirrel is red on its back, lighter red or brown along its sides, and buff on its belly. Often this squirrel will be heard before it is seen, as it chips or chitters loudly from hiding.

Habitat

Red squirrels are most at home in pine forests, although they will also occupy hardwood forests. In Iowa, they were historically found in the north-central portion of the state, with some individuals found as far west as Lake Okoboji. They can still be found in the northern counties, and are often seen at Pilot Knob State Park located in north-central Iowa.



Breeding behavior

Red squirrels may have two litters a year in the southern and eastern portions of their range, which would include lowa, one in spring and one in late summer. Three to five young are born blind and hairless after a month-long gestation. Eyes open after a month, and they are fully furred a few days later. Young are active outside the nest after seven weeks, and are fully independent within a few weeks after weaning.

Diet

Red squirrels primarily eat conifer seeds (i.e. pine and spruce nuts). They will also eat hardwood nuts like acorns and walnuts, buds, flowers, and tree sap. Well known for their love of mushrooms, the squirrels will supplement their diet with insects and animal flesh opportunistically. They create large caches of seeds called middens that they defend from other squirrels. Their choice of hiding location sometimes extends to include unguarded human structures or equipment. Red squirrels often have favorite eating spots, and a large pile of stripped cones and shells can build up underneath.



Southern Flying Squirrel *Glaucomys volans*

The state's smallest squirrel (even smaller by weight than the eastern chipmunk), southern flying squirrels are strictly nocturnal, and rarely seen by all but the most careful observers. Despite their name they do not fly, but rather use the extra skin between their front and back legs (called patagia) as a wingsuit to glide between trees. They can only lose altitude between trees, but are capable of covering up to 100 feet, although most glides are much shorter. Flying squirrels are solitary during summer, but group up during winter to huddle for warmth. As many as 20 squirrels may share a winter refuge, usually a tree cavity or abandoned woodpecker hole.



AdobeStock.com, Tony Campbel



A small squirrel, with silky brown fur above and creamy white undersides. They have large ears and eyes, and their fluffy tail clearly indicates it is a squirrel. The visible fold of patagia along the side can easily distinguish a southern flying squirrel from other squirrels.

Habitat

Flying squirrels are creatures of the woodlands and prefer relatively open deciduous forests with large trees and open flight paths, but enough smaller trees and shrubs for cover on the ground. Because of their reliance on tree cavities, they do best in older forests, or at least woodlands with a few older trees. Southern flying squirrels are uncommon in Iowa, possibly because of habitat loss, although they would always have been absent from prairies in the state.



Breeding behavior

Flying squirrels have solitary cavity nests that they line with bark, moss, lichens, and even bird feathers. They are capable of two rounds of breeding, one in April-May, and another in August-September. An average of 3-4 young are born naked, blind, and deaf after a 40 day gestation. Young are weaned at 6-8 weeks, although they may remain with their mother for longer, especially if the mother does not breed again that season. Average lifespan is likely 3-5 years, although some 10 year old individuals are reported.

Diet

Nuts and acorns make up the bulk of their diet, and are stashed for winter eating in the fall. Flying squirrels will also eat fruit, bark, buds, seeds, flowers, mushrooms, and lichen. They are noted for being among the most carnivorous of squirrels and, like many rodents, readily eat insects and other invertebrates, as well as birds, eggs, nestlings, and even carrion.



Beaver Castor canadensis

The beaver played a key role in the history of exploration and colonization of North America by Europeans from the 1600s through the 1800s. Because beaver pelts were valuable for hats, coats, and other garments, it spurred Europeans to push further into North America's interior, trapping, trading, and building relationships with Native Americans, Beavers build small mounds of mud at the water's edge and deposit an oily musk-smelling scent known as castor (castor mounds) to communicate with other beavers about territory and breeding dominance. Although nocturnal, beaver activity often starts in the early evening, the time most likely to see a beaver.



AdobeStock.com, Robert Cicchett



Beavers are North America's largest member of the rodent family. The typical weight of beavers is 25-90 pounds but they can reach a weight of 100-110 pounds. Beavers have a fairly square-shaped head which is visible when swimming. Most notable is their large, flat tail that they use to slap the water's surface when alarmed.

Habitat

Beavers live in and along lakes, streams, rivers, marshes, and ponds. An abundant food supply nearby of softwood tree species (namely willows and cottonwoods) is crucial for a beaver colony to sustain itself. Because beavers often build dams that pool water, they create ideal habitat for a variety of other wildlife and are thus a textbook example of an ecosystem engineer, creating completely novel habitats in areas where they otherwise would not exist.

Breeding behavior

Mating occurs from January through March. Gestation is about 90 days and kits are born from April through June. Average litter size is 3-4 kits, which are weaned at 6-8 weeks of age. Young stay with their parents through their second or even third winter, and don't reproduce until they are three years old.

Diet

Beavers are strictly herbivores that consume the barks, buds, twigs, and leaves of trees. Willow and cottonwood are their dominant food source, especially in winter. Corn and aquatic plants are eaten in the spring, summer, and fall.

Plains Pocket Gopher Geomys bursarius

A classic burrowing rodent, plains pocket gophers can be found throughout lowa and are the state's only gopher. They spend most of their lives underground and are rarely seen, although their characteristic mounds are good evidence of their location. Gophers are territorial and solitary, although their home ranges can be quite small (500-1,000 square feet) and they can reach densities of several per acre. Gophers are most active at night, but can also be active during the day, especially in the late afternoon. A gopher that is not killed by a predator or trapped may live 4-7 years. Unlike other gophers that use their big incisors to excavate their tunnels, this species relies on its large claws and powerful forelimbs.



Paul Frese, MSIM Program, Iowa DNF



Gophers are rarely above ground, but can be identified by their tubular body, very short tail, short legs, and massive front claws. Ears and eyes are reduced, as is typical for underground mammals. A better identification method is their mounds. A product of the gopher's tunnel excavation, these mounds average 2-3 square feet, much larger than a mound made by a mole. Gophers make mounds as they tunnel and a single gopher may be responsible for as many as 100 mounds.

Habitat

Originally a species of the prairie and other grasslands, plains pocket gophers are now found in grasslands, pastures, agricultural fields, roadside ditches, and lawns. Some people take exception to their



digging behavior in gardens, orchards, fields, and lawns and trap or poison the animals, but they are a species of conservation concern in lowa and play an important role in prairie ecology. Gopher tunnels and burrows provide habitat for many insects, spiders, snakes, reptiles, and other mammals. Their soil disturbance provides germination sites of seeds, and plays an important role in driving plant diversity in prairies.

Breeding behavior

Females bear one litter a year, typically in mid-spring in lowa. Litter sizes range from 1-5 young, and average 3-4. Babies are born naked, blind, and helpless. Fur begins growing around day ten, and young are weaned at 4-5 weeks. Full adult size is reached at about 100 days. Mother gophers have been observed giving up their burrows and territory to their female offspring and then dispersing to new areas.

Diet

Gophers feed almost exclusively on roots and stems of plants, both grasses and broad leaved plants. This is a very fibrous, tough diet, and gophers are considered specialist feeders due to the specificity of their diet. They will cache food in their burrows.


Meadow Jumping Mouse *Zapus hudsonius*

This is lowa's version of a gerbil or kangaroo rat, a small mouse with huge feet, a long tail, and the capability of jumping on its back legs. Despite their apt name, jumping mice typically move about slowly on the ground but when frightened will quickly flee in a series of jumps. They are also the state's only hibernating mouse, spending half the year in hibernation. If they do not put on sufficient body reserves they are at risk of dying during hibernation and, indeed, many do.



Ryan Rassmussen, MSIM Program, Iowa DNF









This small mouse is not easily confused with any other lowa mouse due to its huge back feet and long tail. In fact, the tail is considerably longer than the body. They also have a groove on their upper incisors, allowing for identification of skulls in owl pellets. A small flash of yellow jumping away may be all most observers see of this mammal.

Habitat

Meadow jumping mice do well in fallow fields, shrubby areas, meadows, and along the edges of woodlands. They are especially common in moist sites with lots of grass and jewelweed, a favorite food.

Breeding behavior

Mammals of Iowa

Breeding season begins as soon as they emerge from hibernation in mid-spring. Gestation is short, only about 18 days, and litter sizes can vary between two and eight. As with many rodents, the young are born naked, blind, and helpless, but grow quickly, developing fur by their third week and are weaned after four or five weeks. Adult females will often have two litters each summer.

Diet

Jumping mice are granivores, meaning they eat seeds, especially grass seeds and jewelweed. Like harvest mice, jumping mice are capable of climbing grass stalks to reach the seeds. The mice will also eat berries, fungus, and insects like beetles and caterpillars. These insects are especially important early in the season before grass seeds are abundant.



Plains Pocket Mouse Perognathus flavescens

The plains pocket mouse is a small mouse closely related to the kangaroo rats and pocket mice of the desert southwest. This species ranges the farthest east of the pocket mice, although little is known of its habits in lowa, Minnesota, and Missouri, where it is only rarely found. This species is not seen during the winter, and is likely holed up in a burrow. They are believed to hibernate, but wake up periodically to feed on cached food, as they are not able to build up enough fat to last an entire winter.



B.L. Clauson, American Society of Mammalogists



The plains pocket mice is a very small mouse, about the same size as the harvest mouse and less than half the weight of the more common deer mouse. These mice may reach a total length of five inches, about half of that length in the tail. Hind feet will be much larger than front feet, a common feature in desert and jumping rodents. Fur is mottled buff, with interspersed black hairs, and may shade to orange towards the lighter-colored belly. Ears are shorter and the long tail is less furred than other mice native to lowa. As their name implies, these mice have fur-lined cheek pouches on each side of their mouth which they fill with seeds while foraging. Unlike squirrels, which will stuff the inside of their cheeks, these pouches open to the outside of the cheek.



Habitat

This species seems to be strongly tied to sandy soils and likely prefers relatively sparse grasslands. Very few individuals of this species have been captured in Iowa, although some populations likely remain in the Loess Hills found along Iowa's western border. They may also range east toward the Des Moines River. Populations are likely separated as a function of soil type and disturbance.

Breeding behavior

Plains pocket mice likely have two and possibly three litters each summer, starting in about May and extending through at least September. Litter sizes range from two to seven individuals.

Diet

Plains pocket mice almost exclusively eat seeds of a variety of plants, including grasses and sedges. Even in agricultural fields they seem to prefer smaller seeds of weedy species rather than crops. They will cache seeds in their burrows, and may rouse from hibernation to snack periodically.

Norway Rat *Rattus norvegicus*

The Norway rat, also commonly referred to as the brown rat, is believed to have its origins in northern China, but has now become an invasive species on every continent except Antarctica. Closely related to another invasive, commensal rat, the black rat (Rattus rattus), the Norway rat is larger, stockier, and ecologically more dominant than its cousin and often displaces the black rat, especially in colder climates. As such it is probably the only common rat in Iowa. Highly dependent upon humans, the Norway rat may be abundant in urban areas and farmsteads, but rare or absent in more natural settings. This species is also widely used in medical and biological experiments, and is a common house pet.



www.BayerCropScience.co.ul



Much larger than lowa's native mice, the Norway rat has large ears, a stocky build, and a long, furless tail. In the wild they are typically brown, although domesticated strains may be all white or come in a wide variety of colors and patterns.

Habitat

This is a highly commensal species outside of its native range, and can be very abundant in cities, towns, and farmsteads. There is some belief that they may not be capable of thriving in the absence of humans They will tolerate wetter areas than black rats, and are less inclined to climb trees. Colonies live underground in sewers, under buildings, or in burrows they dig.



Breeding behavior

Rats are capable of explosive population growth due to a short three-week gestation period, large litter sizes (4-8 common, up to 14 possible), quick development (wean at one month, sexually mature at three months), and their ability to have up to five litters per year. In some populations the females will sync their reproduction such that all are pregnant and give birth on the same schedule. Mortality is high in this species, with fewer than five percent of individuals reaching one year of age and a maximum lifespan of three years.

Diet

Norway rats are classic omnivores, and will eat a wide variety of foods including refuse, grain, insects, small vertebrates, and plants.



House Mouse Mus musculus

The house mouse is thought to be native to the Mediterranean and central Asia, but has now become an invasive species on every continent except Antarctica. House mice are highly dependent upon humans, and while they may be abundant in urban and agricultural areas, they are rare or absent in more natural settings where they are easily out-competed by native species. This species is widely used in medical and biological experiments, is commonly kept as a pet, and is globally regarded as an unwelcome house pest.





House mice are small rodents with grey fur and long, mostly furless tails. Their ears are smaller than many of lowa's native mice, and are also only lightly furred. Although domesticated strains can be found from all white to all black and in a wide variety of patterns, wild house mice are grey. Thus, any non-grey mouse found in the wild in lowa is most likely a native species, not a house mouse.

Habitat

This is a highly commensal species outside of its native range and can be very abundant in cities, towns, and farmsteads. They are thought to not be capable of thriving in the absence of humans, and are usually out-competed by native species in natural areas.

Breeding behavior

House mice are capable of breeding year-round, although some wild populations will decrease or stop breeding during the winter. A female can have between five and 10 litters of young per year, with an average litter size of 5-7 pups. Young are furred within days, weaned at three weeks, and sexually mature around six weeks of age. Females are capable of becoming pregnant within hours of birth. As with many rodents, most individuals live less than one year, although captive mice may live two years or longer.

Diet

House mice eat a wide variety of foods including refuse, grain, insects, and plants. They are less omnivorous than rats.



Northern Grasshopper Mouse *Onychomys leucogaster*

lowa's largest mouse, this stocky insect eater is a capable and aggressive predator of grasshoppers, crickets, beetles, and sometimes small vertebrates. Grasshopper mice are also known for "howling" or standing on their back legs and screeching. This may have a role in maintaining territory as grasshopper mice are solitary and are known to attack and even kill other members of their species. At times this even includes their mates.



R.B. Forbes, American Society of Mammalogists



Stocky, midway in size between a deer mouse and a chipmunk, the grasshopper mouse is distinctly bi-colored, brown or gray above, and white beneath like the deer mouse. The tail of this species is shorter and thicker than that of its smaller cousin and not more than half as long as its body length.

Habitat

Northern grasshopper mice inhabit short grass prairies, grasslands, pastures, and even sand dunes. They may be found in crop fields as well.

Breeding behavior

Gestation is believed to be about 30 days, after which 3-4 babies are

born. As is typical with rodents, the babies are born naked, blind, and helpless but grow quickly. Young are weaned at about 20-25 days. Breeding occurs from early spring until late summer, and females may have two or three (possibly more) litters a year.

Diet

They are insect predators and active hunters. The bulk of the diet is beetles, grasshoppers, and crickets, as well as spiders and small vertebrates such as other rodents. Grasshopper mice will also eat some plants, including seeds and other plant matter. The proportion of plants in their diet is highest in winter and lowest in summer.



Western Harvest Mouse Reithrodontomys megalotis

A tiny mouse of the prairie, with adults weighing less than a third of an ounce, these mice are so small they are capable of climbing grass stalks and eating the seeds from the top without bending the grass to the ground. They are noted for their attention to detail in caring for their nests where they readily repair any damage from disturbances.



Activity Period

Diet

Winter Strategy

Mammals of Iowa

Status

They have typical mouse-like characteristics including large ears, obvious eyes, and a long tail about the same length as the body. In coloration, western harvest mice look much like their larger cousins the *Peromyscus*, with white underbellies and mixed grey, brown, and orange fur above. One sure way to identify a western harvest mouse from a small deer mouse is the presence of golden hairs ringing the underside of their ear. An even better, but harder to see, characteristic are groves on its upper incisors.

Habitat

The western harvest mouse resides in prairies, grasslands, pastures, and old fields. Their population density can vary greatly, but in the right habitat with enough food and shelter they can number a dozen or more per acre.

Breeding behavior

Western harvest mice breed spring through fall, and a female may have multiple litters in one season. Each litter averages about four babies, which are born naked and without hair. Young are weaned after about three weeks. Females are sexually mature by four months of age. Mice demonstrate old age by 45 weeks, and few live to their first birthday.

Diet

These mice are primarily eaters of seeds and grains. Their small size allows them to climb plant stalks to access seeds before they fall to the ground.





Deer Mouse *Peromyscus maniculatus*

Deer mice are one of the most widely distributed mammals in North America, stretching from Mexico to northern Canada, and reaching both the Atlantic and Pacific Oceans. Deer mice are nearly identical to white-footed mice, making field identification difficult. It appears white-footed mice may be slowly displacing deer mice as they expand their range northward, thus deer mice may be less common in lowa now than in the past, although strong evidence for this is lacking.







Deer mice are nearly indistinguishable from their cousin the whitefooted mouse, making identification between the two species difficult even for experts. Like their cousins, they are a classic wild mouse with large eyes, large ears, and a furred tail about the same length as the body. Deer mice are distinctly bicolored; the white furred underside and reddish-brown upper meet along the sides, and the bicolor extends down through the tail. The transition from dark to white fur is sharper in deer mice than in white-footed mice.

Habitat

The deer mouse occupies a very diverse array of habitats, but the subspecies found in Iowa is known as the prairie deer mouse (*P. m. bairdii*)

and, as its name implies, prefers meadows, grasslands, pastures, cultivated fields, and ditches. It may also enter farm and suburban yards, as well as homes and outbuildings. Deer mice make ball-shaped nests from grass, leaves, feathers, fur, and shredded plant material which they use to rest during the day. These nests, as well as their scat, are often the first sign of their presence in buildings.

Breeding behavior

Few mice survive to their first birthday, but their incredible reproductive potential can quickly build populations. Mating begins in mid-spring and continues into the fall. The first litter of the year has only a three-week gestation, but subsequent litters will gestate for up to 35 days if the mother is still nursing a previous litter. By becoming pregnant shortly after giving birth, a female may have four or more litters of about four babies each year. This high reproductive potential is important for a species in which most individuals will not survive their first year of life, despite having a maximum life span of over eight years in captivity.

Diet

Grass seeds and nuts are important foods, as are fruits, grubs, beetles, crickets, caterpillars, and agricultural crops like corn, soybeans, and wheat. Deer mice have small cheek pouches in their mouth and will use them to move food to caches to prepare for winter.

White-footed Mouse *Peromyscus leucopus*

Almost certainly the most numerous wild mammal in the state, white-footed mice are likely all too familiar to many lowans who discover them in their houses. garages, and sheds. The species has a very wide distribution throughout the eastern United States, and is one the most important prey items for both raptors and mammalian predators. White-footed mice are nearly indistinguishable from their close cousins the deer mice, but are slowly displacing deer mice as their range expands northwards.







The white-footed mouse is the classic wild mouse, with large eyes, large ears, and a furred tail about the same length as the body. They are distinctly bicolored; the white furred underside and reddish-brown upper meet along the sides, and the bi-color extends down through the tail. White-footed mice also have a darker stripe running down their back.

Habitat

White-footed mice are most at home in deciduous woodlands and prefer those with abundant plants at the ground floor and lots of ground structures like logs, rocks, and sticks. The mice will also inhabit pastures, meadows, suburban yards, farmyards, ditches, and cultivated fields. They will happily make themselves at home in garages, sheds,



houses, and even engine compartments. They make and use nests in the same way deer mice do.

Breeding behavior

Few mice survive to their first birthday, but their incredible reproductive potential can quickly build populations. Mating begins during late winter and continues into fall, allowing for as many as four litters a year. Gestation is about three weeks, after which an average of four pups are born naked and helpless. Growth is quick and young are weaned after 3-4 weeks and are capable of breeding on their own after seven weeks.

Diet

Seeds and nuts are important foods, as are fruits, grubs, beetles, and caterpillars. Animal matter may make up a third of the calories in their diet during certain times of year. White-footed mice will cache seeds and nuts in preparation for winter.



Meadow Vole Microtus pennsylvanicus

One of Iowa's most common small mammals, these mouse-like rodents can be found across the state. They serve as a major source of prey for many raptors, snakes, and mammalian predators. They are capable of living in high densities and are known for large population cycles. Voles create pathways within their home range, making visible ruts in turf grass, especially in the spring after snowmelt.





This mouse-sized rodent looks like a mouse or a hamster, with obvious eyes, noticeable ears that are smaller than those of a mouse, and a tail about twice as long as its back foot, but less than half the length of the animal. Their much shorter tail and ears are the best hint that they are voles and not mice. Meadow voles are grey-brown above and a lighter grey on their underside.

Habitat

As its name implies, the meadow vole is a creature of meadows, fields, and prairies, although they can be found in woodlands as well. They make their lives both above and below ground, feeding on the surface, but retreating to underground burrows to rest.

Breeding behavior

Voles are capable of producing young year-round. Gestation lasts three weeks with an average of six pups per litter, although summer litters are larger. Young are born hairless and helpless, and are weaned after two weeks. Most voles die before they are three months old, although they can live for more than a year.

Diet

Voles are almost entirely herbivorous, yet they will eat insects and carrion when available. Voles are grazers and feed primarily on grass, sedges, and many herbaceous plants. Careful observation may reveal grasses that have been grazed near the ground. At high densities voles are capable of doing damage to trees and shrubs by chewing on the bark. They may also become garden pests and are known to feed on vegetables and other garden plants.

Prairie Vole *Microtus ochrogaster*

Prairie voles are less common than meadow voles in lowa, but can still be found in natural habitats across the state. Like their cousin the meadow vole, they serve as a major source of prey for many raptors, snakes, and mammalian predators. Unlike meadow voles, which are promiscuous, prairie voles form long term pair bonds. This major behavioral difference between the two species has inspired considerable research into the mechanisms of stable relationships.



D.G. Mikesic, American Society of Mammalogists







These voles are almost identical to the meadow vole, differing only subtly in coloration and tooth shape. Another difference are the small pads on the bottom of their hind feed; the meadow vole has six pads, the prairie has five.

Habitat

The prairie vole is at home in its namesake prairie, but will also inhabit meadows, old fields, weedy areas, and fencerows. Its habitat overlaps that of the meadow vole, and either or both species may inhabit suitable areas. There is some evidence that when both species are present the prairie vole will select drier, shorter vegetation habitat.

Breeding behavior

The prairie vole is known to mate for life, unlike the great majority of rodents. The male will defend his area from other males and also assist in rearing young. Adult offspring of the pair may also remain in the home range (generally less than a quarter of an acre) and help in caring for their younger siblings. Breeding can occur yearround, although it slows down or stops during winter. Both gestation and time to weaning are about three weeks and litter size averages four young. Females are sexually mature within two months of birth.

Diet

The vole diet is almost entirely made up of plants and they will eat insects and carrion when available. Voles feed primarily on grass, sedges, and many herbaceous plants. Like cattle they are grazers, although certainly each mouthful is much smaller! If closely looking in areas where they are feeding, grass may be seen to have been nipped near the ground. They may also cache seeds underground. Like other voles, prairie voles will gnaw on trees and shrubs at the base, and may girdle young trees. As with other rodents, voles are themselves food for a large number of other animals, and many voles likely do not reach three months of age.

Woodland Vole Microtus pinetorum

Also known as the pine vole, this species is slightly smaller than lowa's two grassland voles. True to its name, the woodland vole prefers wooded habitats, especially those with dense ground vegetation. These voles are semi-fossorial, meaning they spend a considerable portion of their time underground, and are noted for their underground tunnels and above ground runways. Where available this species lives under leaf litter; when not available it will create tunnels just under the soil surface. These voles are not territorial and several social groups may share a tunnel system. They are uncommon in lowa and thus of special concern for conservation.



Phil Myers, AnimalDiversity.org



This nut-brown rodent is about the same size as a mouse. Due to its underground lifestyle its eyes, ears, and tail are reduced in size even more so than those of other voles. Its tail is only a little longer than its hind foot, which is a good way of distinguishing it from its cousins.

Habitat

Woodland voles live in wooded areas, although they have been known to live in a broad variety of wooded and brushy habitats. They thrive best in areas with thick litter or dense ground vegetation. Voles also do very well in orchards and may attain population densities higher there than in more wild settings.



Breeding behavior

Breeding occurs from late winter through the fall and females may have anywhere from 1-4 litters in a season. One to six pups are born after a three-week gestation. These voles have only four teats, so larger litters are unlikely to have complete survival. There is some evidence that litter size may be influenced by light intensity and the quality of forage. Young are born with their eyes and ears closed and reach maturity by three months of age.

Diet

Woodland voles eat both above- and below-ground vegetation. They will do some grazing like other voles, but roots and tubers form a much larger portion of their diet. Other food items include fruit, fungi, and tree bark. These voles have the capability to severely damage or even kill orchard trees through girdling and can be a pest in gardens. However, in lowa the species is very rare and unlikely to be a pest.

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Southern Red-backed Vole Myodes gapperi

Despite its name, the southern red-backed vole is a creature of northern forests and mountains. Northern Iowa is at its southern range in the Midwest, and in the last half century was only seen in Pilot Knob State Park and its immediate surroundings in northcentral Iowa. It is listed as an endangered species in the state and a lack of modern records suggest it may already be extinct here.



Phil Myers, AnimalDiversity.ord



A small mouse-sized vole with a short tail that is significantly less than half the length of the body but longer than its hind foot. These voles have buff-grey undersides, brown sides, and typically a distinct red swath from their head to their rump, giving them their name.

Habitat

Southern red-backed voles are primarily forest dwellers. It is noted for its high water consumption, and does best in moist forests with good ground cover, litter, and decaying wood.

Breeding behavior

They breed from late winter to late fall. Litters of 2-8 young are born

after a 17-19 day gestation. Young are born naked and without hair, but grow quickly, are able to crawl after a week, and are weaned by 17 days. Voles are sexually mature by four months of age and may live up to a year in the wild.

Diet

Red-backed voles are omnivorous. They primarily eat vegetation including plants, seeds, fruit, nuts, fungi, lichen, and moss and will also eat insects.



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Southern Bog Lemming Synaptomys cooperi

The southern bog lemming closely resembles our native voles and indeed shares many of the same characteristics. These rodents occur across much of the eastern United States, but seem to be relatively uncommon throughout their range, occurring only in scattered pockets. This species is considered threatened in Iowa and there are only a handful of confirmed sightings in the state.



Phil Myers, AnimalDiversity.org



The southern bog lemming looks much like a vole: 4-5 inches long, brown-reddish fur, and smaller ears than seen among mice. The southern bog lemming is often noted as being grizzled or shaggy in appearance, with longer guard hairs than is typical for a vole. Its most noticeable outside characteristic is a very short tail, only slightly longer than its back foot. In Iowa, only the woodland vole has a tail as short, so an observer can quickly narrow a specimen down to only two choices. Unfortunately, the woodland vole and southern bog lemming overlap in all of their size measurements (tail, ears, weight, hind foot) requiring an examination of their teeth for conclusive identification. The southern bog lemming has a shallow groove in its top incisors, akin to the groove in the pocket gopher.



Habitat

The southern bog lemming is only locally abundant across its range and seems to have a special affinity for sphagnum and tamarack bogs as well as wet, grassy areas near streams. Iowa has few bogs, but the lemming has also been found in old fields, wet meadows, clear-cut forests, shrublands, and even mature forests. In total, its habitat selection seems to resemble that of the meadow vole, with some suggesting the lemming's patchy distribution is because of exclusion by voles.

Breeding behavior

Lemmings are capable of breeding year-round, although the majority of reproduction is from late winter through fall. Gestation averages just over three weeks and the helpless young grow quickly, weaning between two and three weeks. Litter size averages three. Mothers may mate within days of giving birth and a female may produce 2-3 or even more litters in a year if sufficient resources are present.

Diet

The bulk of the lemming diet is tender growing parts of grasses, sedges, and rushes. Like voles, the lemming will snip the plant at its base. If the grass is held upright by surrounding vegetation when it is nipped, the vole will continue to nip at the plant, continually shortening it until it can reach the desired part. Lemmings will also eat moss, fungi, lichen, bark, fruit, and invertebrates such as beetles and snails.

Muskrat Ondatra zibethicus

The muskrat is a medium-sized rodent that can either live in bank dens along the edge of a body of water or will build a house, or hut, out of aquatic vegetation in wetlands and shallow lakes for the winter. These huts often provide valuable natural nesting and resting platforms for waterfowl, grebes, and coots within wetlands. Like rabbits, muskrats are prolific breeders that exhibit boom and bust population cycles.



AdobeStock.com, Dave



Diet

Mammals of Iowa

Muskrats are dark brown on their back, and lighter tan on their belly. They have small eyes and ears and a sparsely-haired, black, rat-like tail with front feet that are relatively small compared to their larger back feet.

Habitat

Muskrats live in and along lakes, streams, rivers, marshes, and ponds. Muskrats are typically secretive, but have relatively poor eyesight so they are often spotted when swimming nearby.

Breeding behavior

Muskrats are capable of having up to three litters per year. Mating begins in March and peaks in May and June. Gestation is about 30 days

after which an average of 4-7 kits per litter are born, usually in a bank den or hut. The young are fully mature at six months of age, and a few may breed in their first summer. Kits face many obstacles such as disease, predation, and competition with other muskrats to survive longer than a year in the wild. Muskrats are preyed upon by mink, hawks, owls, foxes, coyotes, humans, and motor vehicles.

Diet

Muskrats are herbivores, but occasionally feed on small animals if plants aren't readily available. They feed mostly on a variety of aquatic plants such as arrowhead, cattails, pondweeds, waterlily, dry grasses, corn, and soybean.



Eastern Mole *Scalopus aquaticus*

Moles are fossorial, living their entire lives underground and only rarely coming above ground. Moles are primarily insectivores, and as predators have large home ranges, up to two or more acres, a much larger range than most similarlysized mammals. Moles excavate nesting cavities, frequently used traveling tunnels, and one-time hunting tunnels. In good conditions, a mole can dig up to 15 feet of tunnel in an hour. What may look like an infestation of moles is almost certainly only one or two active moles feeding over a wide area.



Gary Stolz, U.S. Fish and Wildlife Service



Moles are readily identified by their velvety fur (which can range in color from silvery to black), lack of visible ears, almost non-existent eyes, long pointy snout, and very short tail. It may be confused with the shorttailed shrew, which shares many of these characteristics but lacks the massive front paws moles use for excavating tunnels.

Habitat

Eastern moles will live underground in a wide variety of habitats, including forests, pastures, fields, and lawns. They are limited more by soil type than above-ground vegetation, preferring damp, loamy, or sandy soils that are more easily excavated. Moles typically avoid rocky, heavy clay, and saturated soils. Despite its scientific name aquaticus,



this species does not readily swim, nor does it prefer wet soil. They are highly mobile in the soil, often coming near the surface during the growing season and living under the frost line during winter.

Breeding behavior

Moles are mostly solitary and come together only to breed in mid-spring. A single litter of 3-5 young are born after about 45 days of gestation. The naked, toothless young grow quickly, and are weaned within five weeks.

Diet

The great bulk of a mole's diet is earthworms, as well as beetles and ants. Moles will also eat slugs, snails, millipedes, and centipedes, as well as a small proportion of plant matter. Although many homeowners and lawn caretakers decry the mole for the tunnels it makes, the presence of moles is also an indicator of an abundant prey source.

Least Shrew Cryptotis parva

The least shrew is a high metabolism insect eater. However, unlike our other shrews which are solitary or even aggressive to other members of their species, this shrew is known to be more social. In the wild, groups from 2-30 individuals will huddle or burrow together. These shrews have also been kept in captivity in medical research colonies.



One of the world's smallest mammals, a full grown adult is about the size of a human thumb. It is similar in body shape and size to the more common masked shrew, but distinguishable by its much shorter tail. Eyes are tiny and external ears are not visible. The small eyes and lack of obvious ears make it easy to distinguish these animals from mice and voles.

Habitat

These shrews prefer grasslands and brushy areas over wooded habitats. Like lowa's other shrews, they have an affinity for moist ground and are often found near wetlands.

Breeding behavior

Breeding occurs from mid-spring through mid-fall. On average 4-6 helpless, furless young are born after about three weeks of gestation. The young leave the nest in their fourth week.

Diet

Least shrews consume primarily insects, worms, and frogs. They may also eat other amphibians and reptiles. These shrews have been noted to incapacitate larger grasshoppers and frogs by attacking their knees.





Masked Shrew Sorex cinereus

Masked shrews are one of the world's smallest mammals and have one of the fastest metabolisms known among mammals. The heart of an adult shrew may beat over 1.000 times a minute. Because of their small size and incredible metabolism, these little animals need to eat almost constantly to stay alive. Masked shrews are capable of eating more than three times their body weight a day. They have a much broader range than lowa's other species of shrews, and can be found in every county of the state. The species ranges from southern lowa to north of the Arctic Circle These diminutive creatures must stay active all winter, and have evolved the ability to shrink in size and create body heat directly from fat rather than shivering. As tiny, cryptic insect eaters, however, most lowans are unlikely to see one up close.



Chris and Tilde Stuart/FLPA/Nature in Stock



A full grown adult is about the size of a human thumb, with a tail about half as long as the body. This long tail makes it easy to distinguish from the least shrew. It is brown with very short legs, a long tail, and a long narrow snout. Eyes are tiny and external ears are not visible. The small eyes and lack of obvious ears make it easy to distinguish these animals from mice and voles.

Habitat

Masked shrews have very broad habitat tolerances and will readily live in both wooded and grassy habitats. They are often associated with moisture, and are more likely to be present in higher densities in moist habitats. A good rule for lowa may be if the habitat can sustain moss,



it can likely sustain masked shrews. Their small size allows them to burrow under fallen logs, use tunnels of other species, squeeze between rocks, and even tunnel into rotten logs and stumps.

Breeding behavior

Masked shrews breed in late spring and through the summer. Although they reach adult size quickly, few shrews will breed in the same year they are born, but rather the spring following. Most females are believed to only live long enough to give birth once, although some mothers may bear several litters. Average litter size is around six young. Babies are born naked and helpless but grow quickly, reaching adult size and leaving the nest after about a month.

Diet

Shrews hunt for beetles, grasshoppers, crickets, and other invertebrates under leaf litter, in and under rocks, and under fallen logs. Although considered insectivores any meat will do, and they will eat carrion, frogs, salamanders, and other small mammals opportunistically.

1.10

Hayden's Shrew Sorex haydeni

A very small and very hyper insect eater, the Hayden's shrew, like lowa's other four shew species, needs to eat almost constantly to stay alive. Iowa is at the eastern edge of its range, and the only confirmed records of Hayden's shrew are from the northwest portion of the state. They have not been verified as present in the state for many years and are easily confused with the masked shrew. Only careful examination of teeth or genetic analysis will confirm the species and it is possible this species is still present in lowa, hiding in plain sight.



Hayden's shrews are nearly identical to the much more numerous masked shrew, and they were once even considered the same species. Both species are brown with very short legs, a long tail, and a long narrow snout. Eyes are tiny and external ears are not visible.

Habitat

A creature of prairies and grasslands, with some affinity for wet prairies, this shrew may also be found in rocky pine forests in its range, which covers Nebraska, the Dakotas, and Saskatchewan, Canada, and extends into western Iowa and Minnesota. At home under leaf litter they will make trails across their home range and make small, bird-like nests in which they rest and rear young.



Breeding behavior

Mating occurs from spring through the fall. Females do not breed until the year after they are born, but they may have as many as three litters in a year. Litters average 3-6 young.

Diet

These are classic insectivores, feeding primarily on beetles, insect larvae, and other invertebrates. Like other shrews they will eat any flesh they can find, including carrion, frogs, and salamanders. Never resting for long, these mammals search for food under leaf litter, in and under fallen logs, and probing nooks and crannies much like other shrews. They also cannot hibernate, but must continue to find food all winter long, no matter how harsh the prairie weather is.

3
Northern Short-tailed Shrew Blarina brevicauda

This aggressive little insectivore is one of the world's few venomous mammals. They do not have fangs like a snake or spurs like a platypus, but rather chew the venom into their victim. Many mammalian predators will not eat them because of their very strong and distinctive odor. There is also evidence that they may do a form of echolocation to orient themselves in the surrounding space.





These are mouse-sized (up to 1 ounce) shrews, with a longer, stockier body than the masked shrew and a much shorter, thicker tail. As with lowa's other shrews, ears and eyes are not visible. Their fur is ashen colored, ranging from gray to black, and velvety.

Habitat

Northern short-tailed shrews are habitat generalists, and may be found in both woods and grasslands, as well as pastures, ditches, windbreaks, farmsteads, and lawns. Generally they require at least 50 percent plant cover on the ground, and do best in moist habitats with deep plant litter of leaves or dead grasses. A true semi-fossorial species, they spend more time underground than most other shrews, only rarely



emerging on top of leaf litter or out from under fallen logs and other debris. They make nests tucked under logs, rocks, or underground which they will line with the fur of other small mammals. Despite their strong body odor the shrews keep their nests clean and use dedicated latrine sites.

Breeding behavior

Breeding occurs from late winter to early fall, with most breeding happening in two peak periods of late spring and late summer. The young are born naked and helpless, but are sexually mature by three months of age.

Diet

Worms, millipedes, and other insects are their primary prey. Snails and other small mammals may also be eaten, especially if primary prey numbers are low. Short-tailed shrews have been observed killing other mammals up to twice their body weight. They hunt in short bursts of a few minutes, alternated with rests.

Elliot's Short-tailed Shrew Blarina hylophaga

Like the other members of this genus Blarina, Elliot's short-tailed shrew is one of the world's few venomous mammals. The range of this species just barely enters the southwest corner of lowa where it lives alongside its more common cousin, the northern short-tailed shrew. Elliot's short-tailed shrew is very similar in appearance to its slightly larger cousin and distinguishing between the two species is difficult without genetic analysis.





These shrews look much like the northern short-tailed shrew, with the same short legs, short tail, tiny eyes and grey fur, but are smaller, weighing roughly half what a large northern short-tail can weigh.

Habitat

Elliot's short-tailed shrews are habitat generalists, and may be found in both woods and grasslands, as well as ditches, windbreaks, riparian areas, and pastures. Like the northern short-tailed shrew they do best in moist habitats. They spend much of their time underground or under leaf litter and rotting logs, where they will also make a nest.



Breeding behavior

Individual shrews are solitary, and only come together to mate. Breeding occurs in early spring and late summer. The young are born naked and helpless, and are weaned and fully furred by one month. An average lifespan for this species may be about eight months, although some may live up to two years.

Diet

Their main prey are insects, especially beetles, millipedes, spiders, slugs, and snails but they will also eat worms and other small mammals. They must continue to eat through the winter, and are known to cache uneaten food for later.



Bobcat *Lynx* rufus

The bobcat is a medium-sized. 15-30 pound cat native to lowa. After being nearly extirpated due to habitat loss and unregulated hunting, lowa's bobcat population has grown naturally in size and distribution since the late 1990s in part due to protection. A conservative harvest season began in 2007 after population recovery. Bobcats now occupy all counties in southern lowa south of U.S. Route 30, and some parts of eastern and western lowa, making them a conservation success story. Although bobcats are primarily nocturnal, some crepuscular and daytime activity is known to occur, especially when breeding or hunting for prey to feed their litter. They are noted for being vocal during their breeding season, vielding eerie yowls and screams that can sometimes be heard from miles away, especially at night.



Bobcats are best distinguished by their dark colored spots and short bobbed tail. The ears on bobcats are fairly short but pointed, black and white in color, and with tufts. Bobcats are bigger than house cats. Males typically weigh around 25 pounds while females weigh around 18 pounds.

Habitat

Bobcats are habitat selective, thriving in prey-rich areas of secondary growth forests, grass fields, abandoned farmsteads, and areas of rugged terrain. The presence of shrubby secondary growth woodlands seems especially important. Areas where several types of natural habitat converge to form edges are especially attractive. Bobcats are typically secretive and usually shy away from human activity.



Breeding behavior

Bobcats have one litter a year. Most breeding takes place from late fall through early spring, but continues into late summer. Average litter size is 2-3 kittens, but can range from 2-6. Juvenile kittens begin to hunt on their own by six months of age.

Diet

Bobcats are opportunistic and feed on a variety of prey. Rabbits, mice, voles, and squirrels are the most common prey species, but their diet can vary depending on the time of year and the size of the bobcat. Other prey species can include deer (especially fawns), birds, snakes, and other small animals. Although a carnivore, bobcats do not pose a threat to human safety.

Coyote Canis latrans

Coyotes are intelligent, adaptable, and exhibit a wide variety of behaviors from extremely shy and secretive to bold, even living within the city limits. In Iowa, coyotes are the top carnivore. Although considered nocturnal, coyotes can also be active at dawn and dusk and sometimes during the day. Coyotes are often quite vocal, emitting several types of yips, barks, and howls—especially at night. A pack of coyotes is usually a family group consisting of an adult pair and their offspring.



AdobeStock.com, Kerry Hargrove



Coyotes have a dog-like appearance that resembles a small German shepherd. Adult coyotes typically weigh 18-35 pounds. Coyotes have fairly coarse, long hair on their body that is a mixture of brown, tan, gray, and black.

Habitat

Coyotes are a habitat generalist. Most coyotes in lowa seek out a mix of natural habitat consisting of prairies, forests, marshes, and other brushy spaces in rural areas. Coyotes are commonly seen living within city limits and have been famously documented to thrive in large metropolitan regions such as Chicago.



Breeding behavior

Coyotes are compensatory breeders, which means reproductive rates increase as density of coyotes in an area becomes lower and prey abundance increases. The average litter size in the Midwest is six pups. Coyotes mate from January through early March, and pups are born blind and helpless in a den usually in late April or early May. Dens are usually abandoned when pups reach six weeks and start to feed.

Diet

Coyotes are carnivores and excellent predators with the ability to sit and wait for small prey like moving mice or run up to 45 miles per hour for short distances. Up to 90 percent of their diet consists of rodents, rabbits, and squirrels. They are known to also feed on deer, especially fawns and sick or weak adults. Coyotes sometimes prey on livestock including poultry, sheep, goats, and smaller cattle. However, coyotes are often wrongfully blamed for having killed livestock that died of other causes and were then scavenged by coyotes.



Gray Fox *Urocyon cinereoargenteus*

The gray fox is distributed throughout lowa, but not in high numbers. Their population is on the decline with only pockets remaining in the state, particularly in the southeast. The cause of these declines are not understood, but may be due to habitat loss or disease. Thus, a gray fox is a rare sight in lowa and a lucky person may even be able to witness their unique behavior of regularly climbing trees, which no other member of the dog family does.





Status

The gray fox is smaller than the coyote and red fox, with adults typically weighing only 10-12 pounds. Males are slightly larger than females. They are mostly gray with patches of reddish tan fur down the side of their neck and body. A distinct black line extends down the top of their tail. Their face also has distinct black and white markings.

Habitat

Gray fox live in deciduous forests, but may also be found around brushy abandoned farmsteads or areas of thick cedar trees. Gray fox are sometimes found in proximity of urban areas but not as routinely as the red fox or coyote.

Breeding behavior

Mating occurs during January and extends through early March. Their litter size is 3-5 pups, born during April and May. The pups are weaned at three months and become independent by four months. The family usually disbands at the end of the summer and most females breed during their first winter.

Diet

Gray fox are carnivores but their diet is often more omnivorous than red foxes and coyotes and changes by the season. Rabbits, mice, and voles are frequently prey. However, during the summer and fall, insects and various fruits make up a significant portion of their diet.

Red Fox *Vulpes vulpes*

Red fox have had a variable population size in lowa since settlement. It is thought they used to be more abundant when mixed agriculture with small grains and pasture were common. Mange outbreaks have also plagued their populations since the 1950s. The surge in lowa's coyote population since the late 1970s also likely contributes to the decrease in red fox because coyotes competitively exclude foxes from ranges.



Diet

Activity Period

Winter Strategy

Status

The red fox is larger than the gray fox, but smaller than coyotes. Red fox in lowa typically weigh 8-15 pounds. They are most active at night and "lay up" during the day, usually on a hillside with good visibility. The red fox is built like a dog, but appears more slender. Most red fox are covered in orange to red hair that is quite long in the winter. Their legs and ears are black; the tip of their tail is often white. A small percentage of red foxes have black colored guard hair or outer fur which is sometimes grayish in color and are referred to as cross or silver foxes.

Habitat

Red fox are typically more of a grassland species, while the gray

fox inhabits forests. However, red fox often use a variety of mixed

habitats containing woodlots, fencerows, and draws. Some red fox have adapted to urban settings, even having litters under decks, sheds, or porches.

Breeding behavior

Mating occurs during January and early February and is followed by 53 days of gestation. The average litter size is 4-6 pups, born in late March. Red foxes usually start their litter in an abandoned badger or woodchuck den which they'll often excavate to fit their larger size. Dens often face west or southwest. The pups are weaned at 8-10 weeks and become progressively more independent. Both the male and female assist with rearing the litter.

Diet

The main prey items for red foxes are rabbits, rodents, and birds. A small portion of their diet can also be insects and fruits as they come into season. Like most carnivores, red fox are opportunistic and will feed upon whatever is available at a particular time of the year.



Black Bear Ursus americanus

Black bears are native to lowa but were extirpated from the state by 1876 due to unregulated shooting and habitat destruction. Over time, black bear abundance has increased in neighboring Minnesota and Wisconsin resulting in a spillover effect of increasing encounters of roaming black bears in the northeast corner of Iowa. Time will tell if black bears will establish a breeding population in Iowa. They can cause nuisance issues for humans by raiding bird feeders, bee hives, garbage, and barbeque grills in search of food. Black bears have an exceptional sense of smell, better than dogs. While primarily nocturnal, they can also be active during dawn, dusk, and midday.



AdobeStock.com, PiLensPhoto



Black bears are easy to identify. They are relatively large and black in color. These bears typically weigh 150-400 pounds. Other characteristics include a rounded body shape with powerful, stout legs, a rather large head, and a very short tail. Bears are one of the few mammals that exhibit true hibernation.

Habitat

Black bears inhabit a fairly wide variety of habitats depending upon the time of year and available food sources. Generally, black bears inhabit dense woodlands in close proximity to water sources, but can be found in wooded agricultural areas as well. Research in areas with abundant bears has shown hibernation dens usually occur under root-wads of trees, rocky crevices, or in the ground.



Breeding behavior

The breeding season for black bears occurs from May to July. The average litter size in Minnesota and Wisconsin is 2-3 cubs. Cubs are usually born in a den during January, awake, then nurse from their mother. In April, the cubs emerge from the den and remain with their mother for 17 months, hibernating with her the following winter.

Diet

Black bears are omnivores that eat a wide variety of food dependent upon the time of year. In spring, they prefer sedges and grasses. In the summer they prefer berries, grubs, ants, and ant pupae. In the fall, they often focus on acorns and grain. Meat sources are obtained opportunistically as available.

*Tracks have been reduced to 50% of actual size.

Raccoon *Procyon lotor*

The raccoon population has been stable or increasing in lowa since the 1980s. They are remarkably adaptable, living in all corners of the state, and have few natural predators that exert strong control on their populations. Motor vehicles and hunting are the major causes of mortality in raccoons, and regulated trapping is important to keep their abundance in balance.



AdobeStock.com, Antoine Perroud



Raccoons are a medium-sized, stocky animal. The most distinguishing features of a raccoon are the black mask across their face and the heavily furred tail with dark rings. When moving they often lope along with an arched back.

Habitat

Raccoons favor wooded areas with water bodies in close proximity to provide a place to forage. They'll also travel across crop fields, meadows, and grasslands. Favorite denning sites include tree cavities, rock crevices, or old buildings. Raccoons also utilize urban and farm areas readily, and may cause nuisance problems in attics, chimneys, or outbuildings.



Breeding behavior

About 60 percent of females breed when one year old. Mating occurs mainly in February. Raccoons have one litter per year and gestation is usually 63 days. The average litter size is 3-4 young with most born in late April or May. The young are mainly weaned by ten weeks, but may continue to suckle for a few more weeks. Young stay with their mother over the winter before dispersing. Males don't help raise the young, and are usually solitary the rest of the year except during the breeding season.

Diet

Raccoons are true omnivores with an extremely diverse diet that is opportunistic with foods that are in season and available. This is most often crayfish, frogs, eggs of all kinds, insects, mice, fruits, corn (especially in the milk stage), and nuts. They will also get into bird feeders and garbage. They are very tactile and use their front feet to feel around for food especially when searching murky waters.

Short-tailed Weasel Mustela erminea

Short-tailed weasels, also known as ermine, are more common in the northern forests of the Great Lakes and Canada, but their range extends south into northern lowa. Short-tailed weasels also live in Europe and Asia. They are in the family Mustelidae and, like other members of this family, are voracious predators for their size.



Steve Hillebrand, U.S. Fish and Wildlife Service



Short-tailed weasels are often confused in identification with the longtailed weasel or least weasel. They are generally smaller than long-tailed weasels, with a tail less than 40 percent as long as the head and body. Unlike least weasels, short-tailed weasels have a black-tipped tail. Males are typically 12 inches in total length and females 10 inches. Like other weasels, short-tailed weasels are brown with a white underbelly in the summer and turn white in the winter.

Habitat

Short-tailed weasels can be found in a variety of natural habitats such as grasslands, forests, and marshy areas. They will utilize dens already made by small rodents for short periods of time, but will also sleep and rest above ground in leaves, logs, or grass.



Breeding behavior

Like most other members of the weasel family, short-tailed weasels have delayed implantation of their embryos. Therefore, mating takes place in mid-summer to early fall, long before birth in the following April or May. Gestation is 8-9 months long with about two weeks of development initially, followed by a long pause in development, then about 30 days of development occurring right before birth. The average litter size is 4-9 young which are often born in a vacated chipmunk hole or rocky crevice.

Diet

Mice and voles are the major food item of short-tailed weasels. They also eat rabbits, insects, reptiles, amphibians, birds, and bird eggs.

Least Weasel Mustela nivalis

Least weasels are the smallest member of the order Carnivora and are found across North America, Europe, and Asia. Although secretive and wary, least weasels are aggressive and don't hesitate to attack prey bigger than themselves. Least weasels are small enough to fit into holes less than an inch in diameter. They are a highly specialized predator of small rodents.





Least weasels have a long, slender body. Their tail length is very short, less than 25 percent the length of its head and body. In summer, least weasels are a rich brown color on their upper body and white on their underside. In winter, they may be brown or all white. Some variation in winter color occurs from south to north. They lack the distinct black tail tip of lowa's other weasels but may have a few black hairs at the tip of their tail.

Habitat

Least weasels sometimes inhabit forests, but are primarily found in grasslands, pastures, and shrubby areas like hedge rows or grown-up fencerows. Dens under rocky crevices, logs, or existing rodent holes are used for short periods of time for rest, sleep, and raising litters.

Breeding behavior

Breeding can occur throughout the year, but less so in the winter. Least weasels often have more litters and more young than any other species of weasels found in North America, in part due to this species evolving away from having a pause in embryo development as is seen in other weasels. Two or more litters are raised annually with average litter sizes of 3-5 young.

Diet

Mice are the major food item of least weasels although they also eat voles, insects, birds, and bird eggs.





Long-tailed Weasel Mustela frenata

Despite their small size, longtailed weasels are fearless predators, like other members of the Mustelidae family. They are distributed throughout the United States, Mexico, and southern parts of prairie Canada. Long-tailed weasels are found throughout lowa, but little is known about their exact population size due to their secretive nature.



Bryant Olsen (Conservation Program-Tracy Aviary), Flicki



Long-tailed weasels have a long, slender body. They have two color phases annually. In summer adults are dark brown on their upper parts, with a yellowish white color on their underside, a black tipped tail, and a white chin. In winter they often have an all-white coat with a black tip on their tail. Some long-tailed weasels, especially those in more southern climates, may not change color in the winter. This color change can occur in the transition from northern to southern lowa. Weasels purr and often make a characteristic took-took-took call.

Habitat

Long-tailed weasels are habitat generalists. They prefer woodlands, thickets, and brushy fence-rows, especially if it's near an open water

source. Weasels can have multiple homes which are usually vacated holes left by moles, mice, or ground squirrels. They also utilize rocky crevices and holes around the base of a tree or its roots.

Breeding behavior

In general, mating occurs during July through August, but the young are not born until the following April or May. The average total gestation period is 279 days, however the fetuses often don't develop during this entire period. They actually implant to the uterus about 24 days before birth. The average litter size is 5-8 young. At seven weeks old male young will be larger than their mothers.

Diet

The preferred prey of long-tailed weasels is rodents. Major prey species include mice, rats, squirrels, chipmunks, shrews, moles, voles, and rabbits. They may also eat birds and eggs opportunistically. At times they will kill more than they can eat and cache the surplus. They usually bite the head region of prey, even if there's a significant struggle with larger prey like rabbits.





American Mink Neovison vison

Mink are found throughout lowa. Home range size can vary regardless of gender, due to available habitat and linear stream and river corridors. Males will move within a five mile radius. while females tend to have much more restricted ranges along their preferred habitats. Mink rely heavily on their sense of smell, rather than on their eyesight, to locate prey. Mink are aggressive and often attack prey larger than themselves. They are excellent underwater swimmers and can climb trees.





Mink have medium-sized, long, slender bodies with short legs. They have five toes joined by short webbing at their bases to aid in swimming. Mink are mostly dark brown in color with short to medium length silky hair and a white chin and throat.

Habitat

Mink are almost always found in the proximity of permanent water. They often hunt for prey along the banks of water bodies, but also utilize marshes and grasslands, especially in the winter. Rocky areas and the root wads of trees are favorite temporary denning spots, used usually for 1-2 days at a time.

Breeding behavior

Mating may occur from late February to early April. Mink undergo a physiological process of delayed implantation. Their average gestation is 51 days, but the embryo is only developing for about 20 days. Mink have one litter per year with an average litter size of 4-5 kits that are weaned at five weeks and remain with their mother until fall. They often utilize an abandoned muskrat den or burrow of some other animal.

Diet

Mink are semi-aquatic and therefore comfortable finding prey on land like weasels or in the water like river otters. Their primary food sources are mice, rabbits, fish, muskrats, frogs, and crayfish.





River Otter *Lontra canadensis*

A member of the Mustelidae family, river otters are voracious carnivores that are also very playful. River otters are native to lowa, but were nearly extirpated from the state from the late 1800s. until the 1980s. River otters were successfully reintroduced in lowa from 1985-2003 with stock originating in Louisiana. Today they have been documented in nearly all of lowa's counties and represent a true conservation success story. They have a glossy, sleek pelt of relatively short hair that can be as dense as 370,000 hairs per square inch on their back.





River otters have a streamlined body perfectly suited for swimming. Coming from the same family, otters closely resemble the more commonly seen mink, only larger. Adult otters are at least twice as long as mink, and weigh from 12 to over 20 pounds, as opposed to the 1-3.5 pound mink. River otters often leave scat piles, known as latrine sites, on the bank of a body of water. When found this is a clear indication that an otter was recently nearby.

Habitat

River otters inhabit the shorelines of nearly all types of water bodies including rivers, streams, lakes, ponds, and wetlands. They are often found wherever beaver is present or areas of open water in the winter.

Breeding behavior

Female river otters experience a postpartum estrus, mating shortly after giving birth. Breeding occurs during winter and spring, with peak activity in March and April. Otters usually mate in the water. Embryonic development lasts two months, but implantation is delayed for up to 11 months. Litter size is usually 1-3 pups, but can be up to six. Young begin swimming at about eight weeks, but stay with their mother until fall, or sometimes through until the following spring. Young reach full size at 3-4 years of age.

Diet

River otters are carnivores, primarily feeding on available prey in aquatic environments such as fish (the bulk of their diet), frogs, salamanders, snakes, mussels, freshwater mussels, turtles, crayfish, and even young birds. They can stay under water searching for food for up to eight minutes at a time.



American Badger *Taxidea taxus*

Badgers are extremely good at digging, which they do on a regular basis to hunt prey underground. They can dig a hole more rapidly than a person with a shovel, sometimes so vigorously that they throw dirt 4-5 feet into the air. They also have a grumpy disposition and are fully capable of fending off dogs or coyotes. Although they do not hibernate, badgers greatly limit their activity in winter, and may enter a state of torpor, not coming above ground for days at a time.



Ryan Haggerty, U.S. Fish and Wildlife Service



Badgers are a heavy-built animal with short powerful legs and long claws that often extend more than an inch in length. They are medium in size and have a short bushy tail. Their general coloration is gray with a slight yellowish cast. Their face is marked distinctly with white stripes and a vertical black bar or "badge" in front of each ear. Their feet are also black.

Habitat

Badgers are typically an open country animal—a classic grassland species. However, they can sometimes be found in agricultural areas, mixed open woodlands, and other areas. Except for their conspicuous holes, badgers are not often seen and are typically nocturnal and secretive. Badgers are considered to be transient with no defined home range, instead moving around to find available prey.

Breeding behavior

Less is known about badger breeding behavior than with other animals. Mating likely occurs in September. There is delayed implantation of embryos until February or later. A single litter is typically three young born in April or May. The young stay in or around the den until fall.

Diet

Badgers are strictly carnivores. Their most important prey sources are rodents and rabbits, especially ground squirrels and pocket gophers. When those prey species are not abundant, badgers will focus on mice of all species. Badgers don't seem to require much water to drink and instead derive hydration from prey.

Eastern Spotted Skunk Spilogale putorius

Very few, if any, spotted skunks remain in Iowa. Their numbers peaked in Iowa during the 1930s and early 1940s when diverse farming practices with haystacks and small grains were common and rodents were abundant. However, as farming practices modernized spotted skunk numbers declined drastically, especially during the 1960s. By 1976, spotted skunks were classified as endangered in lowa. Another name for spotted skunk is civet cat, however, this is a misnomer as they are not related to true civets of the Old World, nor to cats. Scent glands are similar to the striped skunk, but stronger and more disagreeable.



AdobeStock.com, ASP Inc



The eastern spotted skunk is a fairly small, slender animal with short legs and a bushy tail. Spotted skunks have white streaking or elongated spotting down their backs which, along with its smaller size, distinguishes it from the striped skunk that has long continuous white stripes down its back. Adult spotted skunks are 14-22 inches in total length and weigh up to 2.75 pounds. They can readily climb trees.

Habitat

Spotted skunks inhabit open prairies, brushy areas, and cultivated lands. Protected areas for denning are important to spotted skunks. This can include dens previously occupied by other animals, rocky crevices, hollow logs, or farm buildings.

Breeding behavior

Mating takes place during the winter and young are born from April to July. Gestation is 50-65 days, likely without delayed implantation. The average litter size is five young that are weaned around 54 days after birth.

Diet

Spotted skunks are omnivores that eat a wide variety of plant and animal material. They typically forage at night, often feeding on mice and large insects such as beetles, crickets, and grasshoppers.

Striped Skunk *Mephitis mephitis*

The striped skunk is most known for its use of an extremely powerful spray to ward off danger. It is so strong it can be smelled at a downwind distance of up to 1.5 miles. When a skunk feels threatened it will arch its back, raise its tail, stamp the ground with its forefeet, and hiss or click its teeth. If this warning doesn't work, it will then spray. Striped skunks spend most of their life alone and are known to carry rabies.



K. Theule, U.S. Fish and Wildlife Service



Activity Period



The striped skunk resembles a little bear in many ways. Their tracks resemble miniature bear tracks and they are also omnivorous like bears. Striped skunks are mostly black with a thin white stripe between its eyes, then a broad white stripe that starts behind the head, forks at the shoulders, and extends to the tail and sometimes down the tail. They have relatively short legs and are usually about the size of house cats, but can get bigger.

Habitat

Striped skunks are habitat generalists. They are most commonly associated with grasslands but also occupy abandoned farmsteads, woodlots, and other brushy areas. Striped skunks also do well in

cultivated and suburban habitats. Great horned owls are one of their main predators which willingly feed on these smelly animals since they cannot smell.

Breeding behavior

Mating occurs in March. Average gestation is 63 days, but this can vary between mothers. An average of six young are born in May. At birth the young are wrinkled and nearly hairless with closed eyes. Weaning occurs at two months at which time they are first able to spray.

Diet

Striped skunks are true omnivores, eating a wide variety of plant and animal material. They typically forage at night by waddling along fields and fencerows looking for grubs, insects, eggs, larvae, reptiles, amphibians, and small rodents.



White-tailed Deer Odocoileus virginianus

White-tailed deer are perhaps the most familiar mammal in lowa thanks to the wide diversity of habitats they occupy and their success in recolonizing every corner of the state after being functionally extirpated by the turn of the 20th century. This status ranks them as both friend and foe to many, offering a welcome glance of nature throughout the year and supporting economically and culturally important hunting opportunities throughout the state, but also conflicting with city landscapers, tree farmers, and motor vehicle operators, among others.



can be easily confused with these large, conspicuous mammals with bright-white undersides on the tail they flag in retreat from humans or other threats. Males, or bucks, annually grow antlers during summer and shed them in early winter after their fall breeding season. They are most active around dawn and dusk, although are commonly seen during the day, especially during their breeding season.

Habitat

White-tails are generally associated with forested areas but can be seen in wooded neighborhoods, prairies, and farm fields where trees, shrubs, or other dense vegetation offer warmth, cover, and food.

Breeding behavior

Females, or does, are bred during the fall and give birth to 1-2 young during June after a 200 day gestation. Fawns stay with the mother all summer and most of the following fall and winter. During the fall rut, or breeding season, males compete for territory and does, attempting to breed multiple females over a few weeks.

Diet

These deer are classified as browsers for their preference for broad-leafed plants, twigs, and stems, but have adapted to eat a wide variety of agricultural grains and plants and even ornamental plants in urban areas. Although grain often comprises a large fraction of their winter diet in agricultural areas, they supplement that diet with natural browse to balance digestion in their specially evolved fourpart stomach.

Big Brown Bat *Eptesicus fuscus*

Although not lowa's largest bat, as the name may imply, the big brown bat is certainly the state's most familiar. Their flexible diet has allowed them to become quite abundant in lowa and they have a well-documented affinity for roosting and even hibernating in human dwellings such as barns, attics, and churches. This affinity for roosting where humans live is so synonymous with the species that its genus, *Eptesicus*, translates to house flier.



ivierlin luttle.org



Big brown bats, like the little brown and Indiana bat, have an unremarkable brown coat. Big brown bats are among the largest species of bat, weighing near an eighth of an ounce. They have broad wings spanning a little over one foot from tip to tip.

Habitat

Big brown bats have the most flexible habitat requirements among lowa's bats. They demonstrate little selectivity in what type of forest they feed in and are even commonly documented taking advantage of swarming insects around city lights. They commonly roost and hibernate in human dwellings. More natural roosting locations include hollow trees and cracks and crevices in rocks. They can tolerate colder,



even freezing, temperatures during hibernation so natural hibernacula can be shallower caves than those used by other hibernating bat species. Females usually move fewer than 50 miles between winter hibernacula and summer habitats to raise their young. This pattern of separate winter and summer roosts provides an opportunity for homeowners to exclude problematic bats during periods of the year during when they are absent.

Breeding behavior

Mating among big brown bats occurs immediately prior to hibernation in the fall, although fertilization is delayed until later in the hibernation period. Females give birth to 1-2 young in large maternity colonies during early summer. Those colonies can have up to 700 females, although most typically have around 50. Young nurse for about one month and then begin flying and feeding on their own. Males spend the summers away from breeding females in small colonies or alone.

Diet

Their strong jaws allow big brown bats to focus their feeding on hard-bodied insects, primarily beetles and moths. Many economically important pests are among the top prey for big brown bats—including cucumber beetles, stink bugs, and leafhoppers—making their feeding habits important to agriculture in lowa.
Indiana Bat Myotis sodalis

The Indiana bat has the smallest geographic range of all of lowa's bats, occurring nearly exclusively in the deciduous forests of the Midwest and Appalachian Mountains. It is, however, arguably the most social of bats, wintering in large hibernacula that sometimes reach 100.000 individuals and clustering together to raise their young and stay warm during hibernation. This species has the unfortunate distinction of being the only federally endangered mammal in lowa, having been included on that national list since the 1970s due to disturbances to its winter hibernation locations and loss of critical forest breeding habitats.



MerlinTuttle.org



A nondescript, small, brown bat with a 10-inch wingspan that is almost indistinguishable from its congener, the little brown bat. *Myotis* translates to mouse ear, an apt description of the small round ears of this species.

Habitat

Indiana bats stay within a few hundred miles of hibernation sites year-round, constraining their overall distribution to those areas close to caves, their preferred winter habitat. However, many hibernation colonies are today found in abandoned mine shafts as well. Large known hibernacula are outside of Iowa and thus all of Iowa's Indiana bats are likely migrants, having dispersed from caves in bordering Missouri or Illinois. During summer, females raise young in a diversity



of forest types under loose bark of living trees like shagbark hickories or dead or dying trees. Indiana bats rarely associate with urban areas.

Breeding behavior

Breeding occurs outside of hibernacula in a behavior common among bats called swarming. Females give birth to one young in June or early July and raise their young in small maternity colonies in trees with 20-30 other mothers. They commonly move young between roost trees until they are capable of independent flight in late summer.

Diet

Indiana bats consume a diet of primarily moths, beetles, and midges. They have also been documented to eat wasps, flies, caddisflies, ants, oak weevils, and many other insects.

Little Brown Bat Myotis lucifugus

Historical records from lowa portray the little brown bat as one of the most abundant bats, using forests and houses across the state during summer and retreating to caves in eastern lowa or even as far south as the Missouri Ozarks during winter. However, this species, along with the other cave-dwelling bats in Iowa-Indiana bat, northern long-eared bat, and tri-colored bat-have been severely impacted by an exotic fungal disease called White Nose Syndrome, leading to appreciable reductions in abundance since the early 2000s throughout its range.





Mammals of lowa

Smaller than big brown bats, but with a coat functionally identical, the little brown bat is difficult to distinguish from other lowa bats, especially those in the *Myotis* genus. A trained eye can distinguish the little brown bat from the Indiana bat based on some discrete differences on a rod of cartilage on their foot called a calcar. Otherwise, this small, one-third ounce, mouse-eared bat with a nine inch wingspan blends in with the crowd.

Habitat

Little brown bats commonly feed on wooded edges along streams, rivers, lakes, or wetlands. Following early evening feeding, they commonly congregate in nighttime roosts in buildings or hollow trees.

Maternity colonies are common in houses or buildings, but are also found in hollowed-out trees or natural crevices in rocks if they are suitably warm. Daytime roosts of solitary bats are often unremarkable, occurring on the sides of trees or buildings, or in more sheltered areas inside buildings or hollow trees. They make regional migrations to hibernate deep below the ground in caves or abandoned mines

Breeding behavior

All of lowa's bats have characteristically low annual reproductive rates and high annual survival rates, and the little brown bat is the best case study for this phenomenon. Before problems of White Nose Syndrome plagued their populations, it was common to capture individuals around ten years old and some North America studies have captured little brown bats over 30 years old. This life history strategy is supported by a tendency for low annual reproduction, and female little brown bats adhere to that, giving birth to only one offspring each year. Mothers raise their offspring in colonies with up to 1,000 other females. The young develop quickly, are weaned, and capable of flight within three weeks of birth. They leave the nursery roost in midsummer and then breed with males outside hibernacula in late summer or early fall, before retreating to the depths of the caves or abandoned mines for winter.

Diet

Feeding commonly occurs over or near water, so aquatic insects, namely adult midges in the Chironomidae family, are a dietary staple among little brown bats. They also consume beetles, leafhoppers, moths, caddisflies, and other insects.



Northern Long-eared Bat *Myotis septentrionalis*

This relatively solitary, hibernating bat has seen drastic declines after the arrival of White Nose Syndrome in the United States in the early 2000s, leading to its being listed as threatened on the U.S. Endangered Species Act in 2015. Concern for Iowa's northern long-eared bats however dates back to the 1970s, when population declines associated with loss of forest habitats on the western edge of the species' range were apparent. Northern long-eared bats, along with Indiana bats, are lowa's only federally listed mammals in the state and a great concern for conservationists



Jill Uterp, U.S. Fish and Wildlife Service



As their name appropriately conveys, the northern long-eared bat is most easily identified by its 1.5 centimeter long ears. Although not the largest ears among bats globally, they certainly stand out among lowa's bats and make identification of this species easier. They have otherwise very similar coats to other *Myotis* bats in lowa, and an intermediate weight and wingspan.

Habitat

Among the hibernating bats of lowa, the northern long-eared has the least affinity for human dwellings, generally preferring tree cavities and loose bark in lowa's forests while only occasionally using the sides of houses or attics for roosts. The bats are commonly found throughout



forest interiors and edges and often feed over water bodies. They hibernate in small clusters or alone, often in colder locations in the same caves or abandoned mines used by lowa's other hibernating bats.

Breeding behavior

Females form relatively small (generally less than 60) maternity colonies where they give birth to one offspring in May, June, or July. Colonies are typically in trees but occasionally under shingles or in buildings. Females commonly move young every few days between roost trees in close proximity to one another in the forest.

Diet

Northern long-eared bats are very general in their selection of insect prey, which includes moths, beetles, flies, midges, leafhoppers, lacewings, spiders, and others. In addition to the typical strategy of using echolocation to capture prey in flight, northern long-eared bats use their large ears to hear prey on surfaces and glean them more than most other bats.

Tri-colored Bat *Perimyotis subflavus*

The smallest bat found in lowa. the tri-colored bat at its heaviest just before hibernation in the fall, weighing in at only onequarter of an ounce. During winter, they retreat for months at a time deep into caves in eastern and southern lowa where temperatures are stable. In those stable environments, tri-colored bats hibernate alone, rather than in small clusters commonly seen among lowa's other hibernating bats. They were formerly known as the eastern pipistrelle bat before a recent name change.



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As their name implies, a tri-colored bat's hair is colored in three unique bands—dark base, a lighter, yellowish band in the middle, and dark tips—distinguishing it from other small bats that have mostly brown hair. Their scientific name even eludes to this characteristic, with root words translating to somewhat-yellow bat. The wingspan is around 10 inches and they can sometimes be identified in flight for their tendency to emerge and feed earlier at dusk and their slow, fluttery flight.

Habitat

During summer, tri-colored bats are found feeding over water and along forest edges. Because females often raise their young in barns or other man-made structures, tri-colored bats are often found around



farmsteads or human dwellings, although many are thought to also use trees, cave entrances, or rock crevices for roosting or raising young. During late summer and early fall, males and females gather outside caves to breed before retreating to the depths of the cave for long winters. They are thought to be among the longest hibernating bats in lowa, retreating for hibernation in early fall and not emerging until late spring.

Breeding behavior

Females raise their pups in maternity colonies with up to 30 other mothers while males are solitary. Mothers give birth to twins weighing less than one-tenth of an ounce during June and July and nurse them until they are able to fly and feed on their own after 3-4 weeks.

Diet

Because of their small size, tri-colored bats eat insects generally less than one centimeter long. Main prey items include mosquitoes, midges, beetles, small moths, and leafhoppers. Their diet often includes many aquatic insects, like caddisflies, because of their tendency to feed over water.

Evening Bat *Nycticeius humeralis*

An evening bat in Iowa is a long way from home, or at least a long way from where it will spend the cold winter months. That's because lowa is the northwestern edge of this species geographic range that spans east to Philadelphia, across the southeastern United States, and into northeastern Mexico Female evening bats take long trips north from the southeast to take advantage of lowa's forests and the insects they provide to raise their young before flying south for the winter. Adult males of the species rarely take such a far venture north and are unlikely to be seen in lowa.





Evening bats join the roster of nondescript medium-sized brown bats found in Iowa. Biologists distinguish the evening bat from others by the size of their tragus, a small projection in their ears, when in hand. Otherwise, this one-quarter to one-third ounce bat with a 10-inch wingspan is hard to distinguish from others.

Habitat

Because evening bats migrate to from southern wintering areas, their habitats in the state are restricted only to those places where the young are raised, learn to fly, and feed on their own. Females raise their young in colonies found in either human structures or trees. Young and their mothers spend days in tree cavities, dead trees, or in buildings



after leaving breeding colonies and before migration. They commonly feed along forest edges, in forest openings, or over crop fields. Evening bats rarely associate with caves in the way most other bats do.

Breeding behavior

Breeding occurs south of lowa during winter and fall, when males and females are together on their winter ranges. Females fly to lowa to give birth to two large pups and raise them in colonies with sometimes up to 900 other mothers. Mothers nurse their own young for the first two weeks in the colonies. As the young get more mobile, mothers become less selective in which young they nurse over the final few days before leaving the colony at around 30 days of age.

Diet

Females and young feed on a diversity of aerial insects in lowa, focusing primarily on beetles, moths, and leafhoppers. Many of their prey, including carabid beetles, are common agricultural pests affecting corn and soybean crops.

Eastern Red Bat *Lasiurus borealis*

Arguably lowa's most charismatic bat, the red bat, with its rusty coat and round features, stands out among its more drab Chiroptera relatives. Although unfamiliar to most because of their late-night foraging habitats and general avoidance of houses, they are one of the state's most abundant bats, migrating to lowa from southern wintering areas annually to raise young among the foliage of trees in forests and cities.



Susan Ellis, Bugwood.org







Their thick, insulating red coat is diagnostic, along with their round features and short ears. They have a relatively wide wingspan among lowa bats, spanning a little over one foot on average. Behind hoary and big brown bats, they are lowa's third heaviest bat, weighing in around one-half ounce.

Habitat

Red bats use trees almost exclusively for roosting and raising young. Most commonly, they relate to the foliage of trees, where they attach with one foot and blend in with the leaves or needles. The bats show a preference for trees near the edges of forests where they have quick access to open foraging locations. They also hide in the bark of large



trees and only occasionally use house shingles. Red bats are commonly seen feeding together at night, sometimes in front of city lights.

Breeding behavior

Red bat females typically have two young in an early summer litter but can have up to five in a litter. The mothers are well-known for their tendency to rear their young on their backs while roosting in trees, with the young grasping the mother with their teeth or hind feet. Mothers will even fly with her young on her back to change roost trees after being disturbed. Young become capable of flight 3-6 weeks after birth and are weaned shortly thereafter.

Diet

They prefer soft-bodied prey and eat a wide range of aerial insects including moths, beetles, midges, and flies, ranging from just above the ground to well over the forest canopy. They will also glean a range of insects from trees including crickets, flies, beetles, or cicadas.

Hoary Bat Lasiurus cinereus

Everything is bigger in the hoary bat's world: its body size, its geographic range, and even its prey are larger than seen among other lowa bats. Hoary bats are found in lowa only during spring, summer, and fall while either raising young or passing through on migration to areas as far north as Canada's boreal forest or south to a variety of locations. The hoary bat is found all over the Western Hemisphere, occurring as far south as Chile and even having the distinction as Hawaii's only native land mammal. This species is often struck by wind turbines in lowa and elsewhere in North America, concerning biologists about the possible threat posed by this unnatural mortality source.



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lowa's largest bat, with a 15-inch wingspan has an average weight up to 1.25 ounces. Their coat is very diagnostic as well, with silver-tipped black hairs across their bodies and a golden mane-like ring around their heads. Despite these diagnostic features, most people are unlikely to ever see a hoary bat because of their tendency to live far from humans and travel after dusk.

Habitat

The hoary bat relies heavily on trees to roost, raise their young, and feed. Roosts are commonly under bunches of leaves from 4-16 feet above the forest floor, leaving the bats visible from below. They prefer edge habitats between crop fields and forests, like grown-up fencerows or windbreaks common in agriculture fields. They rarely associate with urban areas.

Breeding behavior

Males are seldom seen in the state, except after breeding and during migration. Females raise litters of 1-4 young alone in the foliage or bark of trees and shrubs. Young are generally born in June and cling to their mother during the day and foliage during the night while she forages. Young become capable of flight in late July.

Diet

Hoary bats eat a wide range of insects including beetles, flies, grasshoppers, termites, dragonflies, wasps, and moths, but are best known for their tendency to eat large prey. A combination of their large body size and their tendency to seek out prey from a long distance, rather than more sinuous feeding flights typical of other bats, explains their affinity for large prey items.



Silver-haired Bat *Lasionycteris noctivagans*

The silver-haired bat is a uniquely North American forest bat species. It is found along the coast of the Pacific Ocean from northern California to southern Alaska, and across the eastern United States north of Florida. In Iowa, the females of the species give birth and raise their young here before they are thought to migrate back to southern climes for a winter hibernation period that has been only scarcely documented.



Winter Strategy

Activity Period

Diet

Mammals of Iowa

Status

The most distinguishing characteristic of the silver-haired bat is their namesake silver-tipped hair that gives them an appearance similar to the hoary bat. However, this species lacks the golden mane characteristic of the hoary bat and is only half its size, with a wingspan around one foot and weight around one-third of an ounce.

Habitat

Silver-haired bats are notable for their solitary lifestyle, raising young and roosting alone. They also rarely use human structures, preferring to stay in forests where they feed, raise young, and rest in and around trees, under loose bark, in cavities, or in holes dug by other critters. During migration they commonly seek out crevices in trunks of large, often dead or dying trees for shelter from weather and predators.



Breeding behavior

Giving birth in trees, silver-haired bat mothers average two young per litter in early summer. The young wean after about a month. Breeding occurs in swarms, with males and females together in the fall, and is thought to occur at southern latitudes where males are more common than in lowa.

Diet

This bat species has a broad generalist diet of insects, which they normally capture through highly sinuous flights but also occasionally glean from trees. Prey includes moths, flies, beetles, caddisflies, spiders, and even termites. The bats are commonly seen feeding on swarms of insects, like midges, over water.

Although the 57 species with detailed accounts in this guide are by far the most abundant wild mammals in Iowa, a few remaining species may be found occasionally in the state or were once common but are now extirpated. Despite their rare or extirpated status, many species that are only occasionally seen in Iowa attract a lot of attention, either for wandering into the state from distant populations or as destinations for visitors to see herds of elk or bison held in a large enclosures. Here we briefly explore this grab bag of species.

Occasional Visitors

Some species of mammals wander into lowa, often arriving after having dispersed from far away ranges in neighboring states in search of new habitats. Although only seen in small numbers and by a few people, many of these mammals make headlines when they appear. The two species that most typify this behavior cougars (*Puma concolor*) and gray wolves (*Canis lupus*)—share a comparable history in Iowa, having once been abundant and now found only occasionally as wayward visitors.

Cougars are known by many names: cougar, mountain lion, puma, and panther, among others. They are the largest of the three wildcats historically documented in lowa. The cougar probably occurred throughout most of the state originally, but nowhere in great numbers. The latest historical record of a cougar in lowa was one that was shot in 1867 in Appanoose County near the town of Cincinnati. They were functionally absent between then and the mid-1990s, when sightings became more regular. Wildlife biologists have confirmed cougars come from established populations in western South Dakota, Nebraska, or Wyoming. These visiting cougars typically don't stay in lowa very long because they fail to find what they're searching for—a mate. Those found in lowa are almost always young males, evicted from their home range and in search of a new one. Cougars are territorial and capable of moving long distances in search of new territories that contain adequate habitat, mates, and abundant prey. Because much of lowa's landscape has been altered for row crop agriculture, it is doubtful a breeding population of cougars will become established in lowa.

Two populations of **gray wolves** originally occurred in lowa prior to European settlement, with one routinely associating with the bison herds on the prairies and another found primarily in the wooded northeastern corner of the state. The last credible historical wolf record was from Butler County in the winter of 1884-85, although unconfirmed reports continued through the early 1900s. Unlike bison, cougars, fishers, and others species,



wolves were still classified as wildlife in lowa around the turn of the 20th century and for that reason have legal protections today not afforded those other species. The first confirmed modern record of a wolf in lowa was in 2014 and additional sightings have occurred in subsequent years. Modern sightings are young males, dispersing away from established populations in Minnesota and Wisconsin where gray wolves have re-established a healthy presence. Wolves are likely to continue to visit lowa from these populations, and these visits may increase as northern populations stabilize and find the large forest tracts of northeastern lowa suitable.

The nine-banded armadillo (Dasypus novemcinctus) is another species with a tendency to occasionally show up in Iowa, though it tends to garner fewer headlines. Armadillos are widespread in the southern United States and reach as far north as Missouri. However, they have been expanding further north and are increasingly being noticed along roads in southern lowa thanks to their peculiar tendency to jump straight up in the air 3-4 feet when frightened by an oncoming car. It is unknown if today's records in Iowa are foreshadowing future range expansion into the state or if armadillos are simply being transported into the state on north-bound semi-trucks. Armadillos cannot tolerate temperatures below 20°F for extended periods of time, which has historically constrained their northward distribution. It is projected that armadillos will likely continue to expand their range northward if winter temperatures continue to trend upward across the Midwest.

A number of additional species have been found more regularly in lowa often after long movements from distant ranges. The



Nine-banded armadillos continue to expand their range north, approaching Iowa's southern border.

USFWS

fisher (*Pekania pennanti*) originally inhabited the northern third of lowa and were extirpated in the mid to late 1800s. Occasional reports have occurred since the late 1990s roughly coinciding with a southward expansion seen in established populations in Minnesota. **Moose** (*Alces alces*) thought to be dispersing from Minnesota have also been documented in northern lowa. Encounters of **swift foxes** (*Vulpes velox*), **Canada lynx** (*Lynx canadensis*), **wolverine** (*Gulo gulo*), and **mule deer** (*Odocoileus hemionus*) have also been confirmed in lowa after individuals took long trips from distant populations. Finally, mobile migrant bats may be occasionally encountered, primarily the **Mexican freetailed bat** (*Tadarida brasiliensis*) which is highly abundant in states to the south.

Fringe species

The species discussed in the previous section have populations in adjacent states but share an ability to move relatively large distances and therefore occasionally find their way to lowa. Two additional species have geographic ranges that come near lowa's borders, but are only rarely seen because of their limited capacity for long movements or the absence of suitable habitat. The **hispid cotton rat** (*Sigmodon hispidus*) is common throughout the southeastern United States, with a range that extends from the Atlantic seaboard, along the Gulf coast, and into Kansas and portions of Nebraska. Research in Nebraska and Kansas has revealed this small, new-world rat expanded its range north through those states during the 20th century and predictions



Hispid cotton rats are lowa's most recently documented mammal.

James N. Stuart, Flickr

are that this pace will continue into the future. Until researchers with Iowa State University and the Iowa Department of Natural Resources (DNR) captured a hispid cotton rat in Fremont County in 2016 the only known record of this species in Iowa had been from regurgitated pellets taken from owl roosts in the far southwestern corner of that county. Thus, this species is Iowa's most recent formally documented mammal. The **Richardson's ground squirrel** (*Urocitellus richardsonii*), a ground squirrel found in the northern prairies of the Dakotas and Canada, is our second fringe species. Their range barely abuts Iowa's prairies and only a few records of the species in the state exist, though mammalogists think they were likely more common in northwestern Iowa before settlers converted the prairies there to crop fields.

Extirpated Species

Extensive changes in the composition of Iowa's land since European settlement led to the outright extirpation of species that were once common in the wild. Seven different species thought to be present in Iowa at the time of European settlement are no longer found in the wild in Iowa. Pronghorn (Antilocapra americana) and black-tailed prairie dogs (Cynomys ludovicianus) were at the eastern edge of their Great Plains range when conversion of lowa's prairies led to their extirpation. Pygmy shrews (Sorex hoyi), American martens (Martes americana), and porcupines (Erethizon dorsatum) were similarly likely fringe species, common in forests or riparian areas that were fragmented or converted to alternative land uses after settlement American bison (Bison bison) and elk (Cervus canadensis) are perhaps the most well-known examples of extirpated species in the state. These species each played pivotal roles in shaping lowa's natural ecosystems prior to a period of unregulated harvest and rapid land use change which

led to their complete elimination from the state by the late 1800s. lowa's modern landscape, with its focus on row crop production and dissection by gridded roads, is fully incompatible with their historic roaming life history. However, progress has recently been made in natural areas throughout the state, where wildlife biologists and land managers are using small captive herds of bison or elk to graze grasses in a controlled manner that mimics their historical impacts on those plant communities. Along with yielding these positive outcomes for restoring native prairie plants, these projects also provide lowans a unique glimpse of what lowa once looked like, ensuring future generations can learn about the rich ecological heritage of the state.

Exotic species

As lowa transitioned into an agricultural state, settlers brought with them, either intentionally or otherwise, a few species of mammals that made lowa their home. This includes unwanted animals like house mice and Norway rats that hitched a ride with packages, containers, or other equipment moved to North America and are well adapted to human dwellings. Some domesticated species, namely cats, dogs, and pigs, have escaped into the wild, or live parts of their lives in the wild, and in many cases present problems for native wildlife or wildlife habitats in Iowa. Feral dogs are locally problematic in some areas of the state while feral cats are a widespread issue, annually killing millions of native birds and small mammals. Fortunately, wild feral pigs have not taken a stronghold in lowa as they have in states to the south where they pose threats to domestic animals and have drastic negative impacts on forest vegetation.



Black-tailed prairie dogs were found in the prairies and pastures of western lowa until the early 20th century.

Adam Janke

Living with Mammals in Iowa

The history of relations between humans and our fellow mammals in lowa is complex. Ice-aged extinctions notwithstanding, native peoples who inhabited lowa lived in harmony with native mammals, hunting and likely killing in defense of crops or lives but never exerting such strong impacts on their populations so as to pose threats to their resiliency in the state. Further, many cultures perpetuated species of cultural, spiritual, or pragmatic significance, most famously with the burning of prairies to change the feeding behaviors of bison, elk, and deer to ensure an abundant and accessible food source. European settlers during the 1800s had similarly utilitarian attitudes about many wildlife, using furs and meat as way to generate revenue for new river towns and expand into the plains



An ounce of prevention, such as this electric fence that excludes deer and other mammals from a sweet corn patch, is worth a pound of cure when it comes to living in harmony with wild mammals in lowa.

to lay the groundwork for today's agricultural economy in lowa. However, greed and sheer abundance of people was too much for many native wildlife as settlement intensified through the mid 1800s, leading to the extirpations and population declines of many species discussed elsewhere in this guide. The lessons of this history are important guideposts for living with and appreciating the mammals we share these 99 counties with.

Most of the mammals we find in Iowa go unnoticed, living their lives in wild places or avoiding human dwellings, fields, or domestic animals, outright. The remaining minority of species may come in contact with the activities of humans and thus present challenges for harmonious relationships. Many of our most abundant mammals are that way because they have been successful in figuring out ways to thrive in human-dominated landscapes. Deer have made the most of abundant foods and relative safety on our farms and in our suburbs. Coyotes and red foxes are at ease in the city. Raccoons think sewers make a nice refuge between nightly foraging bouts in search of discarded human waste. Eastern moles are undiscerning between city yards and forest floors. The challenge thus becomes finding ways to minimize impacts of these well-adapted species.

The most effective way for minimizing conflicts with any wildlife is to change the environment in a way that makes it less attractive. This could be as simple as removing unnatural food sources, like outdoor pet food or open trash containers, or more complicated measures like building fences to prohibit access. Knowledge of the behaviors and food habits of offending critters, as described in the accounts in this book, is a key asset in effectively management wildlife damage. For example, knowledge of rabbit diets reveals they prefer browsing bark of woody shrubs during winter, so protection then is important, and not necessary during summer when other foods are preferred and available. Another application of this basic lifehistory knowledge can be applied in landscapes, where strategic plantings of less preferred species can curtail damage issues before they start. Deer have well-documented preferences for landscape plants, and in areas where they are abundant and problematic, local nurseries often have sound advice for plants to avoid or target. On farms, fences find frequent application, especially for sensitive horticultural or tree crops that need protection from herbivores during certain times of the year. Livestock can be protected through sound husbandry techniques that protect them during the night when predators are most active or with livestock protection dogs, donkeys, or even llamas. Direct control of many mammals in Iowa is also an effective strategy that is closely regulated by the Iowa DNR. Thousands of licensed hunters and trappers play important roles in Iowa to manage populations of well-adapted species like raccoons, beavers, and deer while also providing access to sustainably harvested meat and furs. Hunting and trapping within seasons are permitted by license holders and special exemptions and programs exist for landowners and farmers experiencing damage outside seasons. Finally, an important and oft-employed tactic for living with our fellow mammals is tolerance. Learning to enjoy and value interactions with these species can help us manage them and value the unique enrichment they bring to our experiences in lowa.



Many wildlife, including white-tailed deer, have adapted to urban spaces and living alongside humans in modern, highly modified landscapes.

Adam Janke

Glossary of Key Terms

- Browse Plant matter that is from trees or shrubs: leaves, stems, buds, twigs, and bark. The diet of a browser is different from that of a grazer, which eats mostly grass.
- **Cache** A hiding spot for food (noun) or the act of collecting and storing food for later use (verb). Some animals store small amounts of food in many places, others store larger amounts in a single spot.
- **Carrion** Dead animals. Scavenging animals will feed on carrion from animals they have not killed but instead found dead.
- **Commensal** When one species benefits through its relationship with another species without causing harm to either. Primarily used to describe species that live in close association with humans.
- **Crepuscular** An activity pattern associated with twilight hours. Crepuscular animals are most active at dawn and dusk. Few mammals are strictly crepuscular, though many show peaks of activity during these times. In this guide, we avoided using this term alone, preferring to refer to animals that become active at dusk and cease activity at dawn as nocturnal and vice-versa for diurnal.
- **Delayed implantation** A reproductive strategy where the fetus does not immediately attach to the uterus after fertilization, but instead pauses in development, attaching to the uterus and resuming growth after a period of time.
- **Dispersal** The movement of animals from one area to another, typically from the area of their birth to a new home range as they approach adulthood.
- Diurnal Animals most active during daylight hours.

- **Estrus** A part of the breeding cycle in which a female is capable of becoming pregnant. Colloquially referred to as "heat" in domestic animals. Estrus may last days or hours, and may occur multiple times in a year, or only once, varying by species.
- Extirpated A locally extinct species.
- **Fossorial** Underground lifestyle. Fossorial animals spend all or a majority of their lives under the soil. A semi-fossorial animal is one which spends considerable time underground (either feeding or resting) but also lives above ground.
- **Genus** First part of a scientific name and used by taxonomists to group related species. More closely related species will belong to the same genus, while more distantly related species would be considered in separate genera. The full scientific name includes its genus and its specific name or species. For example coyotes are *Canis latrans*, or the *latrans* species within the genus *Canis*. Wolves (*Canis lupus*) are more closely related to coyotes than either would be to a red fox, which is in the genus *Vulpes*, but is still in the dog family, Canidae.
- **Gestation** The period of fetal development in the womb. We use the term here to refer to active development, though some lowa mammals have a pause in the development of young where little change happens.
- Intermittent An activity pattern in which the animal may be active for short periods, and inactive for longer periods. These periods are typically driven by weather, with animals basically "staying home" during cold or otherwise harsh weather.

Hibernacula - Places of refuge in which animals hibernate.

- **Hibernation** A physiological state in which body temperature and metabolism are lowered to conserve energy. An extended form of torpor which may last days or even months. In this guide, we reserve the term for animals that demonstrate this state for the entire winter season.
- Latrine A fixed location routinely used for urination or defecation by an animal.
- Litter A group of babies born to a single mother in one pregnancy.
- Nocturnal Animals most active during the night.
- Partuition The act of giving birth.
- **Postpartum estrus** When a female re-enters breeding state (estrus) very shortly after giving birth.
- **Subnivian** Living under snow, at the surface of the ground. Deep snow creates a habitable area at ground level where temperatures are moderated and animals can move about in otherwise extremely low temperatures.
- **Swarming** A breeding behavior displayed by bats, where both sexes gather in large numbers for reproduction, generally in the fall and followed by delayed implantation.
- **Torpor** Short term hibernation, in which an animal reduces its temperature and metabolism to save energy, typically for a length of time measured in hours. In this guide, we extend this to include mammals that significantly reduce activity during the winter, resting for long periods of time but active when food or weather permits. This definition includes animals that may hibernate for days or weeks at a time, rather than an entire season.
- **Wean** -The process of fully transitioning offspring from a milk diet to a diet of natural foods.

Resources Used for the Text

The information in this guide comes from a wide variety of sources and experiences of the authors. The primary references for the guide included John Bowles' 1975 text "Distribution and biogeography of mammals of Iowa"; Charles Schwartz and Elizabeth Reeder's 2001 edition of "The Wild Mammals of Missouri"; Allen Kurta's 2017 edition of "Mammals of the Great Lakes Region"; and James Dinsmore's 1994 historical account of wildlife in Iowa titled "A Country So Full of Game: The Story of Wildlife in Iowa." In addition to those texts we also relied heavily on published literature from studies of diets and habitat use of mammals included in the guide, as well as detailed species accounts in a series titled "Mammalian Species" published by the American Society of Mammalogists.

Unpublished data and professional opinions of the authors and reviewers in drawing specific conclusions about the ecology and distribution of each species in Iowa were also used.

Data to inform the range maps came from published accounts and long-term monitoring done by the Iowa DNR through several surveys, primarily the Natural Areas Inventory program, Multiple Species Inventory and Monitoring program, the Bowhunter Observation Survey, and the Spotlight Survey.

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