

# New York's Wildlife Resources

## WILDLIFE NOTEBOOK



Engaging Environmental Education Through Teen Experiential Learning  
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**Cornell University Cooperative Extension**



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## PREFACE

# Ethic of Stewardship through Environmental Education

To whom much is given, much is expected! It is with this outlook; young people are asked to engage in both the learning objectives and activities of environmental education. This curriculum for **Wildlife Notebook** opens a window of curiosity and wonder into the habitat for the 4-H youth.

We do not exist outside of “nature” because it is all around us and we, ourselves, are fundamentally “natural”! We breathe, feed, live, reproduce, and die like other beings. In other words, the habitat consists of communities of living beings all around us. The word ‘animal’ derived from the Latin root *animus* meaning that which is endowed with will, spirit, or mind carries with it the understanding that we are part a larger community of beings. The world around us is animate, a source of deep wonder through observation and reflection, and through direct engagement with it, the basis of boundless insight. By mindfully participating in our habitat, we learn as much about it as we do about each other and ourselves.

The Greek word *oikos*, “household,” is the root of the prefix ‘eco’ in both ecology and economics. In the twenty-first century, we grasp the complex connectivity of geophysical, biological and sociocultural systems, in which the planet is truly our *oikos*: it is the dwelling place of humanity. However, to understand it, we must begin locally with our habitat, our home.

The objectives of this revised and updated curriculum for the 4-H youth are:

- to generate an appreciation for their natural habitat;
- to provide knowledge about specific aspects of that habitat;
- to directly engage the habitat through guided activity; and
- to develop an ethic of stewardship through responsibility, recognizing that one’s community includes the living habitat.

These objectives, while distinct, are not mutually exclusive because they work in tandem to achieve environmental education among youth. For instance, appreciation of ones habitat occurs only when a young person acquires knowledge about it. This knowledge creates wonder and curiosity that act to widen a youth’s perception and understanding of their natural environment – to create a wider sense of community. Furthermore, knowledge is firmly grounded among the youth through guided experiential learning by undertaking activities outside. Book learning is not sufficient, as it must be accompanied by direct experience. This engagement, in turn, creates appreciation. Only when one appreciates, does a young person develop a sense of responsibility to care for ones habitat. At its core, this process creates informed and committed youth to environmental stewardship.

Responsibility for ones habitat is at the core of the ethic of stewardship. The word ‘steward’ combines the two active roles: of being ‘in charge’ on the one hand; and ‘to serve’ on the other. Humanity and by extension the 4-H youth are both ‘guardians of’ and ‘servants to’ life on this planet. Both ideas are commensurate, equally relevant, neither can be compromised. For 4-H youth, this means inculcating through this curriculum the value of responsibility by demonstrating how a human being is simultaneously in charge of their habitat and by knowledgeable action serves its wellbeing. The specific activities should engender a sense of mutual relationship where the youth benefits from and conserves their habitat.

A human ecological perspective informed by the ethic of stewardship is not only desirable, rather it is a necessary value in the twenty-first century. As a result of using the *Wildlife Notebook*, over the lifetime of the 4-H youth we should expect:

- An expanded ethic of stewardship encompassing all lands and waters whether they are urban or rural;
- A desire to work collaboratively with employers and employees, educators, artists, clergy and laypeople, young and old alike – to achieve a future that is sustainable;
- An understanding that economic and ecological matters relating to their habitat or home (*oikos*) are not unrelated, but are profoundly interconnected;
- Valuing of local place-based and indigenous knowledge about landscapes and natural resources; and
- An embrace of the ethic of stewardship throughout their adult life.

In short, it is important that the 4-H youth understands that: once you learn about wildlife in this **Wildlife Notebook**, you become responsible for your habitat!

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## Introduction

At the time that author Dr. Dan Decker wrote and released the *Wildlife Notebook* in January 1988, it was intended as an informal information resource for educators, 4-H club leaders, 4-H members, and residents. The species fact-sheet format was similar to Aldo Leopold's Sand County Almanac, written more to share personal knowledge and observations than to convey specific educational goals or concepts. However, the basic environmental literacy of the average sixth through tenth grader has been declining as it relates to native species of wildlife in their own backyard.

In order to make this publication and others written by the Department of Natural Resource staff (specifically from the mid-1980s to mid-1990s), a collaborative campus-county partnership was developed with funding through a USDA Smith-Lever grant. The grant allowed the collaborators to review and update scientific knowledge while matching the materials to current NYS and Next Generation learning standards. This update will make these resources available through both web-based and hard copy sources. The materials will also suggest some inquiry-based questions that match the topic-specific materials.

## Learning Standards

In 1988, there were no curriculum standards that had to be met in the educational system. Since then, core curriculum standards have been put into place in New York State that describe mandatory educational requirements. These standards are based upon age group and topic, such as Science, Math, English, Technology, and so on. Even though this booklet was written before educational standards existed, the information within meet many of the current curriculum standards. These standards come from the NYS Elementary Science Core Curriculum Standards and the Next Generation Science Standards.

The NYS Elementary Science Core Curriculum Standards are just a portion of what should be covered in an elementary level science program. The NYS Elementary Core Curriculum Standards are meant to guide curriculum preparation, not to serve as a strict syllabus. Teachers have the ability to be flexible with what they teach and manipulate curricula to suit the age group of their students. Teachers are encouraged to expand upon curricula to meet NYS Standards

for Math, Science and Technology. These standards

specifically address the expected skills and content which will be required to take NYS examinations. Curricula should be aimed at hands-on experiences, to allow students to personally interact with the elements they are learning about. This is particularly true with education about the environment. Inquiry-based questions should be used to test what information the students have retained and understand.

The Next Generation Science Standards are a compilation of educational requirements that must be met within all areas of science education. They are relevant for elementary, middle, and high school students. These standards are meant to help teachers create a curriculum that helps students understand information and develop skills in the sciences. The sciences touched upon include: Physical Sciences, Life Sciences, Earth and Space Sciences, and Engineering Design Sciences.

The *Wildlife Notebook* contains the material that follows NGS standards:

Kindergarten: K-ESS2 with ESSE.2 Bio geology, ESSC.3 Human Impacts on Earth's Systems, K-ESS3 Earth and Human Activity with ESS3-A, ESSC.3.c,

Second Grade: 2LS4 Biological Evolution with LS4.D, 2-LS2 Ecosystems: Interactions, Energy, and Dynamics, 2-LS4 Biological Evolution: Unity and Diversity,

Third Grade: 3-LS2 Ecosystems: Interactions, Energy, and Dynamics with LSD.2, 3-LS4 Biological Evolution: Unity and Diversity with 3-LS4-1 through 3-LS4-4,

Fourth Grade: 4-LS1 From Molecules to Organisms: Structures and Processes with 4-LS1-1 and 4-LS1-2,

Fifth Grade: 5-LS2 Ecosystems: Interactions, Energy, and Dynamics with LS2A,

Middle School: MS-LS2 Ecosystems: Interactions, Energy, and Dynamics with LS2A, LS2C, and LS2D, MS-LS4 Biological Evolution: Unity and Diversity with LS4A-C, MS-ESS3 Earth and Human Activity with ESS3.A, ESS3.C.

High School: HS-LS2 Ecosystems: Interactions, Energy, and Dynamics with HS-LS2-1 and LS2-2, LS2-6 through LS2-8, HS-LS4 Biological Evolution: Unity and Diversity with HS-LS4-2 and HS-LS4-4 through HS-LS4-6 (LS4B, LS4C, LS4D, and EST1B).

## New York State Common Core Standards:

Elementary (K-4) Standard 4: The Living Environment. This publication connects with Key Ideas 1, and 3 (Performance Indicators 3.1a, 3.2, and 3.3); Key Idea 4 (Performance indicators 4.1a, 4.1e-4.1g, and 4.2); Key Idea 5 (Performance indicators 5.1, 5.2b through 5.2g); Key Idea 6 (Performance indicator 6.1); and Key Idea 7.

Intermediate (Grades 5-8) Standard 3: Performance Indicators 3.1b, and 3.2a-b, Key Idea 4: Performance Indicators 4.1a-b, 4.2, 4.3a, 4.3c, 4.3d, and 4.3f, Key Idea 5: Performance Indicator 5.1, Key Idea 6: Performance indicator 6.1, Key Idea 7: Performance Indicator 7.1, 7.2.

## Inquiry-Based Learning

In a publication titled *Experiential & Inquiry-based Learning with Youth in Non-Formal Settings*, the NYS 4-H office defines inquiry-based learning as “constructing learning through hands-on experiences that provide evidence about phenomena in the world.” Learning is driven by exploring and directly observing the processes in the world around us, hypothesizing as to why certain phenomena occur, and gathering evidence, either through experiments or further observation, to support or counter the original hypotheses.

Inquiry-based learning is absolutely essential in developing a youth’s curiosity and scientific knowledge. The most critical part of planting the seeds of curiosity within a new generation is teaching them to always incessantly ask “why?” When we foster such relentlessly inquisitive thinking, kids learn at an early age how to: explore deeper levels of understanding on their own, shape questions that interest and inspire them, explore the validity of their hypotheses, collect and review original data, and independently develop their evidence-based answers based on the overall experience.

Here are some examples of inquiry-based questions related to the NGSS and NYS Common Core standards:

- What happens to organisms when their environment changes?
- How do internal and external structures support the survival, growth, behavior, and reproduction of animals?
- How do organisms change over time in response to changes in the environment?

Encourage youth to ask questions and provide them

with the opportunity discover their own answers through personal observation, research, and data collection. It is now easier than ever for youth to become engaged with scientific methods and tools. There are affordable trail cameras, GPS units, and even drones available for wildlife observation that allows humans to collect data using hi-tech methods, and the ubiquity of information on the internet provides insight into countless questions.

## Summary

The *Wildlife Notebook* has been popularly used in Cornell Cooperative Extension’s 4-H program for over a decade. The original text meets many of today’s NYS Elementary Core Curriculum Standards as well as the Next Generation Science Standards. This booklet did not have an explanation of these standards before, but one has now been added so Educators know what specific standards this curriculum meets.

The *Wildlife Notebook* is a resource that can be used by educators, 4-H leaders, and members who are participating in Wildlife Habitat Education Program (WHEP), Forestry, and Wildlife curriculums or programs. While this revision of the original *Wildlife Notebook* is not comprehensive, it is intended to foster a greater understanding of several species that the average New York resident may encounter in daily life. Whether in Central Park West or the high Peaks of the Adirondack Mountains, our interactions with the world around us are heightened by knowing more about our shared environments. We hope to foster the understanding that we are just as much a part of the squirrel’s world as they are a part of ours, along with the framework of inquiry-based methods to examine what exists, the relationships among them, and their roles within an ecological system.

## The Evolving Definition of Ecology

The word “ecology” is derived from the Greek word for “household”: oikos. Thus, from the start, the study of ecology sought to examine relations among all the parts within a system, living and nonliving. The Ecological Society of America has provided a definition for the concept of ecology: “Ecology is the study of the relationships between living organisms, including humans, and their physical environment; it seeks to understand the vital connections between plants and animals and the world around them.” An ecologist can study any habitat, from the unfathomable depths of our vast blue seas to an

invisible patch of microscopic bacteria on the inside of a fish tank, from a squirrel's nest high in a pine's branches to an apartment complex in a city. Humans are key actors within the ecological systems of our planet, as our activities heavily influence the lives of our fellow species and often have lasting biophysical impacts on the biotic and abiotic features of our environments. Understanding the ecological contexts and relationships that bind ecosystems together can help us learn how to use Earth's resources in sustainable ways that will keep the planet healthy for generations to come, both human and nonhuman.

Humans have historically not been the best stewards of our environment. We have polluted and exploited our habitats, often without regard for the other living creatures we share our environments with, and without recognizing that just as we have the ability to shape our environment, our environment in return shapes us. With the aid of ecological studies and an ecological mindset, ways of living that are more acknowledging of our environmental contexts and relationships have been discovered. In the 1960's, it was found that the high levels of nitrogen and phosphorus in laundry detergents and fertilizers that leaked into various water sources, such as lakes and streams, could severely damage the ecological balance within those systems. All living communities around polluted waters were negatively impacted, from the bacteria to the fish to the people. Armed with ecological knowledge, human communities were able to clean up their local lakes and streams, restoring the habitat for all.

Another ecologically damaging force is that of invasive species. The USDA has defined an invasive species to be a species that is non-native to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm, or harm to human health. Invasive species disturb the complex ecological balance of their invaded environment by competing with native species and often decreasing native populations. Humans have tried several control measures, but invasive species are very difficult to eradicate. It must be noted that the concept of an invasive species is defined by what humans perceive to be threatening. For example, many earthworms in the U.S. are non-native, as they were brought to the continent in the 1600s by European settlers. While we do not tend to perceive earthworms as invasive, their presence has fundamentally altered soil composition, making it more difficult for native flora to survive and compete with invasive plant species. This results in population shifts of plants, affecting animals up and

down the food chain, the physical environment, and of course, the human behaviors and communities that are integrated within this complex ecosystem-wide web of interactions.

Environmental factors have a great impact on public health, as human populations exist within the context of their environments. Ecologists have found that wetlands and marshes act as gigantic water filters. Such a realization is of great importance to the public, since the maintenance and care of wetlands and marshes means that money does not need to be funneled into water treatment plants, and vital habitats for countless organisms are conserved. Without wetlands, we lose key pieces of the ecological puzzle that holds the whole system in balance. For example, many young fish rely on the protected waters of wetlands for food and as a safe place to grow. Without intact and healthy wetlands, fish populations decrease, leaving all those who fish for a living, be it the fisherman or the osprey, without the resources they need.

Understanding the relationships between humans, other organisms, and their environments has given humans the ability to be *stewards* as we mindfully manage and conserve the environment in a way that respects the complex connectivity of a given habitat. Fires in forestlands and grasslands may at first be seen as a purely destructive force, yet they are in fact necessary for the smooth functioning of the ecosystems in which they occur. Low intensity fires clear the forest floor, reducing competition for nutrients among the strong and healthy trees. They get rid of pests and diseases, and some pine trees have serotinous cones that are covered in a resin that requires fire to induce germination. By studying the ecological impacts of fires, humans have learned how to manage wildfires in a way that benefits all life in the system and contributes to the stability of the abiotic landscape.

Life shapes its environment, and the environment shapes its life. Ecology helps us, human pieces in a great puzzle, to learn and internalize quantifiable facts about the web of connections in which we are embedded. The wisdom of ecological thinking has already been with humans for centuries, and to maintain the balance of Earth's ecosystems, we must constantly keep in mind that our bodies, beliefs, and actions all exist within the context of our environments and cohabitants. With the tools of ecology, we can begin to untangle the intricate web around us, understanding the parts as well as the whole. There is always more to learn about our environments -- all we must do is let our curiosity run wild!

# Beaver (*Castor canadensis*)

## Description

The beaver is North America's largest native rodent. Beavers weigh between 26 and 65 pounds (12 to 30 kilograms) and are between 25 and 35 inches (65 to 135 centimeters) from head to tail. They are primarily aquatic mammals with a waterproof coat that ranges from reddish-brown to blackish-brown in color. The beaver's coat consists of thick protective guard hairs over a layer of fine underhairs.

The beaver is easily distinguished from other rodents due to their very large, bright orange upper incisors. The incisors are usually  $\frac{1}{4}$  inch (5 millimeters) wide and  $\frac{3}{4}$  inch (20–25 millimeters) long, growing continuously throughout the beaver's life. Beavers keep their unruly teeth at a manageable length by constantly chewing on wood to wear them down. Teeth are strong and essential tools for beavers; while humans must use sharp metal axes and saws to fell trees, a beaver needs only its teeth and muscular jaw.

Beavers have several features that help them accommodate an aquatic lifestyle. Their small, rounded, dark ears close up tight in the water, as do their nostrils. Over their eyes lies a protective clear membrane, which allows them to swim while able to see. Their back feet are webbed, and their powerful hind legs are ideal for propelling them through the water. Since their back legs are so large, beavers look like they have hunched backs while standing.

The most defining feature of the beaver is its large, flat tail, covered in blackish scales. Located at the base of the tail in both males and females are the anal and castor glands, which give beavers their distinct odor. Beavers use these glands to mark their territory. People have been able to use the secretions from these glands as well, mostly for baiting animal traps.



**Adult Beaver**

## Signs

Prints left by beavers tend to consist of one webbed rear foot across from one non-webbed front foot, from a waddle-like movement pattern. The rear foot is about 5 inches (13 centimeters) in length and the front foot about 3" (8 centimeters) in length. The drag mark of the tail may be seen running down the middle of the tracks. A clearly noticeable sign of beaver activity is freshly gnawed trees, with large piles of wood chips at the base. The gnawing marks form rings that tend to expose the bright yellow or tan wood of the tree against the darker bark. Your nose may alert you to beaver activity, as they may mark their territory with musk. Dams, lodges, and muddy, trampled trails through the grass along the lakes and ponds are sure signs of beaver activity nearby.

## Distribution and Abundance

Beavers make a living all across North America, with notable exceptions being the deserts of the southern United States and Mexico, as well as in the northernmost parts of Canada. Beavers usually live along lakes, streams, and ponds, preferably out of the way of humans. Beaver fur was a very desirable material for hats from in Europe during the 1600s and 1700s, and the promise of profitable trapping lured European hunters and explorers ever deeper into the North American continent. In fact, the beaver's pelt was in such high demand that by the 1800s, the beaver was almost completely wiped out from New York State, except for a small population in the Adirondack region. Fortunately, in the 1920s, beavers were able to make a comeback due to a change in the latest fashion craze from beaver-skin hats to silk hats, legislative reintroduction efforts, dispersion from neighboring states, and forest fires that enabled poplar populations to increase along rivers, giving any beavers present an abundant food supply. Beavers can now be seen all around New York State.

Beavers live in family colonies which consist of the parents, offspring from the previous year, and offspring from the current year. Usually, there are between four and six beavers per colony, but a full house of up to a dozen beavers is possible as well. The colony's territory is protected by scent-mounding—a process in which an adult beaver secretes castoreum from their castor glands on a pile of mud and debris by urinating on the mound. The scent keeps other beavers away from their territory. In the event of an intruder, beavers viciously defend their home range; however, a fight between beavers rarely leads to death.

## Life History

### Reproduction

Beavers are monogamous, meaning they mate with one partner for life. If one of the pair dies, the widow or widower beaver readily takes another mate. Both male and female beavers reach sexual maturity at three years old. In colder climates, the mating season is between January and March, but farther south, beavers mate between April and June. Females give birth to one litter a year with 1 to 4 babies in a litter, after a gestation of about 107 days. When the babies, called kits, are born, they are about 15 inches (38 centimeters) long and weigh 9–21 ounces (250 to 600 grams). Kits are fairly precocial, meaning they are relatively mature at birth, as they enter the world covered with hair and eyes wide open. Amazingly, kits are able to swim when they are only 24 hours old. Within several days, they are diving out of the lodge to play and explore with their parents.

Kits stay close to their lodge for about a month, until they have enough energy to leave for a longer period of time and find solid foods. They are usually weaned after 14 days, but sometimes weaning can take up to 90 days. Young beavers stay with their parents until they are two years old, then they depart to start homes and families of their own.

### Habitat and Food

Beavers build lodges along streams, on the shores of lakes and the banks of ponds, on islands and reservoir margins, in swamps and marshes, and anywhere else with a permanent water source, trees, and plenty of food. Beavers use sticks, grass, moss, and mud to build the outside of their lodges, and the inside the floors are lined with a carpet of wood chips, bark, and grass. As repairs are made every year, the lodges increase in size, growing up to 8 feet (2.4 meters) wide and 3 feet (1 meter) tall.

The beaver's lodge is not just a home to raise a family. The lodge's walls protect the beavers from predators and harsh weather. The inside of the lodge is brilliantly engineered to be temperature-controlled, and is always slightly warmer than the air outside, which keeps it cozy during the frigid winter months.

Beavers have a unique diet. A majority of their diet consists of tree bark and cambium, which is the outer layer of wood in a tree. They preferentially munch on the twigs, leaves, buds, and wood of willow, maple, poplar, beech, birch, alder, and aspen trees. In the summer months, beavers often feed on aquatic vegetation, such as water lilies and fern rhizomes. Beavers are able to survive off this

seemingly impossible diet because they can digest cellulose, a feat which is practically unimaginable for other mammals. Thanks to the microorganisms in their cecum, a small sac between the large and small intestines, they can extract plenty of energy from cellulose-rich stems of woody plants. During the winter months of New York, thick ice forms on the water bodies beavers live by, making it hard for beavers to find fresh food. Before winter is in full swing, beavers store food at the underwater entrances to their dens, creating a "feed pile" to nourish them until temperatures are warm enough to melt the ice.



Beaver Kit

### Mortality

The beaver's predators include coyotes, fishers, bears, and bobcats. Beavers are most vulnerable when they travel far distances from the water in search of food. Kits face even more threats, since they are small enough to be preyed upon by great-horned owls, fishers, otters, and foxes. In the Adirondack Mountains, beavers are the preferred meal for coyotes, for on land they are much easier to catch than the nimble white-tailed deer.

Though beaver is not widely hunted for our food, humans also kill several beavers every year. Many beavers accidentally get hit by cars, and they are currently a species of interest for trappers.

Beavers are known to host a variety of parasites. It is expected that beavers have intestinal parasites, such as nematodes and tapeworms, yet any such inhabitants seem to have no negative affect on their hosts. Recent studies have indicated that beavers may be linked to the intestinal parasite *Giardia lamblia*, which causes "beaver fever" in humans when we drink infected unfiltered water. However, the disease's common name may be misleading as it has never been definitively proven that the beaver hosts this parasite.

Externally, beavers carry many different species of mites in their fur. One beaver may be home to as many as ten different species of mites, all adapted to live on different parts of its body.

## Ecological Values

### Positive Impacts

Beavers have an abnormally large impact on their environment, compared to other rodents. When a beaver picks a spot to build a home, the only thing it requires are steady water flow and enough wood. From these basic supplies, beavers construct dams and lodges. Beavers are called “ecosystem engineers” because their buildings dramatically alter the local environment, creating and destroying habitats for other species. Other examples of ecosystem engineers are corals in the oceans (who build reefs that are large enough to see from outer space) and humans on land (whose activities impact the global environment). When the beaver creates a dam, usually in a stream, water begins to pool up behind the barrier, creating new ponds. Aquatic vegetation begins to grow, supplying the beaver and other grazers with a new source of food. The new pond also creates a habitat for fish, amphibians, reptiles, waterfowl, and mammals, which in turn attract all sorts of ecologically significant predators. The trees which the beavers fell and gnaw holes in are perfect homes for cavity-nesting animals such as the wood duck. The beaver’s activities have cascading effects that ripple dramatically through their local habitat.

Beaver activity helps maintain and fortify wetlands that already exist. Wetlands are vital and delicate ecosystems that act as gigantic water filters by trapping debris from upstream while letting clean water continue downstream. Beaver dams also prevent riverbank erosion, which saps nutrients from the soil and prevents healthy plant growth along waterways.



*Beaver Skull*

### Negative Impacts

As is the case for any ecosystem engineer, while the beaver’s home can create a favorable habitat for some animals and plants, it can also decimate certain populations that already exist in the area. In fact, biological diversity in a local environment may

be completely wiped out by beaver activity. Some amphibians and reptiles require different water temperatures than that of the water in the beaver ponds. The usually dry roots of many trees can be drowned by the excess water now present in the soil. Only flood-tolerant or wet-tolerant species will persist. High beaver concentrations may completely destroy sections of forestland. Their impacts may alter the ecological succession of the area, and a landscape can be completely and radically altered.

## Economic Values

Over the past century, humans have sought out the beaver for its soft, warm pelt. When beaver populations and pelt demand were both high, commercial trappers could make quite a profit, but recently demand for beaver fur is relatively low. As of late, beavers have been proving to be a management challenge. Beaver dams often create flooding that impacts human habitation along with the habitats of nearby plants and animals. Dams can lead to flooded roads, railroad tracks, septic systems, agricultural lands, and plug culverts. Private property damage is often an issue as well. Due to their high numbers and low predation rates, beavers can be a financial burden for cities, towns, counties, and home owners.

## Management

When beaver activity leads to flooded roads, it is usually due to a plugged culvert. The fairest way to deal with beavers that negatively impact their local environment is to allow them to stay in their home while limiting their activities so they do not create major floods. One method for dealing with a plugged culvert is to put fencing around the culvert inlet, prompting the beavers to build their dams against the fencing instead of blocking the culvert. For example, a structure called a “Beaver Deceiver” is made of fencing either in rectangle or trapezoid around a culvert’s inlet, creating a barrier between the beaver dam and the culvert while allowing other wildlife to pass through without issue.

If a beaver dam becomes too much of a problem, a common solution is to lower the water level, usually only by a foot a day. This often provokes the beavers to abandon their home, but a tenacious family may work harder to combat the loss of water. At some point, it may be decided that the dam itself should be removed. Removal is also done in stages, by a foot a day. However, taking out a dam sometimes only results in stubborn beavers simply rebuilding it.

A variety of live catch and kill traps may be used by animal damage control and highway departments, depending on beaver populations, local and state regulations, and harvest seasons. Some towns and cities may utilize licensed recreational trappers to conduct animal removal during established trapping seasons to reduce program staffing costs.

## **References**

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[http://animaldiversity.org/site/accounts/information/Castor\\_canadensis.html](http://animaldiversity.org/site/accounts/information/Castor_canadensis.html)

<http://www.dec.ny.gov/animals/63052.html>

# Muskrat (*Ondatra zibethicus*)

## Description

From a distance, the muskrat can only be confused with one other iconic New York mammal: the beaver. Upon closer inspection, the muskrat can be distinguished from its cousin by its tail, which is vertically compressed instead of laterally flattened. The muskrat's head is small yet broad with small eyes and nearly invisible ears. Its body is very compact, with small front feet and large, webbed hind feet, perfect for powerful underwater propulsion. The underfur is thick and woolly, interspersed with long, coarse guard hairs. The muskrat's coat ranges from dark brown or black on top, reddish to grayish brown on the sides, and a pale creamy gray on the underside, the throat being light gray to white.



**Adult Muskrat**

Muskrats are active during both the night and day, although they are mostly nocturnal. They do not hibernate and are active year round. They are exceptional swimmers, having the ability to stay under water for up to 17 minutes on one breath. On land, however, they are very slow and susceptible to predation.

Muskrats often live in family groups of 4 to 5 muskrats. When a family group becomes too crowded, the female drives out her offspring that are old enough to survive on their own. Family groups live in an established territory which is protected by the male. Males guard their home range vigorously, particularly just before and during the breeding season.

Young adult muskrats often do not have established homes and are vulnerable to predation while searching for a territory. Older muskrats aggressively chase newcomers out of their well-stocked territories, leaving their younger counterparts to scrounge for any food they can find.

While muskrats have poor eyesight, sense of smell, and hearing, they communicate with musk to signal territorial boundaries to each other and warn off intruders. They also make vocalizations, chatting and arguing amongst each other with squeals and squeaks.

Weather conditions have a large impact on muskrat survival, and muskrats have evolved to best be able to survive in various conditions. Dry and hot weather lowers water levels, making muskrats susceptible to predation and possible starvation. In the cold, muskrats use a special adaptation called "regional heterothermia," which regulates blood flow to the tail and feet, making these parts of the body slightly cooler than the core. This allows the muskrat to conserve heat, since its extremities lack thick fur cover to insulate against the frigid water and air.

## Signs

You might think that the tracks of the muskrat would be similar to the beaver. While they have some small similarities, the muskrat's rear feet are 2-3" (5-8 centimeters) in length are not webbed. The front feet are 1" (2.5 centimeters) in length. The rear tracks slightly overlap the back of the front tracks and a slim tail drag mark may be seen down the middle. The most common sign of muskrat activity is fairly large piles of stacked reeds and grasses along the edges of lakes and ponds. Muskkrats sometimes eat mussels, crayfish, and carrion, leaving the discarded empty shells or bones of these foods nearby.

## Abundance and Distribution

The muskrat's habitat ranges from northern North America down to the Gulf Coast and the border of Mexico. They are not found in Texas or in the very hot parts of the southeastern and southwestern United States. The muskrat can also be found at the southern tip of South America. In New York, muskrats are one of the most abundant furbearing species. They were introduced to Europe in the 20th century, and have since reached such high numbers that they are considered pests. Invasive species are not a concern in Europe alone. Muskkrats were introduced to the Delmarva Peninsula of the United States in 1938, and are now found across the country.

## Life History

### Reproduction

The muskrat breeding season begins in April, by May, the first litter of young is born. The gestation period lasts 25 to 30 days (an average of 28 days), and 4 to 8 kits are born per litter, though muskrat mothers can

carry up to as many 14 babies at once. A female has up to three litters a year.

When the young are born, they are hairless, pink, and blind, weighing about 0.8 ounces (23 grams). They develop rapidly, opening their eyes between 14 and 16 days old and weaning at about 21 to 28 days old. Females born in the early spring can mate in their first autumn, however northern muskrats do not become sexually mature until they are at least a year old, as full adults.

In the wild, most muskrats live to about 3 years old, but in captivity they have been known to live for 10 years.

### **Habitat and Food**

Muskrats like to set up homes in wet areas, with at least 4 to 6 feet (1.2 to 2 meters) of water. They can be found in ponds, lakes, streams, rivers, and swamps, but their favorite place to live is in marshes where the water level remains constant year-round. Marshes are also abundant with favorable food for muskrats, such as cattails, bur-reeds, and bulrushes. Muskrats are found in both fresh and brackish waters (waters where salt water meets and mixes with fresh water).



**Muskrat**

Muskrats build burrows in the banks of ponds, lakes, and streams. The burrows are concealed structures, consisting of tunnels, an underwater entrance, and a few larger chambers. Muskrats also build small houses out of mud and aquatic vegetation. These houses are not as expansive as the burrows, with an underwater entrance and just one or two living chambers within. On occasion, muskrats move into abandoned or inhabited beaver lodges.

A muskrat's diet depends on its local habitat. Muskrats living in marshy areas may solely consume aquatic vegetation, especially cattails. They also eat pickerel weed, pondweeds, arrowheads, water lilies, and several other aquatic plants, particularly favoring their roots and stems. The muskrat uses its forefeet and sharp incisors to harvest its meals. Muskrats living in lakes, ponds, rivers, or streams may have a more omnivorous diet. When plants are scarce, a muskrat can eat animals, such as mollusks, fish, various invertebrates, and even turtles and crayfish. A muskrat prefers to eat food while on a solid platform, such as the bare edges of a stream's banks, the tops of tussock grass clumps, or nestled within aquatic plants.



**Muskrat push-up mound on the ice**

In the winter, muskrats make a specialized structure out of vegetation. These muskrat-made mounds are called "push-ups" or "breathers," and are constructed out of plant matter from the bottom of the stream that has been pushed through holes and cracks in the ice. The structure freezes solid, and a muskrat may use it as a protected breathing or resting site.

### **Mortality**

The two main predators of the muskrat are the raccoon and the mink. Other threats include snapping turtles, foxes, coyotes, red-tailed hawks, great-horned owls, northern harriers, weasels, otters, and bobcats. The muskrat's best defense against predators is to either escape into the water where their excellent swimming skills give them an edge, or escape into their underground burrows. As was previously mentioned, the muskrat on land is not a fast creature, and a wise muskrat will not stray too far from its watery home for fear of the descending shadow of a hungry hawk. Humans, like other predators, have an impact on muskrat mortality, as muskrats can be run over by vehicles and killed in animal traps.

Muskrats are very susceptible to disease, such as tularemia, leptospira, salmonella, and hemorrhagic

fever. Fortunately, these diseases have not had a major impact in the muskrats of New York State. Muskrats may also host a variety of parasites. The warm underfur of the muskrat is often home to many ticks, fleas, and mites. Their internal parasites include tapeworms and intestinal roundworms, but these parasites do not have a big effect on their overall health.

### **Ecological Value**

When a muskrat moves into an area, they may cause significant structural damage. Muskrats consume much of the edible vegetation around their den's site, reducing the number of plant roots holding soil together, and their dens weaken the banks of the waterway they live in. As a result, muskrat homes increase erosion levels along riverbanks.

On the up-side, a muskrat's building activities also have positive ripple-effects through their ecosystem. When muskrats manipulate vegetation in a waterway for their own use, they create habitats that various animals can use. Turtles use a muskrat's house as a place to hibernate, and Canada geese use a muskrat's hut as a resting place. In New York State, the muskrat's consumption of bur-reed creates open, matted areas in the water, which provides the perfect setting for the endangered black tern's mating rituals. The activities of the muskrat, like the activities of any organism within an ecosystem, touch the lives of the countless beings who share their complex and interconnected environment.



***Muskrat Skull***

Muskrats are abundant enough in New York State to provide predators with a year-round food source that is currently self-replenishing, but muskrat populations may boom and bust over the course several years due to predator-prey interactions and factors such as disease and food availability.

### **Economic Value**

The muskrat's fur has an important place in the fur trade, and there are plenty of muskrats to keep the

supply steady. Muskrat pelt prices vary yearly, but they have never been as highly valued as their larger aquatic cousin, the beaver. A low price is not a deterrent for trappers, due to the sheer numbers of muskrats and relative ease of trapping. Some people eat muskrat meat, though it is said to have a greasy consistency.

Muskrats may have a negative impact on farms, which are part of the large agricultural economy of the state. New York has an abundance of dairy, meat, vegetable, and crop farms throughout the state. Muskrats are most frequently linked to burrowing damage in the stream banks, dikes, and waterways that farmers use to move livestock, prevent flooding, or provide irrigation. On rare occasions, muskrats may take advantage of readily available crops as food sources.

### **Management**

Muskrats reproduce quickly, keeping their populations relatively stable even in tough times. There is a regulated muskrat trapping season, with a liberal harvest number that allows biologists to provide basic population control. Like damage caused by beavers, permits may be issued to trap and or remove particular muskrats whose activities are too damaging to human habitations.

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## Fisher (*Martes pennanti*)



*Fisher*

### Description

The elusive but increasingly abundant fisher is a member of the diverse weasel family. It has a body that lies low to the ground, with short legs and a fairly bushy tail. Fishers resemble both the marten and mink, but are twice the size of these medium-sized mustelids. Their ears are small and rounded, with a fur coat ranging from dark brown to almost black. The females and juveniles are more uniform in color, while the adult males tend to have some blonde mixed in along the chest, neck and upper back. Males have a coarser coat than females.

Males are generally bigger than females. A male weighs between 7 and 13 pounds (3 and 6 kilograms) while a female weighs between 3 and 7 pounds (1 and 3 kilograms). An adult male generally grows to be from 35 to 47 inches (90 to 120 centimeters), while a female ranges from 30 to 37 inches (76 to 95 centimeters). The fisher's large, five-toed feet make it an exceptional tree climber, and it can trot across thick snow with ease. The fisher can rotate its hind feet almost a complete 180 degrees, allowing it to climb down trees head-first. Each foot is also equipped with semi-retractable claws, which help the fisher effectively grasp and kill prey.

### Signs

Like other weasels, the fisher leaves its prints in pairs, meaning that the two front tracks are in line with each other, as are the back tracks. The rear, five-toed prints often overlap the back of the front prints. The prints can be up to 2" (5 centimeters) wide and have a stride of 30" (76 centimeters) in length. Tracks will seem to randomly wander, following the fisher's search for food.

### Abundance and Distribution

North America is the only place in the world fishers call

home. They range from coast to coast, and in the east they are found as far south as Virginia to as far north as Quebec and the maritime provinces of Canada.

Fishers prefer to live in deciduous, coniferous, or mixed forests. In the late 1800s and early 1900s, the fisher population in New York reached very low numbers due to exploitation by hunters and the clearing of forests for farm land and logging. Fortunately, the fisher population in New York has been growing again due to the success of reintroduction efforts and reforestation programs. Within New York, the fisher is mostly found through the northern, eastern, and southeastern parts of the state, inhabiting a total of about 26,000 square miles (67,400 square kilometers) of forested land. While they are not as abundant in the western and southwestern parts of New York, they have slowly been moving back into these regions.

### Life History

#### Reproduction

Female fishers reach sexual maturity after 1 year. The breeding season begins in March and often runs until May. Females experience what is called embryonic diapause, which is when implantation of the fertilized embryo is delayed. This means that the female mates in the spring, but the embryos stay suspended for about 10 to 11 months, then resume developing late in the winter. Altogether, gestation lasts 11 to 12 months, and the female gives birth. Soon after, the tireless female mates again. Because of delayed implantation, females spend most of their lives in a state of either pregnancy or lactation. A female births a litter of 2-3 kits. The kits are born only partially furred with their eyes and ears closed as essentially helpless offspring. The kits are weaned at 8 to 10 weeks after birth. At 5 months old, the kits leave their family group, since inter-family aggression increases with time. Males are sexually mature when they are 2 years old, and from then breed yearly.

#### Habitat and Food

As mentioned earlier, fishers inhabit deciduous, coniferous, or mixed forests. They make dens in the cavities of older trees, hollow logs, brush piles, rocky outcrops, and underground burrows. Young are raised in dens made from hollows in trees that are high above the ground, far from danger. Spruce, fir, white cedar, and a few species of hardwood are the most common tree species within a fisher's habitat.

Fishers are active all year round and have been observed both during the day and night. They are solitary animals, and males often fight with each other

when they do interact. The only time fishers have been known to travel together is during mating season. The fisher's home range is between 5.5 and 13.5 square miles (15 and 35 square kilometers), and males have larger home ranges than females. A male's home range may overlap with a female's range, but the home ranges of two males never overlap.



*Fisher peering from tree cavity/den*

Fishers are not picky when it comes to food. They have an expansive diet, eating a wide variety of small- to medium-sized mammals and birds as well as hard and soft mast (beechnuts, acorns, apples, and berries). Fishers often eat rabbits, squirrels, mice, shrews, and the carrion of larger animals, such as white-tailed deer. The fisher's competitors include coyotes, red and grey foxes, raptors, and bobcats.

There is a species on a fisher's menu that other predators actively avoid. The fisher is the only mammal in North America that can kill a porcupine. Of course, porcupines are not easy to hunt, due to their tens of thousands of quills. To avoid injury, a fisher will attack the face of a porcupine, and if their prey tries to scurry up a tree, the fisher can easily follow thanks to its excellent climbing skills. After a fisher has successfully killed a porcupine by repeatedly striking the face, it eats the entire animal, leaving only the quilled skin and a few large bones as evidence of its extraordinary hunting abilities.

### **Mortality**

An adult fisher faces few threats aside from human trapping, the occasional automobile collision, and habitat destruction. Young fishers are more vulnerable than adults, as hawks, red foxes, lynxes, and bobcats readily prey on fisher kits.

While the fisher does carry some parasites, such as tapeworms, intestinal roundworms, and some flat worms, these parasites have little effect on the overall health of the fisher. Rabies and distemper have been

known to infect individual fishers, but they do not have a huge impact on mortality, with very few fishers dying from disease. There has been little documented research about fisher mortality in the wild.

### **Ecological Values**

Fishers are key to the healthy functioning of their ecosystems. By preying on large numbers of rodents, rabbits, and other smaller species, they help keep the rapidly-growing populations of herbivores in check, which in turn allows for healthy plant growth. Porcupines, who debark and kill many tree species, are kept from becoming too damaging by fisher predation. Since fishers do not carry many diseases, they do not spread rabies or distemper to other animals.



*Juvenile Fisher*

### **Economic Values**

Fishers are valued by humans for their pelts, but their intelligence and elusive nature makes them difficult to trap. Even so, their weasel-family curiosity sometimes gets the better of them, and the fur of a large male fisher can fetch a healthy price.

In recent years, fishers have grown accustomed to living around human habitation. Fishers can become a problem in rural and urban areas as they tend to attack pets, domestic fowl, and other small farm animals. To avoid problems with fishers, people are advised to keep trash out of easy access, watch out for kids and pets while running free outside, and keep domestic fowl out of the predator's reach.

### **Management**

NYS DEC has come up with a plan for increasing and stabilizing the fisher populations in New York State. This plan is called the New York State Management Plan, and it has two main objectives: (1) maintain or enhance fisher populations in all areas of the state where suitable habitat exists; and (2) provide for the sustainable use and enjoyment of fishers by the public. This plan contains summaries of existing data on fisher populations and defines specific objectives

that meets the needs of various areas of the state. A draft of the fisher Management Plan was reviewed by the public and more than 300 individuals and groups gave feedback. All of the feedback was taken into consideration while writing the final draft of the plan.

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## Long Tailed Weasel (*Mustela frenata*)

### Description

The long-tailed weasel has a long, slim body, with short legs and a long, black-tipped tail. The weasel changes its fur color to match the season, wearing snow-white from mid-November to February and changing to a dark brown on the back with a lighter cream color on the belly between mid-February and mid-March. The tail maintains its black tip year round, which is a defining feature of the long-tailed weasel, as it can be used to differentiate the long-tailed weasel from the least weasel, who does not have a black-tipped tail. The weasel's head is narrow with long, slender whiskers. Its coat is made of short, soft underfur topped with long, shiny guard hairs.



**Long-Tailed Weasel**

This species of weasel is similar in size to the grey squirrel, and is the largest of New York's native weasel species. The males are generally larger than the females, weighing up to  $\frac{1}{2}$  pound (0.2 kilograms) while the females weigh up to  $\frac{1}{4}$  pound (0.1 kilograms). The male's body ranges between 13.5 and 17 inches (35 and 43 centimeters) long, and the female's body ranges between 11 and 17 inches (28 and 43 centimeters) long. The long-tailed weasel is aptly named, as its tail is about as long as 50% of its body; in males the tail is between 4 and 6 inches (10 and 15 centimeters) long and in females it is between 3 and 5 inches (8 and 13 centimeters) long.

The long-tailed weasel looks very similar to a couple of its close family members, such as the ermine and the least weasel. The least weasel is the smallest of the New York weasels, and the ermine, sometimes called the short-tailed weasel, is the second largest,

behind the long-tailed weasel. As mentioned earlier, the least weasel does not have a black tip on the tail. The ermine, however, does have a black tip to its tail, but it also has distinctive white feet, which the long-tailed weasel does not have. In the winter, all three weasels turn completely white but the ermine and the long-tailed weasel both keep the black tips on their tails, making them very hard to tell apart without very close examination. Even more confusing, "ermine" is a term used for any weasel in its white winter pelage, but note that this does not mean that every weasel is an ermine.



**Long-Tailed Weasel winter pelage**

### Signs

The long-tailed weasel and short-tailed weasel have very similar tracks, in that they are both paired and up to 1" (2.5 centimeters) wide with strides of 4-5" (10-13 centimeters). Claws are present, and the rear print is larger than the front, but the fifth toe may be obscured. Like many weasels, their track patterns tend to wander or meander as the weasel searches for food. Small tunnels may be left by the smaller weasel species as they burrow in the snow for rodents.

### Abundance and Distribution

The long-tailed weasel can be found throughout most of North America, ranging as far north as just above the United States-Canadian border, and as far south as northern South America.

The sexes live apart in their own home ranges. Males tend to have larger home ranges than females, and a male's home range may overlap a female's home range. Long-tailed weasels exhibit very aggressive behaviors towards intruders in their home ranges.

### Life History

#### Reproduction

The breeding season for the long-tailed weasel is from July to August. After mating, the female goes through a period of delayed implantation where the embryo is

fertilized but does not attach itself to the uterine wall. This lasts between 200 and 250 days, with the embryo developing within the last 27 days of the cycle. A litter usually consists of 4 to 5 kits who are born furless and with their eyes shut, completely dependent upon their parents for food and warmth. While the female is the primary caretaker of the young, males occasionally bring food back for their kits. At 14 days, the young kits develop thick white fur and it becomes easy to tell the males apart from the females due to an obvious size difference. At 36 days, the young weasels are weaned and can begin to eat solid food provided by the mother. They are taught to hunt by the mother, and at 56 days the young weasels are completely able to hunt food for themselves. During the first summer of their lives, females mate, but males do not mate until the following spring.

### **Habitat and Food**

The long-tailed weasel is found in both temperate and tropical habitats. This species is incredibly versatile and can make a home in a range of places, including crop fields, forested areas, and suburbs. The long-tailed weasel is a burrowing animal and can create a den in hollow logs, barns, rock piles, bushy hedgerows, golf courses, backyards, marsh edges, brush piles, and the burrows of their prey.

Long-tailed weasels prefer to make homes in areas with high prey densities and ample cover. Ideal real-estate lies in wooded areas that have been recently cut so that sunlight can reach the forest floor, allowing herbaceous plants to grow. Small mammals are attracted to the abundance of fresh food, and the least wary among them make excellent prey for a hungry long-tailed weasel.

The long-tailed weasel is active year-round, day and night. They prefer solitude, aside from during the breeding season, and they seldom leave their dens. The long-tailed weasel has a considerably large home range, usually 75 to 100 acres (0.3 to 0.4 square kilometers). Within its home range, a weasel has multiple dens for different purposes, such as foraging, taking cover, breeding, and so on.

The long-tailed weasel mostly feeds on rodents, including white-footed and deer mice and meadow voles. Larger prey includes cottontail rabbits, chipmunks, squirrels, woodchucks, bats, birds, and bird eggs.

With an expansive diet, the long-tailed weasel is certainly a generalist, eating almost any small mammal it can catch. Such a varied diet is beneficial, as it is easy

to switch food sources when a certain prey species experiences a population dip. A weasel spends its busy days dashing around its territory, checking every possible rodent hole for a meal. It eats up to 1/3 of its body weight every day to support such an active lifestyle. The long-tailed weasel is highly observant and has a keen sense of smell, making it quite an effective hunter. They are even able to pursue their prey up tree trunks into the canopy.

The long-tailed weasel's great hunting skills have given it a bad reputation over the years. They are said to needlessly kill more than they can consume. This reputation stems from when farms were more common

in New York State, and many people had a chicken coop. As they are such aggressive hunters, weasels are programmed to kill when they encounter any scared prey animals. When a weasel would sneak into a chicken coop, the arousal of the scared flock would trigger the weasel's predatory reflexes, and it would kill more chickens than it could fully consume.

The bad reputation of the long-tailed weasel's eating habits does not stop there. There are many myths surrounding the voracious creatures. One myth is that the weasel has a large parasite in its stomach that drives it to eat copious amounts, but of course this is not true! The long-tailed weasel eats as much as it does because of its extremely high metabolism. Another myth is that the weasel hypnotizes its prey before striking. The reality behind this misconception is probably due to the fact that prey animals often freeze to avoid detection while unsure of what to do in a dangerous situation. A particularly interesting and popular myth is that the long-tailed weasel feasts on only the blood and brains of its prey. This, actually, is partially true. While they do drink their prey's blood for its nutritional value, they do not wastefully suck their prey dry and leave the rest of the animal behind. A hungry weasel must make the most of every meal to survive.



### **Mortality**

The long-tailed weasel is not heavily hunted or trapped by humans because their pelts have low economic value. However, the long-tailed weasel has many predators, including red and gray foxes, great-horned owls, barred owls, goshawks, coyotes, and bobcats. Domestic dogs and cats have also been known to proudly bring home a long-tailed weasel every once in awhile.

In the wild, few long-tailed weasels survive past one year. Once they reach adulthood, they have the capacity to live for several years, but the lifespan of this species in the wild is not well known.

### **Ecological and Economic Values**

It is well known that mice and rabbits have very high breeding rates, producing hundreds of offspring each breeding season. Long-tailed weasels are very important to the environment because they feed on these fast breeding animals and keep their populations in check. This is beneficial for humans because mice and rabbits cause a lot of damage to the crops of farms and home gardens. While a farmer may not mind having a weasel around to help get rid of pests, weasels can turn from friend to foe and damage a farm by attacking poultry flocks.

The ecological benefits of the long-tailed weasel greatly exceed their current economic value.

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# Northern River Otter

*(Lontra canadensis)*

## Description

One of New York's greatest gems is the northern river otter. A river otter sighting is always a surprise because they are fairly elusive. Spotting these playful creatures improves an entire day tenfold. The care-free nature of the river otter is relaxing and fun to watch, while their precision and beauty as they gracefully glide through the water puts the world's greatest figure skater to shame. New Yorkers are very lucky to live in a place with a growing abundance of these charming little creatures.



**Northern River Otter**

The northern river otter has a long, sleek body, usually ranging from very dark brown to light chestnut in color, with a pale belly. They have short legs and rounded heads with small ears and nostrils that can be closed underwater. They have long and thick whiskers, which give the otter extraordinary sensory perception. All of their feet are webbed and equipped with claws, and their tails are thick and tapered. Otters have dense, soft fur to help insulate them during New York's harsh winter months. They weigh from 12 to 30 pounds (5 to 14 kilograms), and female otters are typically smaller than male otters, with body lengths up to 38 inches (96 centimeters) for females and 44 inches (112 centimeters) for males.

The otter's pelt was very valuable to Native Americans as a source of warm clothing during the winter. While they were not hunted and trapped as heavily as the beaver, European colonists would still pay a fine price for an otter pelt. At the rate the otter was hunted and trapped, the New York population was almost completely extirpated. The eventual decrease

in hunting and trapping helped otter populations bounce back, and northern river otters are once again becoming common in New York State.

The extremely playful behavior of the otter is more than just good fun to watch. Many of the playful activities otters take part in are actually helpful for survival. Sliding on their bellies is not only entertaining, it is a method of energy-saving transport. Other activities double up as fun and as a means of practicing hunting techniques, strengthening social bonds, and scent marking. The otter's metabolism is very high, giving them a lot of energy but requiring that they eat a lot of food throughout the day.



**Northern River Otter Skull**

Otters are mostly solitary, except for family groups, which usually consists of a mother and her kits. Different family groups tend to avoid each other, so there is rarely territorial fighting. Otters maintain their home ranges by picking certain landmarks, such as a protruding tree root, and urinating on the landmark multiple times. Otters generally do not bother entering each other's home ranges. Males tend to have larger ranges than females, and territories generally span from half a mile to a whopping 48 miles (0.8 to 77 kilometers) of waterway.

Otters are active year round, without hibernating during the winter months. They are mostly nocturnal animals, but they can be seen loping around during the day while playing and foraging for food. During the winter, otters tend to stay out during the day for more time.

River otters are excellent swimmers, diving and maneuvering through the water with great skill and grace. They can hold their breath for up to 8 minutes, rivaling the abilities of even marine mammals. They also move very well on land, with the ability to bound about at a speed of 18 mi/hr (29 km/hr).

## Signs

As a member of the true weasel family, the otter trots in loping strides. Their tracks tend to be in pairs, groupings, or in a somewhat angled string. The mark of

a tail being dragged between the tracks is a tell-tale sign that the tracks you are looking at belong to a river otter.

As mentioned before, river otters often lie on their stomachs and slide through the snow or mud. The indentations this movement creates can often be seen leading right into the water.

### **Distribution and Abundance**

Northern river otters are found throughout Canada and the United States. They even have populations in the delta areas of the Rio Grande and Colorado River in Mexico. The only areas in the U.S. that otters cannot be found are Southern California, New Mexico, Texas, and the Mohave Desert of Nevada and Colorado.

Historically, habitat destruction and over-harvesting has greatly lowered otter populations. Before their decline, otters could be found in every watershed across New York State. Thanks to a temporary suspension of all hunting and trapping that lasted for nine years, otters are now seen throughout the state once again. In the 1990s, the New York State DEC and volunteers were able to safely trap otters from the Adirondack region and relocated them to the western parts of the state.

### **Life History**

#### **Reproduction**

A river otter has multiple mates in its lifetime. The breeding season lasts from December to May, depending upon geographic location. The female delays sperm implantation, so fertilization may occur between 10 and 12 months after initial copulation. The gestation period lasts for 61 to 63 days, with the female giving birth in either April or May. A litter usually has 1-3 kits, but there have been litters of up to 5 kits recorded. Kits are born covered in fur, yet they are blind and toothless. The kits first open their eyes at about 30 to 40 days of age. They begin eating solid foods at about 10 weeks old, but the mother continues to provide them with nourishment until they leave. The kits stay with their mother until they are about 12 or 13 months old, at which point they set out to find their own home range, sometimes traveling up to 100 miles (160 kilometers) away. By the time the kits are two, they are sexually mature.

#### **Habitat and Food**

Northern river otters are dependent upon permanent watersheds. Otters can be found in inland waterways such as streams, rivers, lakes, ponds, marshes, or in coastal waters such as estuaries. They prefer spots with high amounts of vegetation or riparian corridors. Otters

are able to live in almost any environment, ranging from warm to cold climates at varying elevations. Despite their tolerances, they seem to be especially sensitive to water pollution, as they tend to disappear from areas with pollutants in the waters.

Otters build their small dens in hollowed out logs, the burrows of other mammals, and any other cavities they can find. They often line their dens with a soft and insulating coating of hair, leaves, moss, grass, and bark. The dens have underwater entrances and a tunnel that leads to the nest chamber.

Otters eat mostly fish and have been accused of competing with fisherman and eating all of the game fish in a waterway. Such accusations are misinformed, for otters mostly feed on slow swimmers that are easier for them catch, such as bullheads, suckers, and chubs. Otters eat almost anything they can catch that moves, including mudminnows, frogs and other amphibians, turtles, crayfish, crabs, small birds, bird eggs, and occasionally small terrestrial mammals.

River otters capture their food with their mouths, using their long, thick whiskers to sense movement in the mud and water. An otter immediately swallows small captured prey, and transports larger prey to land to eat on stable ground.

#### **Mortality**

In the wild, an otter can live up to 9 years, and in captivity an otter can live up to 21 years. In the wild, otters have many predators, including coyotes, bobcats, domestic dogs, birds of prey, and in southern parts of the United States, American alligators. The otter's main defense is swiftness and agility in the water, which is useful for evading predators.

Humans have hunted and trapped otters for many, many years. Humans are a major predator during the regulated otter hunting season, especially when otter pelt prices rise. Otters are also at risk of mortality from occasional automobile collisions.

Otters are very susceptible to various types of intestinal parasites, including nematodes (roundworms that infect the digestive tract). They are also prone to rabies and distemper, which can lead to death.

### **Ecological Values**

Otters generally have a low impact on their surroundings when it comes to building a home. In fact, they really don't do much to modify an area when

they move in, as they make dens in the burrows and hollows conveniently created by other animals. When one animal abandons their home, the otter is ready and willing to move in.

Otters benefit greatly from the presence of beavers, and both beavers and otters are often found in active beaver ponds. The habitat created by the beaver brings in fish, vegetation, amphibians, and reptiles, so the otter can eat well when living nearby. The abundant woody materials the beavers bring into the area make ample latrines and denning sites for otters as well.



***Northern River Otter Family Group***

### **Economic Values**

Humans have been trapping river otters for many years because of the demand for their pelts. In the 1983-1984 hunting season, 33,135 otters were harvested throughout the U.S. and sold at \$18.71, per pelt. In Canada and the western United States, the otter is still a good source of income. However, in New York, selling otter pelts is not a huge industry. Despite the accusation that otters deplete sport fish populations, they actually help out anglers by consuming the fish who are necessary to the ecosystem but compete with the much sought after game fish New Yorkers enjoy eating.

### **Management**

The northern otter populations of New York have been stabilized due to reintroduction efforts by the DEC in the 1990s. Unfortunately, otters are a specialized animal, making them very susceptible to habitat damage. They do not fare well in areas of even moderate pollution. Cleaning up waterways, recycling, and decreasing the burning of fossil fuels creates a more livable environment for the river otter and ensures that the species sticks around and brings us joy for years to come.

### **References**

<https://www.nwf.org/Wildlife/Wildlife-Library/Mammals/North-American-River-Otter.aspx>

<http://www.dec.ny.gov/animals/9355.html>

[http://animaldiversity.org/accounts/Lontra\\_canadensis/](http://animaldiversity.org/accounts/Lontra_canadensis/)

## Red Fox (*Vulpes vulpes*)

## Grey Fox (*Urocyon cinereoargenteus*)

### Description

The red fox is easily distinguished from its cousin, the gray fox. The red fox has a red coat which it keeps year round that covers its head, shoulders, back, rump, and tail, with a white underside and throat, and jet-black legs and ears. Their tail is bushy and cylindrical in shape, usually red mottled with black and a predominately white tip. The gray fox has a gray, grizzled color due to multi-colored guard hairs and a black stripe running down its back, leading to a black-tipped tail. They have brownish and reddish coloration on the ears and down the sides of the neck, as well as on parts of their mid-section and tail. Their bellies and throat are white. The gray fox's face is distinctly marked with a white, black, and red pattern. The grey fox has very curved claws and the ability to rotate its forearm outward more than the red fox, which may be adaptations for climbing trees.

Red foxes generally have longer bodies than gray foxes, with the red fox body ranging from 48 to 57 inches (122 to 145 centimeters) nose to tail, and the gray fox ranging from 31 to 44 inches (79 to 112 centimeters). Body weight between the two species is not very different: the red fox weighs from 8 to 12 pounds (3.5 to 5 kilograms) and the gray fox weighs between 7 and 13 pounds (3 to 6 kilograms).

### Signs

The red fox's prints are slightly to the left and right of a straight line. The sizes are about 2" (5 centimeters) in length and the stride is 12-16" (30-40 centimeters) long. They have four toes, though the hair on the feet sometimes blurs the print and the toe marks are difficult to count. Claws may be present, and the pad is an inverted "v" shape. The tracks often travel in long, straight lines until the fox detects some sound, smell, or other indicator that food is nearby. Then, tracks zig-zag and meander as the fox searches for prey. In deep snow, you may find marks where the two front feet were placed together as the fox patted the snow to determine the exact location and depth of its prey. Next to those prints you may find a hole where the fox plunged into the snow after their buried meal. Red fox scat is often shaped in tapered, segmented lengths. The scat may contain animal fur, bones, and even plant fibers or seeds depending on the season. Foxes often leave their scat in the middle of trails, roads, or at corners of fields. Fresh red fox scat may have a strong musky scent.

Grey fox prints tend to be 1 - 1.75" (2.5-4.5 centimeters) wide and 1.25-1.75" (3-4.5 centimeters) in length. There is not much hair on the feet of grey fox, so the toe pads are often more distinct in appearance than those of the red fox. The grey fox can retract its claws, so they may not be present in the track. Like that of the red fox, grey fox scat often contains animal fur, bones, and even plant fibers or seeds depending on the season. The grey fox often prefers dense plant cover rather than the open fields, so their scat is likely to appear on logging roads and animal trails.



Top: Red Fox • Bottom: Grey Fox

### Abundance and Distribution

The red fox is the most widely distributed carnivore in the entire world and can be found in almost every county of New York State. The gray fox is also very broadly distributed and can be found all across New York. They inhabit dense deciduous woodlands and rough, broken terrain. Red foxes prefer to hunt in old fields bordering extensive forests, and occasionally on farmland. Both locations are home to a variety of delicious small mammals, birds, and plant food sources. Growing populations of coyotes have pushed the red fox further into residential suburban areas, but the red fox can still make a living if there are enough prey animals around. Red foxes are not picky about where they make their dens, as they are found living in wood piles alongside lawns, roadside ditches, and utility rights of way.

## Life History

### Reproduction

**Red Fox:** The red fox is a monogamous animal, meaning they mate with one partner for life. The breeding season runs from December to April. When a female becomes pregnant, her gestation period lasts about 52 days and she gives birth to a litter of 1 to 8 pups (3 to 6 pups being the average litter size). The young are born blind and helpless, heavily dependent upon the parents. Both the male and female are very involved in caring for their offspring. When the pups are 12 weeks old they are weaned and learn to hunt for themselves



**Red Fox Pups**

Adult foxes often build their dens in abandoned woodchuck burrows. They widen the main passage and create a dry chamber lined with grasses and forbs to give birth to the pups. Dens can be found in many varied places: beneath hollow logs, among the root systems of large trees, or anywhere a woodchuck may choose to build a burrow.

Young females are ready to breed in their first autumn but they may not give birth to their first litter until the following year. The dispersal of young is triggered by aggressive territoriality between parents and offspring, which tends to begin between September and January. Some young travel up to 100 miles (160 kilometers) away from home to find suitable territory of their own.

**Gray Fox:** Gray foxes are also monogamous. The breeding season occurs from mid-January to May. The female goes through a gestation period of 51 to 63 days. Pups are born hairless, blind, and helpless. Litter size ranges between 2 and 7 pups, and the weaning of pups occurs at 8 to 10 weeks of age. At this time, the pups begin to venture out of the den to hunt with the family. Once the pups are nearly fully-grown they leave the parents. Both males and females are ready to breed within their first year, but males tend to reach sexual maturity before the females.

The gray fox uses its den primarily for rearing young. A gray fox is more discrete in its den-making than a red fox, as it prefers not to excavate its own den and rarely uses the abandoned burrows of woodchucks. Instead, a gray fox chooses hollow logs, rocky outcrops, thick brush, and even abandoned houses, sheds, woodpiles, and other manmade structures. Sometimes the gray fox even builds a den in a tree! They have been documented building dens a few yards above the ground, which protects them from threats like coyotes. Climbing trees is a special ability of the gray fox, which comes in handy for escaping predators, safely rearing young, and hunting.



**Grey Fox Mother & Pups**

### Food and Feeding

The red fox and the gray fox do not differ much in their diets. Both species prey on small mammals, the gray fox primarily eating mice, voles, and cottontail rabbits. The red fox also indulges in mice and rabbits, as well as squirrels and woodchucks. Both species feed on various amphibians, reptiles, birds, and carrion. Aside from meat, the two species also eat some fruits such as grapes and apples. The gray fox even eats acorns and, if living in farm country, fresh corn.



**A Grey Fox climbs a tree by hanging on to the trunk with its front claws, walking its back feet up, then holding on with its back feet, moving its front feet up the tree, shimmying its way up the tree.**

## **Mortality**

The main predator of both the gray fox and the red fox is the coyote. Gray fox populations are not as affected by coyote predation since they are more aggressive than the red fox and they can climb trees to escape to safety. The two species are killed by humans for their pelts, but the red fox is more sought after. Both are equally susceptible to car collisions. The gray fox may also be preyed upon by bobcats and even some large raptors, such as the great-horned owl.

While the red fox and the gray fox are hosts to many species of lice, ticks, mites, chiggers, and fleas, they also carry many internal parasites, such as roundworms and tapeworms. Unlike the gray fox, in New York State the red fox is susceptible to heartworms, which are roundworms that inhabit the right ventricle of many canid species and is transmitted only by mosquitos. The red fox is also prone to sarcoptic mange, a mite that causes an irritation that thickens the skin. Itching results in hair loss, and eventually the animal will die either from malnourishment or hypothermia. The gray fox is innately immune to this parasite. Both fox species are affected by canine distemper and rabies.

## **Ecological Value**

The red fox and the gray fox are important elements in the balance of their ecosystems. Due to their eating habits, they help keep the rapidly breeding rodent and rabbit populations in check. They also promote the growth of plants and trees since they eat fruits and nuts and disperse the seeds in their scat.

## **Economic Value**

The red fox may be hunted more than any other wild mammal in the world because of its massive habitat range. Recreational hunting often involves dogs, horses, and large numbers of people, and are not as often hunted for economic gain. To contrast, gray foxes are mostly sought after by humans for their pelts, and are not as often hunted recreationally.



***A Red Fox pounces high to catch prey, most likely a squirrel on the run.***

Both fox species are beneficial to farm crops because they prey on farm pests such as rodents. Adaptability to the presence of humans makes the red fox particularly important in the control of native and non-native pests around farm buildings. These pests often consume large amounts of feed, damage feed stores, and even damage farm structures, but a hungry red fox quickly solves that problem.

A negative impact of both fox species is their tendency to attack and eat farm poultry. There are many folk tales about the sly nature of the red fox due to its ability to slip into a hen house. Both the gray fox and the red fox carry diseases such as rabies (which are dangerous to domestic dogs and humans) and distemper (which is also dangerous to domestic dogs, but does not harm humans).

## **Management**

Fox populations in New York and most of North America are stable and have no special conservation status at this time. If a fox becomes a nuisance for a homeowner or a farm, wildlife control is often called and the fox is trapped and relocated. The red fox may also be killed by varmint hunters. There is an active but regulated trapping season for both species of fox in New York.

## **References**

[http://animaldiversity.org/accounts/Urocyon\\_cinereoargenteus/](http://animaldiversity.org/accounts/Urocyon_cinereoargenteus/)

[http://animaldiversity.org/accounts/Vulpes\\_vulpes/](http://animaldiversity.org/accounts/Vulpes_vulpes/)

<http://www.dec.ny.gov/animals/63058.html>

<http://www.dec.ny.gov/animals/9354.html>

## Red Squirrel (*Tamiasciurus hudsonicus*)

### Description

The red squirrel is the smallest tree squirrel in New York State. They are about 1/3 the size of a grey squirrel. Their fur is a reddish color, as described in the common name, which is unlike any other squirrel in New York.

The precise color of a red squirrel's fur depends on geographic location. Dorsal coloration generally ranges from reddish to an earthy brown or an olive grey. There is always a reddish-brownish strip running laterally down the middle of the back. The underside is white with two black lines running laterally along the margins, and they have a white eye ring year round. In the winter, their ears become tufted. The tail of the red squirrel is flatter and smaller than most other squirrels, and is rusty red to yellowish-grey in color, with yellow at the tips and a black band running its entire length. Tail features are often used to distinguish a red squirrel from a Douglas squirrel, who has a rusty coat with a blackish wash and a black band down the tail with a white tail tip. Male and female red squirrels do not differ much in appearance.

There are 25 subspecies of red squirrel due to geographical variation. For this reason, body measurements may only be accurate for the region in which they were measured. In general, the mass of the red squirrel ranges from 7 to 10 ounces (200 to 280 grams), total length ranges from 10 to 15 inches (27 to 40 centimeters), and the length of the tail ranges from 3 to 6 inches (9 to 16 centimeters). The tail makes up most of the red squirrel's body length.



**Red Squirrel. Note the light belly.**

The red squirrel experiences two annual molts, but the tail only molts once. The first molt starts in March and ends in August. First, the nose begins to molt, then the

front feet, and the whole body follows up until rump. The second molt happens in the fall, beginning in late August and going until early December. This time, the molt begins with the tail, then the rump, makes its way up to the fore-end, and finishes with the flank and legs.

### Signs

The tracks of both the red and gray squirrel often appear in a "V" arrangement, with the larger rear feet (5-toed) in front of the front feet (4-toed). Both the front and rear foot show multiple pads. Rear prints are 7/8-1.5" (2- 4 centimeters) wide. Look for large piles of pinecone scales at the base of red pine trees, as these are sure signs that hungry red squirrels are nearby.

### Abundance and Distribution

The range of the red squirrel is from the tree line of northern Canada into the northern United States. This species is also found in parts of the Appalachian and Rocky Mountains. Although the red squirrel is occasionally present in New York's deciduous forests, they are associated with coniferous and mixed forests in the Adirondack region.

The red squirrel is not hunted in New York. Its pelt offers little value in the fur trade, and the meat of the squirrel is not valued as a food source. The population of red squirrel in New York is in good standing.

### Life History

#### Reproduction

Squirrels have a breeding season that lasts a total of about 105 days. They mate once or twice a year, with the first breeding season running from March through May. A second breeding period usually happens in the warmer climates of their range, and lasts from August to September. Red squirrels are a polygamous, switching mates over multiple seasons.

When the mating season begins, males invade the territories of females looking for a receptive partner in a scramble competition mating system. A male tries to attract the attention of the female, either by physically chasing after her or calling to her. As he does this, he wards off other suitors. During copulation the male holds the female around her lower abdomen. Copulation occurs several times during the one and only day that the females are in estrus during the breeding season. After mating, females and males have nothing more to do with each other, and the male retreats to his own territory.

The female goes through a 35-day gestation period. When the kits are born, they are mostly hairless, except for some chin hairs and whiskers. Between 1 and 8 young are born per litter. By the time they are 26 to 35 days old, the young open their eyes. The pelage becomes fully developed at about 40 days. Lactation finishes by 70 days, and at this point the kits are cast out of the nest to go find their own territories. If the mother is in poor health, she gives some of her territory to her young.

Both males and females become sexually mature at 1 year of age and reproduce in their first year. Younger females and males have greater reproductive success than the older members of the population.

Reproduction is very dependent upon food abundance. Red squirrels depend mainly on the seeds of conifer species, such as the white pine, for food, and the supply of this food fluctuates yearly. Collecting a personal cache of food allows the female to assess what the food supply will be as she breeds that year. Low seed production does not mean the female will have a smaller litter, but it does mean that reproduction will be more energetically costly for her. Older females take a more conservative approach to reproducing, only doing so when they know their well-being can be maintained, but females over the age of 6 reproduce even if their health is in danger, because they know they will most likely not be able to reproduce the following year.



***Red Squirrel in winter***

### ***Habitat and Food***

Red squirrels are primarily arboreal animals. They mostly occupy coniferous forests, but can be found in deciduous and mixed forests as well. They prefer to live in areas with an abundance of conifer seeds, fungi, and closed canopies. In the southern and eastern boundaries of their range, they are mostly found in the mountains. The red squirrel has a vast distribution and can be found in both temperate and polar climates, as well as in urban areas.

Red squirrels build nests in trees, usually 10 to 60 feet (3 to 18 meters) above the ground. They often use tree cavities, abandoned woodpecker nests, and thick, supportive branches. Red squirrels have also built nests in buildings, logs, stumps, log piles, bird houses, and rock walls. Sometimes, a red squirrel may build an underground chamber, usually about one foot (30 centimeters) below the ground.

The main source of food in the red squirrel's diet is conifer cone seeds. The squirrel cuts green cones from the branches of balsam fir, larch, white cedar, pine, and spruce trees, often picking off up to a dozen before climbing down the tree to bury the cones. Green cones are picked because they are soft, but still contain the delicious seeds. Cones are buried in an underground cache, which are found and dug up later. A food cache coupled with debris accumulated from months or even years of stripping cones from nearby logs and branches are sure signs that a red squirrel is nearby.



***The incredible climbing abilities of the Red Squirrel allow it to live high in the treetops.***

Red squirrels eat parts of deciduous trees such as buds, inner bark, sap, nuts, and seeds. They also feed on fungi, fleshy fruits (especially in summer), insects, some small mammals, birds, and birds eggs.

### ***Mortality***

Red squirrels are prey for many mammals and birds of prey. Cooper's hawks, goshawks, bald eagles, great-horned owls, American kestrels, red-tailed hawks, sharp-shinned hawks, and many more raptors all hunt red squirrels. Red squirrels also make a tasty meal for American martens, minks, red foxes, weasels, fishers, and

lynxes. Humans hunt squirrels for their fur and meat, but they are not as popular in New York nowadays as they were years ago. Many people now consider squirrels to be “poor” food, or low-quality meat.

Red squirrels host many parasites. They carry intestinal parasites, such as 9 species of tapeworms and 9 species of nematodes. External parasites also happily live in a squirrel’s fur, such as 31 different species of mites, ticks, and chiggers, as well as 25 different species of fleas, and botfly larvae often hitch a ride as well. Red squirrels are affected by a few viruses, such as silver-water virus, California encephalitis virus, and Powassan virus.

### **Ecological Value**

Red squirrels have a positive effect on their ecosystem through their food caches. When they bury cones with seeds, they sometimes forget to return to dig up their food, leaving the seeds to germinate and grow into new trees. They have a negative impact on existing trees, as they reduce tree regrowth by eating seeds and inner tissues, but this may allow other trees in the forest to flourish.

The eating habits of red squirrels have a positive impact on other animals. By peeling the bark of lodgepole pines, red squirrels make a food source available for porcupines. They provide nesting areas for many arboreal rodent species, since their bud-nipping causes conifers to grow bushier tops. More nesting sites means there are more opportunities to find a safe place to reproduce and raise young. Red squirrels and the other rodents they attract to the area are essential food sources for predators higher in the food web.

### **Economic Value**

In New York, red squirrels do not have a huge economic importance. However, in Canada, they are the third most harvested furbearer, bringing in about one million dollars each year. Likewise, in Minnesota, thousands of red squirrels are harvested annually for human consumption.

In New York and several other states the red squirrel is economically damaging. Red squirrels eat the inner bark of trees, diminishing the tree’s value as lumber, and their consumption of buds is detrimental to tree growth. They can damage homes by nesting in buildings. They can even be dangerous to humans directly, as they bite if provoked.

### **Management**

Red squirrels are extremely abundant and wide-spread. They have a satisfactory amount of resources and no serious threats to their populations. One subspecies of red squirrel, *Tamiasciurus hudsonicus grahamensis*, is found only in Arizona and is considered endangered due to habitat destruction.

### **References**

[http://animaldiversity.org/accounts/Tamiasciurus\\_hudsonicus/](http://animaldiversity.org/accounts/Tamiasciurus_hudsonicus/)

<http://www.esf.edu/aec/adks/mammals/redsquirrel.htm>

The original text of *Wildlife Notebook* included the twelve bird species, most of which are largely considered gamebirds. As we were in the rewriting process we also spoke to another author for permission to update his curriculum, *Birds of Prey*. The author discouraged us from updating the materials as a significant amount of materials are available from the Cornell's Laboratory of Ornithology through their website.

Here is a list of the live links for the original twelve species of birds:

### **Wood Duck**

[https://www.allaboutbirds.org/guide/Wood\\_Duck/id](https://www.allaboutbirds.org/guide/Wood_Duck/id)

### **Blue-winged Teal**

[https://www.allaboutbirds.org/guide/Blue-winged\\_Teal/id](https://www.allaboutbirds.org/guide/Blue-winged_Teal/id)

### **Mallard Duck**

<https://www.allaboutbirds.org/guide/Mallard/id>

### **American Black Duck**

[https://www.allaboutbirds.org/guide/American\\_Black\\_Duck/id](https://www.allaboutbirds.org/guide/American_Black_Duck/id)

### **Ruffed Grouse**

[https://www.allaboutbirds.org/guide/Ruffed\\_Grouse/id](https://www.allaboutbirds.org/guide/Ruffed_Grouse/id)

### **Canada Goose**

[https://www.allaboutbirds.org/guide/Canada\\_Goose/id](https://www.allaboutbirds.org/guide/Canada_Goose/id)

### **Eastern Wild Turkey**

[https://www.allaboutbirds.org/guide/Wild\\_Turkey/id](https://www.allaboutbirds.org/guide/Wild_Turkey/id)

### **Gray Partridge**

[https://www.allaboutbirds.org/guide/Gray\\_Partridge/id](https://www.allaboutbirds.org/guide/Gray_Partridge/id)

### **Ring-necked Pheasant**

[https://www.allaboutbirds.org/guide/Ring-necked\\_Pheasant/id](https://www.allaboutbirds.org/guide/Ring-necked_Pheasant/id)

### **American Woodcock**

[https://www.allaboutbirds.org/guide/American\\_Woodcock/id](https://www.allaboutbirds.org/guide/American_Woodcock/id)

### **Eastern Bluebird**

[https://www.allaboutbirds.org/guide/Eastern\\_Bluebird/id](https://www.allaboutbirds.org/guide/Eastern_Bluebird/id)

### **Mourning Dove**

[https://www.allaboutbirds.org/guide/Mourning\\_Dove/id#similar](https://www.allaboutbirds.org/guide/Mourning_Dove/id#similar)

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## NOTES



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