

# THE GRAY SQUIRREL

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Obed Watershed Community Association

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## Taxonomic Classification

**Kingdom:** Metazoa (=Animalia) multicellular animals)

**Phylum:** Chordata (chordates)

**Class:** Mammalia (mammals)

**Order:** Rodentia (rodents)

**Family:** Sciuridae (squirrels)

**Genus:** Sciurus

**Species:** *Sciurus carolinensis*

**Common Names:** Eastern Gray Squirrel, Gray Squirrel

**Squirrels** belong to one of the most successful and widespread order in the world, rodents. One of the main differences between squirrels and most other rodents is that squirrels have a rather large, bushy tail.

**Etymology:** The genus, *Sciurus*, is derived from two Greek words, *skia*, meaning shadow, and *oura*, meaning tail. This name alludes to the squirrel sitting in the shadow of its tail. *Carolinensis* refers to the Carolinas where the species was first recorded and where the animal is still extremely common.

## Distribution

**Range:** The Gray Squirrel is a tree squirrel native to the eastern United States to just west of the Mississippi River and north to Canada. Its native range overlaps with that of the fox squirrel (*Sciurus niger*), with which it is sometimes confused, although the core of the fox squirrel's range is slightly more to the west.

**Habitat:** *Sciurus carolinensis* prefers habitats of mature continuous woodlands of greater than 100 acres with diverse understory vegetation. Densities are highest in forests with trees that produce foods that last through winter storage such as oaks and walnuts.

**Migrations:** Overpopulation may trigger major migrations of this squirrel species. In the early 19th century, when vast tracts of the East were covered by dense hardwood forest, observers reported migrations in which squirrels never touched ground but moved great distances from tree to tree. A major migration of thousands of squirrels took place in October 1968 in Tennessee, Georgia, and North Carolina. This movement was attributed to substantial nut production and a high reproduction rate in 1967, followed by a late spring frost and little nut production in 1968.

## Description

**Fur and Coloration:** As its name suggests, the Eastern Gray Squirrel has predominantly gray fur, but it can have a reddish color. It has a white underside and a large bushy tail. Particularly in urban situations where the risk of predation is reduced, both white- and black-colored individuals are quite often found. Gray squirrels molt twice a year (starting with the head) and molt their tail once in summer. The melanistic form, which is almost entirely black, is predominant in certain populations and in certain geographic areas, such as in large parts of southeastern Canada. Squirrels of different sexes do not differ in size or coloration.

**Length and Weight:** Squirrels are about 18 inches long, including 9 inches of tail. The average adult weight is between 1 and 1 1/2 lbs. Their body mass gets smaller as their distribution goes south.

**Lifespan:** Eastern Gray Squirrels live on average three to five years, but some individuals have survived more than ten years in the wild. Factors affecting survival include the severity of winter, abundance of food, and parasites. One parasite, the mange mite, may cause enough hair loss to threaten survival through winter.

**Diet:** Although Gray Squirrels feed on as many as 97 plant and 14 animal items, just 18 plant species account for 87% of stomach volume. They feed mostly on nuts, flowers and buds of more than 24 species of oaks, 10 species of hickory, pecan, walnut and beech tree species. Maple, mulberry, hackberry, elm, bucky and horse chestnut fruits, seeds, bulbs or flowers are also eaten along with wild cherry, dogwood, hawthorn, black gum, hazelnut, hop hornbeam and ginkgo tree fruits, seeds, bulbs and/or flowers. Crops, such as corn and wheat, are eaten, especially in the winter. Insects are eaten in the summer and are probably especially important for juveniles. Cannibalism has been reported, and squirrels may also eat bones, bird eggs and nestlings, and frogs. During low food periods it strips bark to get to inner bast (inner bark) and cambian layers. The squirrel can tolerate humans enough to inhabit residential neighborhoods and will raid bird feeders for millet, corn, and sunflower seeds.

**Home ranges** are rarely more than 2 to five acres in size, with males usually having a 120% larger home range than females (based on seasonal sexual activity). The size of home ranges is negatively correlated with squirrel density. Lactating females may decrease their home ranges by as much as 50%. Ranges are generally larger in the summer. Overlap of home ranges is extensive, but territorially is not evidenced. Home ranges are used in the same sequence each day.

These squirrels are ever on the move about their home ranges, so are always abreast of the many potential food items. They usually feed on just one food at a time, changing the item as additional sources come along. Buried nuts and other items are the mainstays in winter and in spring, but other foods are heavily consumed as they ripen. There is a great increase of activity in fall, when the squirrels spend most of their time cutting and burying nuts. Sometimes there is a rain of nuts on the forest floor, especially when the animals cut white oak acorns.

**Hoarding:** Like many members of the family Sciuridae, the Eastern Gray Squirrel is a scatter-hoarder; it hoards food in numerous small caches for later recovery. Some caches are quite temporary, especially those made near the site of a sudden abundance of food, which can be retrieved within hours or days for re-burial in a more secure site. Others are more permanent and are not retrieved until months later. It has been estimated that each squirrel makes several thousand caches each season.

A squirrel does not cache nuts where it finds them, but carries them to a new spot, burying each nut individually in a hole dug with the forefeet and then tamped down with the forefeet, hindfeet, and nose. Most nuts are buried at the surface, with few more than 1/4 inch (6–8 mm) below the ground. In this fashion, many trees are propagated, although the animal may nip off the germinating end of the nut before burying it, which prevents germination. About 85 percent of the nuts may be recovered. Nuts buried by scientists conducting an experiment were recovered by the squirrels at about the same rate as nuts they buried themselves, indicating that memory is not involved in nut recovery. This squirrel can smell buried nuts under a foot of snow. When snow is deep, the squirrel tunnels under it to get closer to the scent.

**Teeth:** There are a total of 22 teeth in the adults. All rodents are gnawing animals. Squirrels have well-developed jaw muscles and chisel-like front teeth that can chew through just about anything. These front teeth are kept sharp by gnawing on hard objects such as woody plant materials, seeds and nuts. This gnawing also serves another purpose. A rodent's front teeth grow constantly, so

they must be filed down or they will grow to the point where they inhibit eating and the animal will starve.

**Tracks:** Like all squirrels, the Eastern Gray shows four fingers on the front feet and five on the hind feet. The hind footpad is often not visible in the track. When bounding or moving at speed, the front foot tracks will be behind the hind foot tracks. The bounding stride can be two or three feet long.

**Tail:** This animal's tail is used primarily for balance in trees, but serves as a sunshade, an umbrella, a blanket, and a rudder when swimming; it gives lift when the squirrel leaps from branch to branch and slows descent should the squirrel fall. Squirrels can swim (doggy-paddle) at speeds up to 16 mph.

**Known Predators:** Eastern gray squirrels are preyed on by many predators, including weasels, red foxes, bobcats, skunks, raccoons, domestic and feral cats, snakes, owls, red-tailed hawks, and other birds of prey. On occasion, a squirrel may lose part of its tail while escaping a predator. They emit warning calls to warn neighboring squirrels of the presence of predators. Their extreme agility in the trees makes them difficult to capture.

### **Behavior**

**Peak Activity:** During the spring, summer and autumn, squirrels have their peak activity times about 2 hours after sunrise and 2-5 hours before sunset. This allows them to avoid the heat of the day. During the winter, they are the most active just 2-4 hours before sunset. Generally, females are more active in the summer months, and males are more active in the winter months. The squirrel does not hibernate.

**Dominance and Territoriality:** A dominance hierarchy forms in males during breeding times; females mate with several males. Related individuals may defend a territory. Male gray squirrels mark traditional points on trees with urine.

**Homes:** Squirrels occupy two types of homes. They build a type of nest, known as a drey, in the forks of trees, 30-45 feet above the ground. The drey consists mainly of dry leaves and twigs. In addition, the squirrel may inhabit a permanent tree den.

The Eastern Gray Squirrel dens in trees year-round, using either natural cavities, old woodpecker holes, or leaf nests in stout mature trees or standing dead ones, especially white oaks, beeches, elms, and red maples. Tree cavities must be at least 12 inches deep and have an opening at least 3 inches in diameter. Both males and females build winter nests and more loosely constructed summer nests, which are likely to be near dens but are not always in the same trees. Leaf nests are difficult to spot in summer because they are made of green leaves, but nests are very obvious in winter. The more permanent nests are woven together well to weather the elements. Extremely ramshackle nests may have been damaged by the elements but are likely to have been built by juveniles or as temporary shelters near corn or other attractive crops

### **Reproduction**

**Sexual Maturity:** Females may bear young twice a year for more than 8 years. Eastern Gray Squirrels can start breeding as early as six months old, but they usually breed for the first time at a year old. Males usually are sexually mature by 11 months

**Mating:** The Eastern Gray Squirrel mates in midwinter. A mating "chase" is often involved, with several males following a female as she moves about during the day. Frequently the spring litter of young is born in a tree cavity, while the second, late-summer litter is born in a leaf nest. Females often move their litters back and forth between cavity dens and leaf nests, perhaps because of changes in the

weather or to escape predation or parasite infestation. The young are weaned in about 50 days. The second litter stays with the female over the winter.

**Development:** The gestation period is about 44 days. The first litter is born in February to March, the second in June to July. There are normally two to four young in each litter, but this number can be as high as 8. Newborns are naked with the exception of whisker-like hairs used for touch. They are cared for in the nest by their mother until they reach independence. The young are weaned at 7 weeks and leave the nest after 10 weeks. At this point, the juvenile hair is lost. Adult size and mass are reached at 9 months old. The young are weaned at eight or nine weeks, when their previously protective mother abandons them. In September, yearlings and some adults strike out to establish their own home ranges in a process called the "fall reshuffle."

### **Communication and Perception**

**Messages:** Communications are mainly used in mating season and to ward off predators.

**Vocalizations:** Gray Squirrels have quite varied repertoire of vocalizations, including a squeak similar to that of a mouse, a low-pitched noise, a chatter, and a raspy "mehr mehr mehr". The characteristic aggressive bark of the Eastern Gray Squirrel—que, que, que, que—is usually accompanied by flicks of the tail.

**Smell:** Squirrels have a keen sense of smell and can determine much about their neighbors in this way, including levels of stress and reproductive condition.

### **Ecosystem Roles**

Eastern gray squirrels are important predators of seeds and other animals in the ecosystems in which they live. Their seed-caching activities may help disperse tree seeds. Eastern gray squirrels are also prey animals themselves and are hosts for parasites such as ticks, fleas, lice, and roundworms. They are important and ubiquitous members of the forest ecosystems in which they live.

**Invasive Species:** A prolific and adaptable species, the Eastern Gray Squirrel has been introduced to, and thrives, in several regions of the western United States. It has also been introduced to Britain, where it has spread across the country and has largely displaced the native Red Squirrel, *Sciurus vulgaris*. In Ireland, the red squirrel has been displaced in several eastern counties, though it still remains common in the south and west of the country.<sup>[2]</sup> There are concerns that such displacement might happen in Italy.

### **Economic Importance for Humans: Negative**

In Great Britain, *Sciurus carolinensis* is considered very destructive to property and is ranked second in negative impact only to the Norway rat (*Rattus norvegicus*). They are a crop pest and household pest. This species has been nominated as among 100 of the "World's Worst" invaders.

### **Economic Importance for Humans: Positive**

Eastern gray squirrels provided food for Native Americans and colonists and are still eaten by some people today. They have economic importance in some states, such as Mississippi where 2.5 million are harvested each year with an economic impact of \$12.5 million dollars. Squirrels are ranked second to birds in value to nature watchers.

The Obed Watershed Community Association has as its purpose the protection and enhancement of the natural and cultural heritage of the Obed River watershed within Cumberland County. Louise Gorenflo, OWCA community educator, produced this fact sheet. Those wanting to join this membership organization or more information may contact Dennis Gregg, OWCA Director at 484-9033 or at 185 Hood Drive, Crossville, TN 38555.