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Neotoma magister - Baird, 1858

Allegheny Woodrat

Other English Common Names: Appalachian Woodrat

Unique Identifier: ELEMENT_GLOBAL.2.101808

Element Code: AMAFF08100

Informal Taxonomy: Animals, Vertebrates - Mammals - Rodents

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Kingdom	Phylum	Class	Order	Family	Genus
Animalia	Craniata	Mammalia	Rodentia	Muridae	Neotoma

Genus Size: C - Small genus (6-20 species)

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Concept Reference 

Conservation Status 

Distribution

Ecology & Life History

General Description: A large grayish-brown rat with white underparts, large eyes and ears, and a long, furry, bicolored tail. Godin (1977) described the coloration as follows: "In winter the coloration above is buffy gray to pale cinnamon, heavily overlaid with black. The head and the sides of the body are buffy gray, while the axillae, or armpits, are creamy buff. The throat, belly, and feet are white, the fur being white to the roots except along the sides of the belly, where the basal color is pale leaden gray. The tail is sharply bicolored, blackish brown above, white below. The summer pelage is slightly paler and shorter. Immatures are grayer than adults, particularly on the belly."

Total length 35.5-44.7 cm; tail length 16-21 cm; mass 394-500 g (Godin 1977).

The skull is elongated, about 5.0 cm long and 2.5 cm at its greatest width, with "marked interorbital constriction and relatively small auditory bullae. The palate, lacking a posterior median spine, ends about even with the front of the first molar, which is high, flat-crowned, and prismatic. The coronoid process of the mandible is well developed" (Godin 1977).

The sexes are similar in color, and males average a little larger than females. Both sexes have a ventral skin gland which produces a strong, musky odor, especially in breeding males. External genitalia are generally apparent in the males, and females have four mammae.

There are numerous excellent published illustrations of woodrats and their skulls, including Schwartz and Schwartz (1959), Barbour and Davis (1974), Lowery (1974), Whitaker (1980), Wiley (1980), Hall (1981), Hall (1985), and Merritt (1987). Tracks are illustrated in some of these works, and tracks and scats are shown in Murie (1974).

Diagnostic Characteristics: *Neotoma magister* differs from the Norway rat (*Rattus norvegicus*) in having a furry, not scaly, tail; longer, softer fur; larger naked ears; and larger bright eyes. "The molars have enamel arranged in prismatic folds and are thus easily distinguished from the tuberculate molars of *Rattus*" (Adams 1987).

Reproduction Comments: The breeding season is late winter to late summer, with the young born from March to September (Poole 1940, Merritt 1987). Gestation period is about 35 days (32 to 38 days) (Birney 1973). Females normally mate again soon after giving birth, and two or three litters of usually two to four young are produced annually (Poole 1940, Schwartz and Schwartz 1959). Sexual maturity is reached in less than a year, and some early-born females (but not males) breed in the season of their birth (Wiley 1980).

Woodrats are thought to live longer than most small rodents. One female is known to have lived more than three years in the wild (Fitch and Rainey 1956). However, mortality is normally high.

Ecology Comments

Woodrats are basically solitary and unsociable, frequently fighting one another. Each lives alone in its house, except when breeding and raising young. Poole (1949) found "a great deal of individuality" in temperament, behavior, food preferences, etc., among his captive Allegheny woodrats. When upset, woodrats may chatter their teeth or stomp their hind feet (Wiley 1980).

Near the nests are found piles of sticks and trash called middens. Part of the materials found in woodrat houses and middens appears to be cached food in the form of nuts, seeds, berries, cuttings of vegetation, and mushrooms. But there may also be miscellaneous bits of trash, including rags, bits of metal, bones, pieces of glass, paper, etc. Newcombe (1930) and Poole (1940) compiled lists of such materials. The function of this compulsive collecting is unknown.

Scats are deposited in special latrine areas, apparently used by more than one individual, or over a long period of time. Poole (1940) reported seeing such heaps measuring 45 x 25 x 5 cm. A captive kept by Patterson (1933) voided 3 to 84 fecal pellets per day. Similarly, urinating spots are used, leaving dark stains 15-20 cm in diameter on rocks (Schwartz and Schwartz 1959).

Though solitary and territorial, woodrats most often occur in clusters due to patchiness of the rock outcrop, talus, and cave habitat, and conform to the concept of a metapopulation (Hassinger et al. 1996). Home ranges are small, 0.26-0.6 ha (Wright and Hall 1996); usually less than about 90 m across (Burt and Grossenheider 1976). Poole (1940) reported movements of 183 m and 92 m by two woodrats in Pennsylvania. Foraging movements, while often focused within rock habitat, may extend beyond the protection of rocks up to 160 meters from the den site (Wright and Hall 1996). Den shifts tend to be less than 100 meters with a median of 40 m (Wright 1998), and woodrats, particularly females, often live their entire lives in the same outcrop (Feller, pers. obs., 1998). There are reports of large unidirectional movements of displaced woodrats, e.g., 1 km and 4 km (McGowan 1993), as well as naturally dispersing individuals, 0.3-1 km (McGowan 1993), 1 km (Feller, pers. obs., 1995), and up to 6 km (Wright, pers. comm., 1998). While woodrats can travel long distances between patches, as distances increase, the chance of successful emigration between

patches is likely to decrease, particularly in the absence of protective rock crevices. Barriers to dispersal are not clearly known, as woodrats have been documented to traverse seemingly inhospitable terrain, including roads, small streams, and small fields, though movements are largely within rock habitat (Feller, pers. obs.; Mengak, pers. comm., 1998; Wright, pers. comm., 1998). However, woodrats display unwary behavior when crossing roads (Feller, pers. obs.), and roadkills have been documented (Feller, pers. obs., 1993; McGowan 1993).

Cudmore (1983) estimated population densities of 8.3 to 71.9 woodrats per 1000 m of cliff along the Ohio River in Indiana. According to Burt and Grossenheider (1976), populations of 5-8 adults per ha are probably high.

Predators include owls, skunks, weasels, foxes, raccoons, bobcats and large snakes. Interestingly, examination of the stomach contents of 70 rattlesnakes (*CROTALUS HORRIDUS*) and 15 copperheads (*AGKISTRODON CONTROTRIX*) in Pennsylvania and New Jersey revealed no woodrat remains, even though many of the snakes came from areas inhabited by woodrats (Poole 1940). Humans have been killing woodrats for thousands of years--first for food, and much later out of prejudice, because of a resemblance to European rats.

White-footed mice (*PEROMYSCUS LEUCOPUS*) compete with woodrats for food (Rainey 1956), and in Indiana, opossums (*DIDELPHIS VIRGINIANA*), raccoons (*PROCYON LOTOR*) and turkey vultures (*CATHARTES AURA*) may compete for den sites (Cudmore 1983). Woodrats support many ecto- and endoparasites, including fleas, ticks, mites, chiggers, botflies (Diptera: Cuterebridae), nematodes, and tapeworms (Murphy 1952, Cudmore 1986). Bubonic plague (Schwartz and Schwartz 1959) and rabies (Dowda et al. 1981) have been reported in wild woodrats.

Non-Migrant: Y

Locally Migrant: N

Long Distance Migrant: N

Mobility and Migration Comments: Patterns of genetic (DNA) variation indicate that gene flow can be low among subpopulations of *Neotoma magister* and that effective dispersal is limited among subpopulations separated by as little as 3 km (Castleberry et al. 2002).

Thomas (2001, cited by Monty and Feldhamer 2002) reported that in Kentucky an adult male moved 3,615 m from the location of his previous capture 49 days earlier. The movement occurred between November and January. The individual remained at the new site for at least 1 year. The longest movement recorded for a female was 405 m. The longest movement between 2 consecutive days of capture was 638 m by an adult male.

Palustrine Habitat(s): Riparian

Terrestrial Habitat(s): Bare rock/talus/scree, Cliff, Forest - Conifer, Forest - Hardwood, Forest - Mixed, Shrubland/chaparral, Woodland - Conifer, Woodland - Hardwood, Woodland - Mixed

Habitat Comments: Typical habitat is rocky cliffs and talus slopes. These woodrats make midden mounds and stick piles among rocks, but secluded nest sites generally are not within stick houses (see Hayes and Harrison 1992).

Throughout its range, this species associated with extensive rocky areas such as outcrops, cliffs, talus slopes with boulders and crevices, and caves. It occasionally uses abandoned buildings but generally avoids humans. It generally occurs at higher elevations (to about 1000 m) and is rarely found in lowlands or open areas.

In southern New York, New Jersey, and adjacent Pennsylvania, woodrat habitat "consists of extensive boulder fields at the base of ridges with rock outcrops. These talus slopes consist of large boulders (10-20 ft. [3-6 m] across) piled in several layers. *Neotoma* lives among the cave like spaces formed by the piled boulders" (Sciascia 1990).

Referring to the mountainous area of Pennsylvania, Merritt (1987) wrote, "limestone caves, rocky cliffs and accumulations of residual sandstone boulders marked by deep crevices with underground galleries represent favored habitat." Hall (1985) pointed out that good habitat is found "specifically at water gaps where cliff faces and boulder piles are usually abundant." Unpublished data from Pennsylvania Natural Diversity Inventories (eastern and western offices) make frequent references to woodrat occurrences in sandstone, limestone, or shale outcrops and cliffs, usually with crevices or abundant boulders; also solution caves and abandoned limestone quarries and mines. Associated forest is varied, including cove hardwoods, hemlock-birch, oak-pine, and various combinations of oaks, maples, hickories, beech, and yellow poplar (tulip-tree). Grape, mountain laurel, rhododendron and ferns are frequently mentioned.

In West Virginia, woodrats are common in caves, rock shelters, outcrops with deep crevices, and riverbanks with an abundance of sandstone rocks and boulders.

"In Maryland, this species is found predominately in cliffs, caves and rocky areas in the three western-most counties, and along cliffs of the Potomac River to the vicinity of Washington, D.C." (Feldhammer et al. 1984). In western Maryland "Pottsville Sandstone outcrops [provide] massive, blocky boulders and extensive cliffs with numerous crevices and miniature cave-like situations" (Thompson 1984).

In Indiana, extant populations are restricted primarily to south-facing limestone bluffs on the Ohio River, where there are den sites in the rock and dense red-cedar (Cudmore 1983, Scott Johnson, pers. comm.).

In Kentucky, "cliffs with deep crevices, caves, or large boulders piled in such a way as to form numerous retreats and shelters are favored" (Barbour and Davis 1974). In Tennessee, "rocky cliffs, caves and fissures or tumbled boulders on the sides of mountains are the preferred habitat" (Hamilton 1943), and in North Carolina it is "rocky places and abandoned buildings at elevations above 3000 feet (900 m)" (Adams 1987). Castleberry et al. (2001) suggest that forest clearcutting has minimal impact on woodrat movements, home range, and habitat use, as long as sufficient intact forest is retained adjacent to colonies. They mention, however, that harvesting methods that selectively remove important mast-producing tree species may represent the greatest threat from forest management.

A large house of sticks, leaves, and miscellaneous debris is built, usually within a cave, crevice, or other well-protected place. This may be a mound like a muskrat house (typical construction in the range of other subspecies), but is more often open, giving the impression of a large bird's nest (Poole 1940). Outside diameter is about 35-60 cm (Patterson 1933) and the inner cavity is about 12 cm across (Poole 1940). The nest is lined with shredded bark of grape, red cedar, hemlock, or basswood, grass, fur, rootlets, and sometimes feathers (Poole 1940, Merritt 1987).

Adult Food Habits: Frugivore, Granivore, Herbivore

Immature Food Habits: Frugivore, Granivore, Herbivore

Food Comments: Woodrats are primarily vegetarian, and food preferences vary widely among individuals. Leaves, twigs, fruits, and seeds of many plants are eaten. Newcombe (1930) thought fungi were a significant part of the diet. Acorns are probably an important food, and in Tennessee Goodpaster and Hoffmeister (1952) found quantities of honey locust (*GLEDTISIA TRIACANTHUS*) seed pods in caches. New Jersey woodrats appeared to be using seed pods of royal Paulownia (*PAULONIA TOMENTOSA*) for winter food (Beans 1992). Other foods recorded include twigs and seeds of hemlock (*TSUGA CANADENSIS*) and birch (*BETULA LENTA*); leaves of rhododendron; chestnuts (*CASTANEA DENTATA*); fruits of dogwood (*CORNUS FLORIDA*), apple (*PYRUS MALUS*) black cherry (*PRUNUS SEROTINA*), mountain ash (*SORBUS AMERICANA*) (Poole 1940), pokeberry (*PHYTOLACCA* sp.), poison ivy (*TOXICODENDRON RADICANS*) (Linzey and Linzey 1968), grape, and partridgeberry (*MITCHELLA REPENS*); leaves and shoots of polypody fern (*POLYPODIUM VULGARE*), basswood (*TILIA AMERICANA*), black gum (*NYSSA SYLVATICA*), teaberry (*GAULTHERIA PROCUMBENS*), blackberry (*RUBUS* sp.), white pine (*PINUS STROBUS*), trailing arbutus (*EPIGAEA REPENS*), mountain maple (*ACER SPICATUM*) serviceberry (*AMELANCHIER* sp.) (Heisler 1941), tree-of-heaven (*AILANTHUS ALTISSIMA*), Virginia creeper (*PARTHENOCISSUS QUINQUEFOLIA*), and red cedar (Cudmore 1983). Woodrat cuttings noted in rocky riverbank habitat in West Virginia included asters, balsam squaw-weed (*SENECIO PAUPERCULUS*), riverbank goldenrod (*SOLIDAGO RACEMOSA*), tasselrue (*TRAUTVETTARIA*), violet (*VIOLA* sp.), and ferns (Norris 1991). Animal food (insects, etc.) is rarely consumed. Woodrats eat about five percent of their weight in dry matter daily (Schwartz and Schwartz 1959).

Water consumption varies greatly among individuals (Poole 1940). Though some captive woodrats drink often, others drink little or nothing. Apparently some woodrats obtain their water from dew or succulent vegetation or from metabolism of foods (Murphy 1952).

Adult Phenology: Nocturnal

Immature Phenology: Nocturnal

Phenology Comments: Primarily nocturnal; most active during first few hours of darkness; less active on moonlit nights (Wiley 1971); more active on cloudy, rainy nights than on clear ones (Rainey 1956, Tate 1970). Active throughout the year but tends to remain "indoors" during bad weather (Poole 1940).

Length: 44 centimeters

Economic Attributes

Population/Occurrence Viability
Not yet assessed

U.S. Invasive Species Impact Rank (I-Rank)

Not yet assessed
Not yet assessed

