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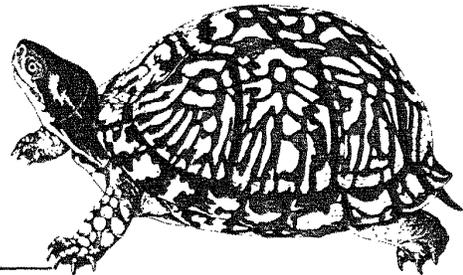


New England Wildlife: Habitat, Natural History, and Distribution

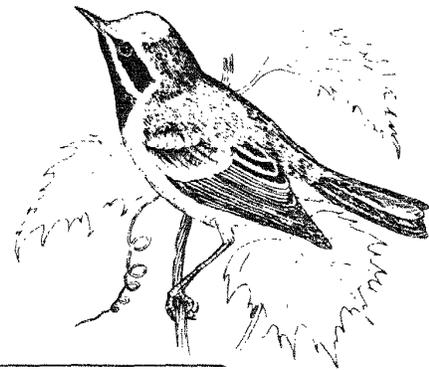
Richard M. DeGraaf
Deborah D. Rudis



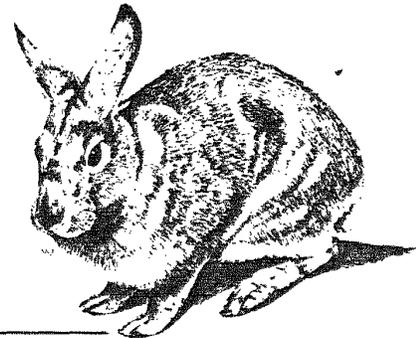
Amphibians



Reptiles



Birds



Mammals

ABSTRACT

Describes natural history profiles of New England wildlife species and their associations with forested and nonforested habitats. Provides a data base that will enable forest managers or wildlife biologists to describe the species or groups to be found in a given habitat.

THE AUTHORS

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Mammals

This section provides information on the life history, distribution, and habitat associations of terrestrial mammals in New England. Nomenclature follows the *Revised checklist of North American mammals north of Mexico, 1982* (Jones et al. 1982). This checklist is the standard reference used by the American Society of Mammalogists. Species are arranged in phylogenetic order

We have included the mountain lion (*Felis concolor*), which many consider to be extirpated from the Northeastern United States and adjacent Canada; however, many unconfirmed sightings and one confirmed

track cast (R. Downing, personal communication) warrant its inclusion here. We have omitted the beach vole (*Microtus breweri*) which only inhabits Muskeget Island, Massachusetts.

The relationships of New England mammals to forest habitats are not understood as well as those of birds. For some species, life history and distribution data are lacking, particularly for bats and shrews. For such species, this compilation must be regarded as a starting point. From a habitat structure or classification standpoint, mammals have not been studied as thoroughly as have birds.

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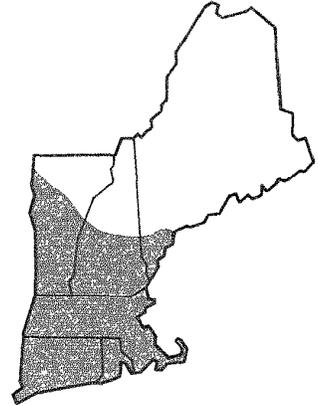
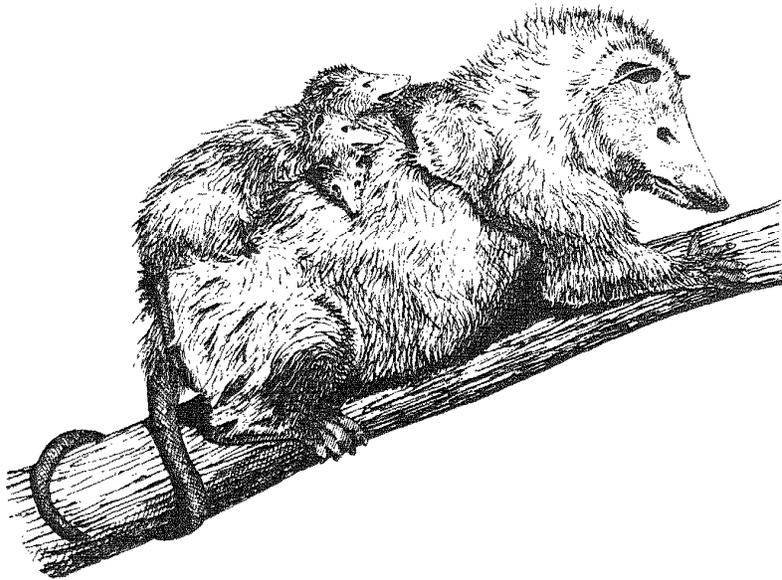
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| SPECIES | Special habitat needs | Local occurrence | | | | | | | | | | | |
|---|--|------------------|----|---|----|---|----|---|----|---|----|---|----|
| | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Snowshoe Hare <i>Lepus americanus</i> | Dense brushy or softwood cover | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| European Hare <i>Lepus capensis</i> | Fields, meadows | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Eastern Chipmunk <i>Tamias striatus</i> | Forest edge or shrub cover, elevated perches, logs. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Woodchuck <i>Marmota monax</i> | Open land. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Gray Squirrel <i>Sciurus carolinensis</i> | Tall trees for dens or leaf nests. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Red Squirrel <i>Tamiasciurus hudsonicus</i> | Woodlands with mature trees, conifers preferred. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Southern Flying Squirrel <i>Glaucomys volans</i> | Mature woodland with cavity trees; favors cavities with entrance diameters of 1.6 to 2 in. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Northern Flying Squirrel <i>Glaucomys sabrinus</i> | Mature trees, cavities for winter dens; arboreal lichens. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Beaver Castor canadensis | Woodland streams, lack of disturbance. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Deer Mouse <i>Peromyscus maniculatus</i> | Northern hardwoods or northern coniferous forests. | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| White-footed Mouse <i>Peromyscus leucopus</i> | | B | BF | W | WF | B | BF | W | WF | B | BF | W | WF |
| Eastern hemlock | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Red spruce | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Red spruce-Balsam fir | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Eastern white pine | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Balsam fir | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| White pine— Northern red oak— Red maple | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Northern red oak | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Red maple | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Northern hardwoods | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Paper birch | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |
| Aspen | | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp | S | Sp |

Virginia Opossum
(*Didelphis virginiana*)



RANGE: Throughout the Eastern United States except n. New England. Also occurs along the West Coast as a result of transplants and in parts of Central America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Dry to wet wooded areas; commonly found in wet woods near rivers and swamps, less often in wooded uplands or cultivated fields. Common near human habitation where they are attracted to garbage.

SPECIAL HABITAT REQUIREMENTS: Den—usually in abandoned burrow, tree cavity, hollow log, or brush pile; water (Llewellyn and Dale 1964).

REPRODUCTION: Age at sexual maturity: 8 to 12 months. Breeding period: Late January to early July, New York (Hamilton 1958). Gestation period: 13 days (Lay 1942). Young born: February to July in extremely undeveloped stage and remain in female's pouch for 60 days. Litter size: 5 to 13, average 8. Litters per year: 1 per year in north, 2 or 3 per year in south (Walker 1975:24).

HOME RANGE: Not territorial; separate home ranges not maintained. Average minimum range was 11.5 acres (4.7 ha). Range 0.33 to 58 acres (0.1 to 23.5 ha) for 29 opossums in East Texas (Lay 1942). 15 to 40 acres (6 to 16 ha) (Burt and Grossenheider 1976:1). Average minimum length of 25 elongate ranges in several habitats in Maryland was 0.6 mile (1 km) (Llewellyn and Dale 1964).

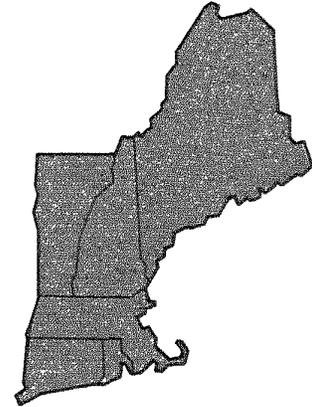
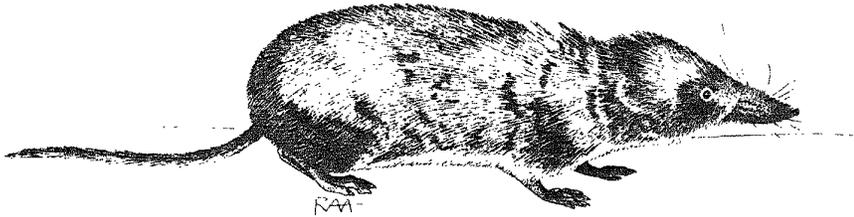
FOOD HABITS: Insects, worms, fruits, nuts, carrion, and garbage; almost any vegetable or animal food (Lay 1942). Also preys on voles, shrews, and moles (Hamilton 1951, Taube 1947).

COMMENTS: In winter, opossums become less active but do not hibernate (McManus 1971). Individuals in the north are often lacking ears and tails due to frostbite. Avoids predators by feigning death and voiding noxious odors (Francq 1969).

KEY REFERENCES: Hamilton 1958, Hartman 1953, Lay 1942, Llewellyn and Dale 1964, McManus 1974, Wiseman and Hendrickson 1950.

Masked Shrew

(*Sorex cinereus*)



RANGE: Throughout Canada and Alaska s. to North Carolina, New Mexico (mountains), and c. Washington.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Damp deciduous and coniferous woodlands with grasses, rocks, logs, or stumps for cover; bogs and other moist areas. Less often in open country with abundant moisture or in dry woods. Kirkland (1977b) found them in clearcuts in West Virginia.

SPECIAL HABITAT REQUIREMENTS: High humidity (moist sites) (Banfield 1974:9), ground cover (especially leaves, rotten logs, herbaceous vegetation).

REPRODUCTION: Age at sexual maturity: 20 to 26 weeks (Short 1961). Breeding period: Late April to late September or October (Banfield 1974:9). Gestation period: Probably 18 days (Godin 1977:24. Peterson 1966:36). Young born: Late April to September or October. Litter size: 2 to 10, average 4.4 (Banfield 1974:9). Litters per year: Up to 3 may be produced in a single season.

HOME RANGE: About 0.10 acre (0.04 ha) (Banfield 1974:9).

SAMPLE DENSITIES: Densities of up to 9 individuals per acre (22/ha) have been reported in favorable habitats (Banfield 1974:9).

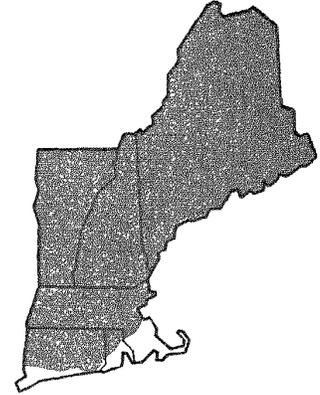
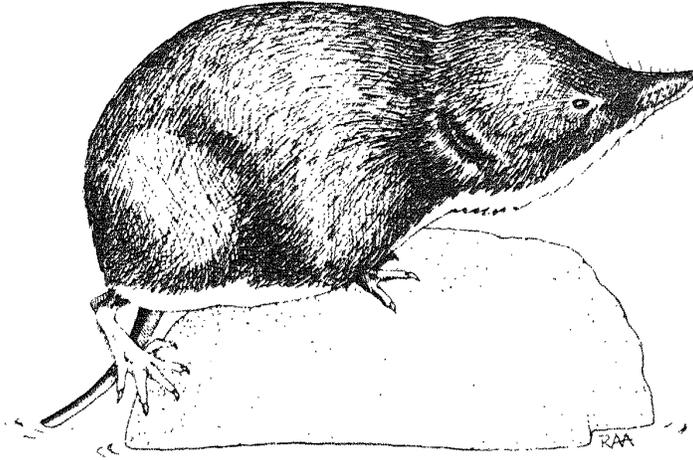
FOOD HABITS: Mainly insectivorous and carnivorous. Also consumes worms, spiders, snails, slugs, and small amounts of vegetable matter. Feeds among litter on forest floor.

COMMENTS: Young are independent when about 1 month old (Godin 1977:24). Nests in grass, or under logs, rocks, or brush. Active throughout winter.

KEY REFERENCES: Banfield 1974, Walker 1975, Wrigley et al. 1979.

Water Shrew

(*Sorex palustris*)



RANGE: Nova Scotia and s. Quebec w. to British Columbia, s. through New England, much of New York, Pennsylvania, and the s. Appalachians. Also occurs in the mountains of the West.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: Wet areas, especially grass-sedge marsh or shrub zones along ponds and streams in coniferous forest (Wrigley et al. 1979). Also at wooded shores with favorable cover in the form of crevices beneath boulders, tree roots, or overhanging banks.

SPECIAL HABITAT REQUIREMENTS: Herbaceous cover, body of cold water (bog, stream, lake, and so on).

REPRODUCTION: Age at sexual maturity: Possibly 9 months. Breeding period: Possibly February to August. Peak: Possibly March to July. Gestation period: Probably about 21 days (Conaway 1952). Young born: Probably March to August. Litter size: 4 to 8, average 6. Litters per year: Possibly 2 to 3 are produced each year by mature females (Banfield 1974:14).

HOME RANGE: 0.5 and 0.8 acres (0.2 and 0.3 ha) for two individuals live-trapped in Manitoba (Buckner and Ray 1968).

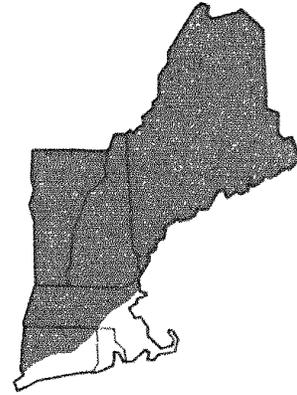
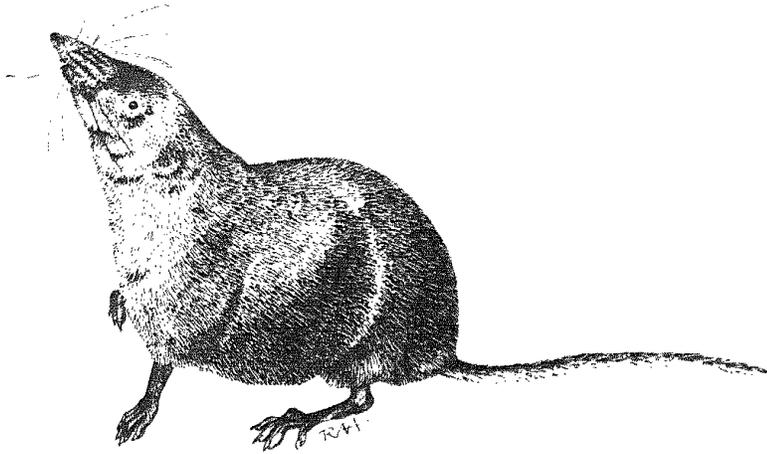
FOOD HABITS: Insectivorous—mainly eats larvae of aquatic insects. Also takes snails, flatworms, and small fish (Banfield 1974:14).

COMMENTS: Little is known about the habits of this species. Have been found more than 100 m from streams in mature northern hardwood stands in northern New Hampshire (D. Rudis, personal observation).

KEY REFERENCES: Banfield 1974, Conaway 1952, Wrigley et al. 1979.

Smoky Shrew

(*Sorex fumeus*)



RANGE: Maritime Provinces, s. Quebec and Ontario w. to Lake Superior. Southern Maine s. through parts of s. New England, Ohio, Kentucky, and Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Damp, boulder-strewn, upland woods (often beech or maple, birch and hemlock) with thick leafmold. Typically near streams with moss-covered banks (Burt and Grossenheider 1976:5, Godin 1977:27). Also uses early clearcuts in coniferous woodlands (Kirkland 1977b).

SPECIAL HABITAT REQUIREMENTS: Loose damp leaf litter—does not burrow, uses runways of other small mammals (Banfield 1974:16) in shady wooded areas (Peterson 1966:38).

REPRODUCTION: Age at sexual maturity: Spring following first winter. Breeding period: Late March to early August (New York Godin 1977:27). Gestation period: About 20 days (Hamilton 1940). Young born: Mid-April through August (New York) (Hamilton 1940). Litters per year: Up to 3 (Hamilton 1940).

SAMPLE DENSITIES: Ranged from 5 to 50 individuals per acre (12 to 123/ha) in late summer (Hamilton 1940).

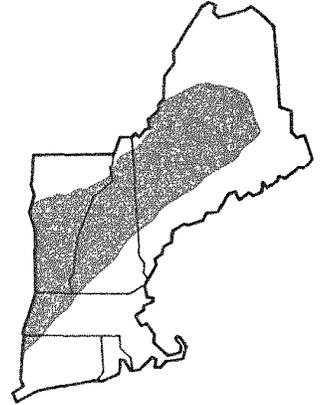
FOOD HABITS: Mainly insectivorous (80 percent) but also eats earthworms, spiders, snails, salamanders, small mammals, and birds (Hamilton 1940:480).

COMMENTS: Usually nests beneath stump, rotten log or in tunnels dug by larger mammals (Banfield 1974:16, Godin 1977:27). Active throughout winter (Banfield 1974:16).

KEY REFERENCES: Banfield 1974, Godin 1977, Hamilton 1940.

Long-tailed Shrew

(*Sorex dispar*)



RANGE: Central and w. Maine s. in the Appalachians to North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Undetermined—possibly rare.

HABITAT: Cold, damp coniferous forests, typically near moss-covered rocks and logs, which provide shady protective crevices, or wooded talus slopes (Connor 1960, Richmond and Grimm 1950). Also found in deciduous and mixed forest (Burt and Grossenheider 1976:b). Five individuals were found in a 1-year-old red spruce clear-cut in West Virginia (Kirkland et al. 1976). Others have been taken in road construction rubble (Conaway and Pfitzer 1952).

SPECIAL HABITAT REQUIREMENTS: Rocky, wooded sites.

REPRODUCTION: Age at sexual maturity: Less than 1 year. Breeding period: Possibly late April to August (Kirkland and Van Deusen 1979). Gestation period: Unknown. Young born: Probably May to August. Litter size: 5 reported (total of 4 records for litter size).

HOME RANGE: Unknown.

SAMPLE DENSITIES: 7 individuals were trapped on 1 acre (0.4 ha) of talus in Pennsylvania (Richmond and Grimm 1950).

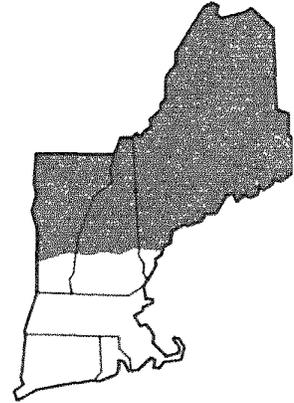
FOOD HABITS: Mainly insectivorous. Also eats centipedes and spiders (Connor 1960, Richmond and Grimm 1950).

COMMENTS: Little is known about this shrew. Occasionally it is found in moderate numbers in favorable habitat and is known to be partly subterranean. Also called the rock shrew.

KEY REFERENCES: Connor 1960, Godin 1977, Kirkland and Van Deusen 1979, Richmond and Grimm 1950.

Pygmy shrew

(*Sorex hoyi*)



RANGE: Gaspé Peninsula w. to s. Wisconsin, s. in the Appalachians to n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Generally thought to be rare, but may be fairly common.

HABITAT: Wet or mixed (wet-dry) habitat or less often in dry areas close to water. Found in damp litter especially near rotten stumps and logs in wooded areas. Prefers grassy openings in coniferous forests (Godin 1977:20), but tolerates a variety of habitat conditions (Wrigley et al. 1979). In New Hampshire, this species was more abundant in swamp hardwood than coniferous stands (Hill 1982).

SPECIAL HABITAT REQUIREMENTS: Moist leafmold near water.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: Unknown. Litter size: Unknown. Litters per year: May bear only 1.

HOME RANGE: Unknown.

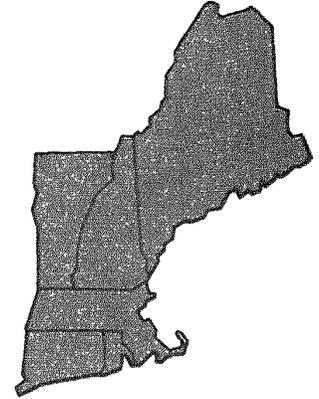
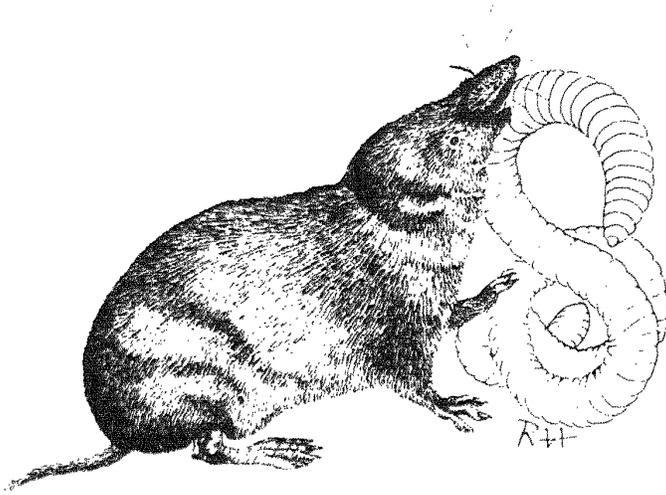
FOOD HABITS: Observed eating insects and flesh of small animals in captivity.

COMMENTS: Life history is little known.

KEY REFERENCES: Godin 1977; Long 1972, 1974; Prince 1941; Spencer and Pettus 1966; Wrigley et al. 1979.

Northern short-tailed Shrew

(*Blarina brevicauda*)



RANGE: Nova Scotia w. to Saskatchewan, s. to East Texas and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Both timbered and fairly open habitats; deciduous, mixed, and less often coniferous forests with moist loose humus; especially common along banks of streams and in meadows with tall rank grasses or sedges, brush piles, and stone walls. Avoids dry, warm sites (Getz 1961a, Pruitt 1959). Favored grass-sedge marsh and willow-alder shrub zone in Manitoba (Wrigley et al. 1979).

SPECIAL HABITAT REQUIREMENTS: Low vegetation, loose leaf litter, high humidity.

REPRODUCTION: Age at sexual maturity: Early females may mature in 6 weeks, but probably do not breed until a year after their birth. Breeding period: March to September. Gestation period: 21 to 22 days. Young born: April to September. Litter size: 3 to 10, average 4.5 (Banfield 1974:23). Litters per year: 2 to 3.

HOME RANGE: 1.0 to 1.25 acres (0.40 to 0.51 ha) (Banfield 1974:22), 0.5 to 1.0 acre (0.2 to 0.4 ha) (Burt and Grosheider 1976:16).

SAMPLE DENSITIES: Densities of up to 48 individuals per acre (119/ha) have been reported in good habitats (Banfield 1974:22).

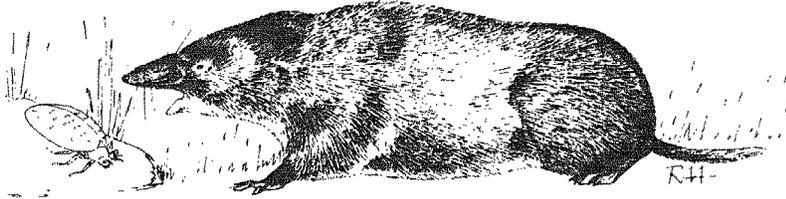
FOOD HABITS: Mainly insects, plants, worms, sowbugs, snails, small vertebrates, centipedes and millipedes, spiders (Banfield 1974:23).

COMMENTS: Active day and night throughout the year. More fossorial than other shrews; digs own tunnels and uses burrows of other vertebrate species, especially voles.

KEY REFERENCES: Banfield 1974; Blair 1940a, 1941; Burt 1940; Hamilton 1931a; Wrigley et al. 1979.

Least Shrew

(*Cryptotis parva*)



RANGE: Southwestern Connecticut w. through c. New York to South Dakota, s. through e. Texas and Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Undetermined—may be fairly common. Seldom caught in traps, but remains are often found in owl pellets (Banfield 1974:25).

HABITAT: Open grassy areas with or without scattered brush, salt marshes, woodland edges (Banfield 1974:25, Godin 1977:34).

SPECIAL HABITAT REQUIREMENTS: Loose soils for tunnels (often uses runways of larger mice and shrews).

REPRODUCTION: Age at sexual maturity: About 40 days (Godin 1977:35). Breeding period: Early March to early November (at northern edge of range) (Hamilton 1944). Gestation period: About 15 days (Godin 1977:35). Young born: Late March to late November. Litter size: 3 to 6, average 4 or 5 (Godin 1977:35). Litters per year: Probably 2 to 3.

HOME RANGE: Unknown.

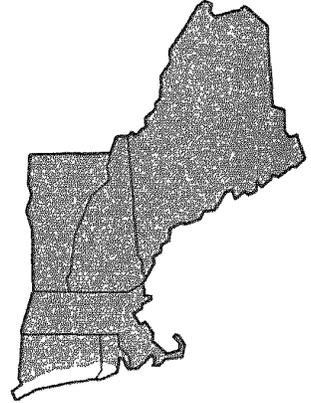
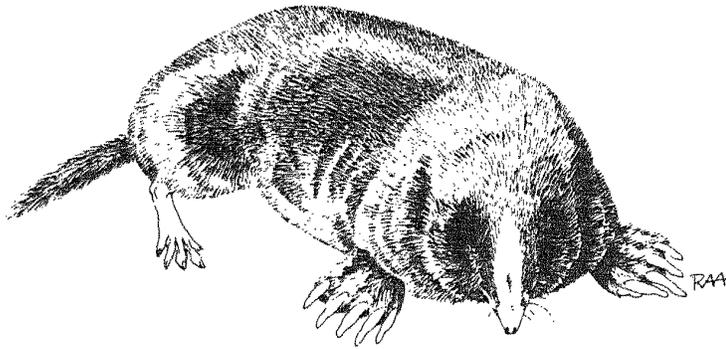
FOOD HABITS: Insects, mollusks, amphibians, lizards, worms, mammals, and vegetable matter (Hamilton 1944).

COMMENTS: Rarely nests in burrows. More often uses hollows under stones, logs, or stumps. Highly social—31 individuals were found in one winter nest (Burt and Grossenheider 1976:15).

KEY REFERENCES: Conaway 1952, Hamilton 1944, Mock 1970.

Hairy-tailed Mole

(*Parascalops breweri*)



RANGE: New Brunswick and se. Quebec w. to se. Ontario s. through e. Ohio and w. North Carolina (Appalachian Mountains).

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Open woods and meadows with light, sandy loam. Prefers areas with vegetative cover and sufficient moisture. Avoids heavy wet soils.

SPECIAL HABITAT REQUIREMENTS: Loose moist well-drained soil.

REPRODUCTION: Age at sexual maturity: 10 months (Eadie 1939). Breeding period: March and April (New Hampshire, Eadie 1939). Gestation period: About 30 days. Young born: April and May. Litter size: 4 or 5, average 4. Litters per year: 1 (possibly 2).

HOME RANGE: About 0.2 acre (0.1 ha) (Eadie 1939).

SAMPLE DENSITIES: An average density of 1.2 moles per acre (3/ha) on 27 acres (11 ha) and a maximum density of 11 individuals per acre (27/ha) has been reported in various habitats in New Hampshire (Eadie 1939). 10 to 12 moles per acre (25 to 30/ha) have been reported in maple-beech-hemlock woods in New York (Hamilton 1939a).

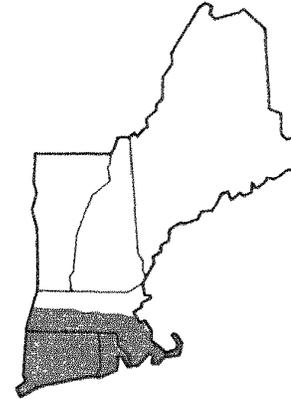
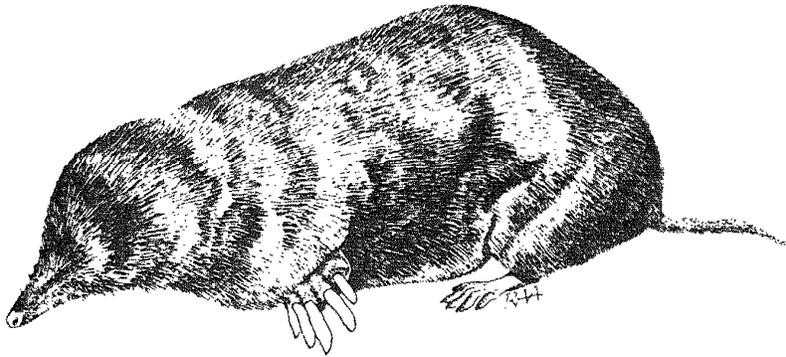
FOOD HABITS: Earthworms, insects (adults, larvae, pupae), millipedes, centipedes, snails, slugs, sowbugs (Godin 1977:37); forages on forest floor at night.

COMMENTS: Constructs two tunnel systems—one shallow (just below surface), the other deep (10 to 18 inches, 25 to 46 cm). Permanent deep tunnels are sites of breeding and winter nests (Eadie 1939) and may be used for several years.

KEY REFERENCES: Eadie 1939, Godin 1977, Hallett 1978.

Eastern Mole

(*Scalopus aquaticus*)



RANGE: Massachusetts w. to Wyoming s. to c. Texas and the Gulf of Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Pastures, meadows, lawns, and less often in open woodland, in loamy or sandy soils that permit easy digging. Often in moist (not wet) bottomlands where earthworms are plentiful.

SPECIAL HABITAT REQUIREMENTS: Soft moist soils containing earthworms.

REPRODUCTION: Age at sexual maturity: 1 year. Breeding period: March and April. Gestation period: 42 to 45 days. Young born: Late April or May. Litter size: 2 to 5. Litters per year: 1.

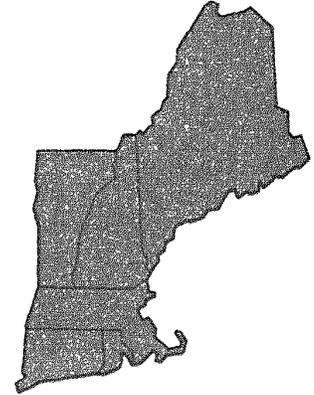
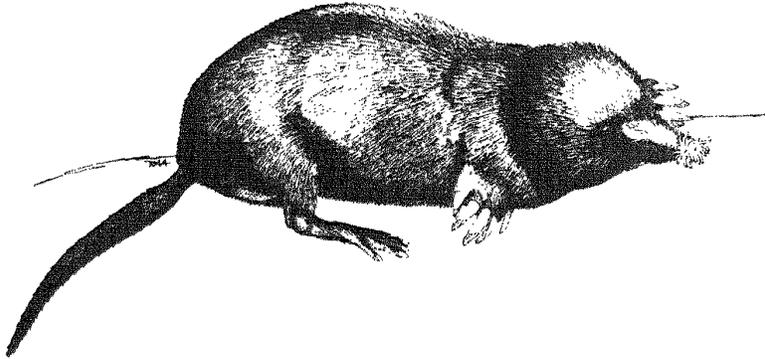
HOME RANGE: Average area 0.74 ha (0.3 acre) for 7 moles in Kentucky, 4 males averaged 1.09 ha (0.4 acre); 3 females averaged 0.28 ha (0.1 acre) (Harvey 1967).

SAMPLE DENSITIES: Active throughout the year during all hours of day and night except early morning and early evening (Harvey 1967). Digs tunnels just below surface or in dry or cold weather excavates deeper burrows 10 inches or more deep. Spends most of life below ground. Young are independent when about 1 month old (Godin 1977:38). Solitary except during breeding season.

KEY REFERENCES: Arlton 1936, Harvey 1967, Yates and Schmidly 1978.

Star-nosed Mole

(*Condylura cristata*)



RANGE: Southern Labrador w. to sw. Manitoba, se. through n. Ohio, s. in the Appalachians through w. North Carolina and along the coast to the ne. corner North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Prefers low wet ground near bodies of water, swamps, wet meadows, occasionally wet spots in fields or low-lying woods. Has been found in mixed hardwood strands with dry soils near water.

SPECIAL HABITAT REQUIREMENTS: Wet, mucky humus.

REPRODUCTION: Age at sexual maturity: 10 months. Breeding period: April and May. Gestation period: About 45 days. Young born: May and June. Litter size: 3 to 7, average 5.4. Litters per year: 1.

HOME RANGE: Probably about 1 acre (0.4 ha) (Banfield 1974:36).

SAMPLE DENSITIES: 10 individuals per acre (24.7/ha) have been reported in late winter in New York (Eadie and Hamilton 1956).

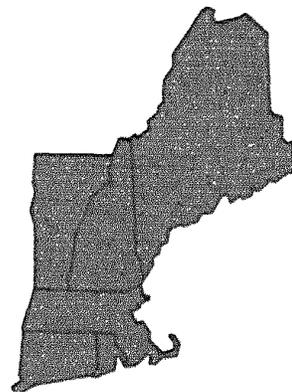
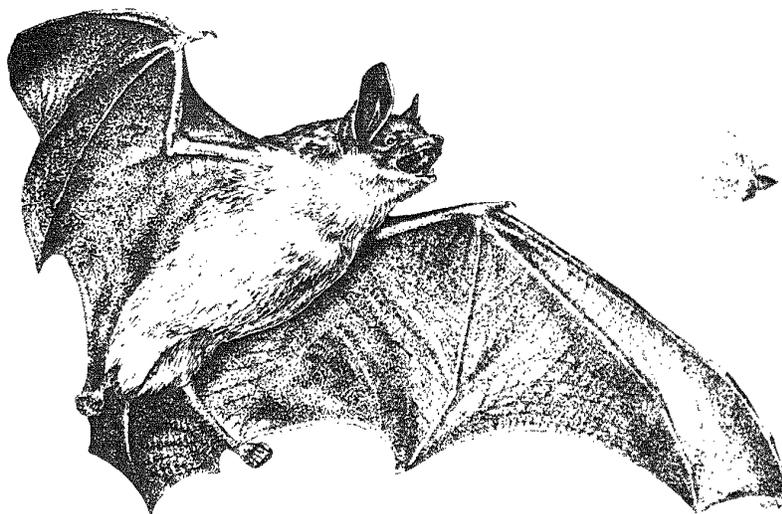
FOOD HABITS: Aquatic insects, earthworms, crustaceans, slugs, snails, isopods, small fish (occasionally), and small amounts of vegetable material. Forages above ground at night.

COMMENTS: Excellent swimmer, spending much time in water. Usually lives in small colonies (Eadie and Hamilton 1956). Active day and night throughout the year. Has been found swimming under the ice of streams and ponds (Hamilton 1931b). Not uncommon on ground surface.

KEY REFERENCES: Eadie and Hamilton 1956, Hamilton 1931b.

Little Brown Myotis

(*Myotis lucifugus*)



RANGE: Labrador w. to s. Alaska s. to Georgia (in the Appalachians) Arkansas and s. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Breeds in caves in fall. Females seek attics and barns in spring for maternity colonies. Roosting habitat: caves, quarries, mine tunnels, hollow trees, buildings. Winter habitat: caves with constant 40° F (4°C) temperatures and 80 percent relative humidity (Banfield 1974:42)

SPECIAL HABITAT REQUIREMENTS: Females seek dark, warm sites for maternity colonies. Males seek cooler daytime roosts, frequently in valleys near streams and marshes.

REPRODUCTION: Age at sexual maturity: About 6 to 9 months for females, 1 year for males. Breeding period: Usually from September to October with fertilization delayed until spring. Gestation period: 50 to 60 days (estimate) (Wimsatt 1945). Young born: Mid-June to early July. Litter size: 1. Litters per year: 1.

HOME RANGE: Unknown.

SAMPLE DENSITIES: Summer density: average 26 bats per square mile (10/km²) over an 8,600-square-mile (22,274 km²) area served by a cave in southern Vermont. Winter density: In caves in southern Vermont—300,000 ± 30,000 (Davis and Hitchcock 1965).

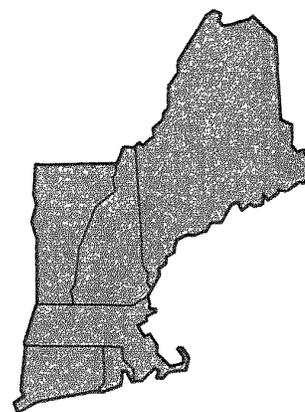
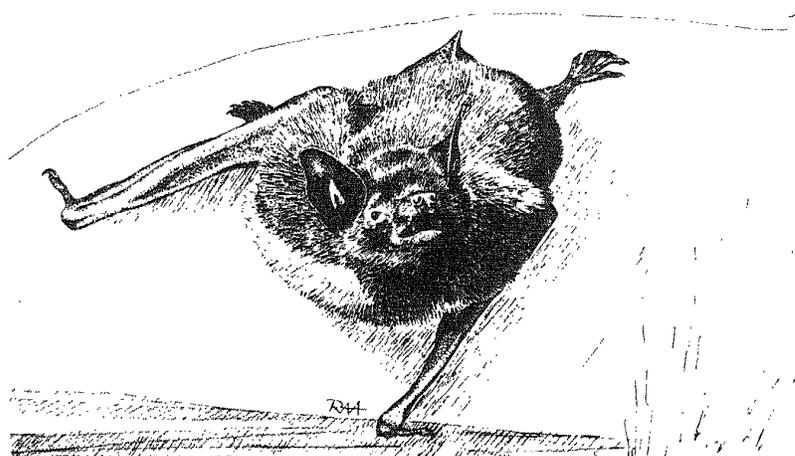
FOOD HABITS: Congregate over water to drink and hawk flying insects, especially midges and mosquitoes, but also beetles, moths, and caddisflies (Anthony and Kunz 1977).

COMMENTS: Breeding colonies of 12 to 1,200 have been reported in Vermont. Females seek nursery sites in late April and disperse July to mid September (Davis and Hitchcock 1965).

KEY REFERENCES: Barbour and Davis 1969; Carle and Cockrum 1943; Davis and Hitchcock 1965; Griffin 1940b, 1945; Humphrey and Cope 1976; Wimsatt 1945.

Keen's Myotis

(*Myotis keenii*)



RANGE: Newfoundland and Nova Scotia w. to Saskatchewan, s. to Wyoming and n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Females seek attics, barns, and tree cavities for small nursery colonies. Both sexes roost singly or in small colonies in crevices under loose tree bark, in cliff walls, or in caves.

SPECIAL HABITAT REQUIREMENTS: For hibernation, Keen's myotis seeks caves or mine shafts with temperatures near 40° F (4.5° C), high relative humidity (Banfield 1974:46), and calm air (Fitch and Shump 1979).

REPRODUCTION: Age at sexual maturity: About 6 to 9 months for females, 1 year for males. Breeding period: September to October with fertilization delayed until spring. Gestation period: 50 to 60 days. Young born: Mid-June to early July. Litter size: 1. Litter per year: 1.

HOME RANGE: Unknown.

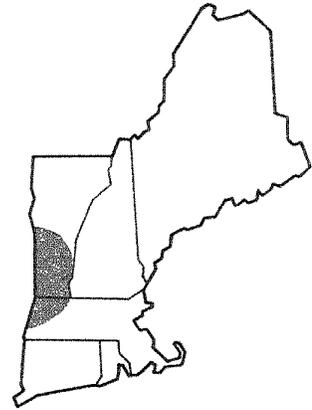
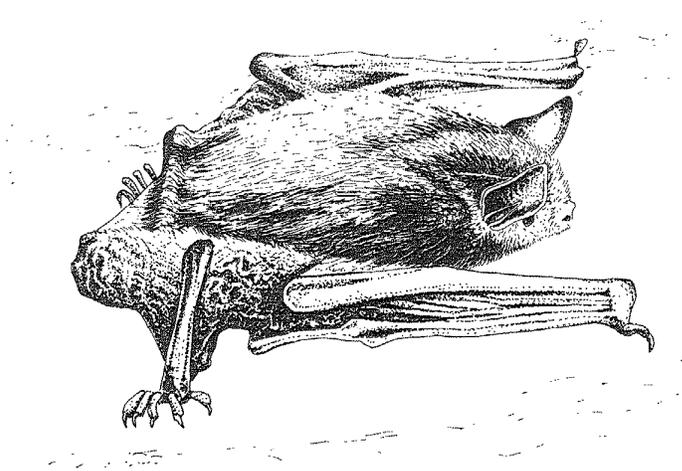
FOOD HABITS: Little is known—probably similar to little brown myotis (Godin 1977:49). Forages over ponds and clearings and high along the forest edge (Cowan and Guiquet 1965). Stomachs of three individuals in Indiana contained assassin bugs, moths, butterflies, flies, leaf hoppers, and other unidentified insects (Whitaker 1972a).

COMMENTS: Locally and irregularly distributed within its range. Several hundred individuals were observed hibernating in caves in Canada (Hitchcock 1949). Frequently found mixed with *Myotis lucifugus* during hibernation.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Fitch and Shump 1979, Godin 1977.

Indiana Myotis

(*Myotis sodalis*)



RANGE: Eastern New York and probably s. Vermont and w. Massachusetts.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and endangered.

HABITAT: Favors limestone caves with pools of water. Solitary females or small maternity colonies bear young in hollow trees or under loose bark. Cannot tolerate high temperatures of attics.

SPECIAL HABITAT REQUIREMENTS: Caves for hibernation that have cool, stable temperatures of 40° to 46° F (4° to 8° C) throughout the winter (Humphrey 1978). Trees for nursery colonies.

REPRODUCTION: Age at sexual maturity: About 6 months. Breeding periods: Early October (Kentucky). Gestation period: Unknown. Young born: Late June. Litter size: 1.

HOME RANGE: Unknown.

FOOD HABITS: Forages in the foliage of crowns of trees 7 to 98 feet. (2 to 30 m) tall along the shores of rivers and lakes and over floodplains (Humphrey et al. 1977). Four stomachs examined in Indiana contained ichneumonids, leafhoppers, beetles, and unidentified wasps (Whitaker 1972a).

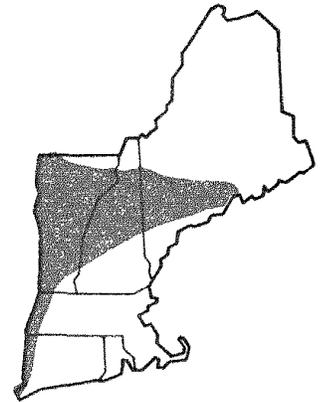
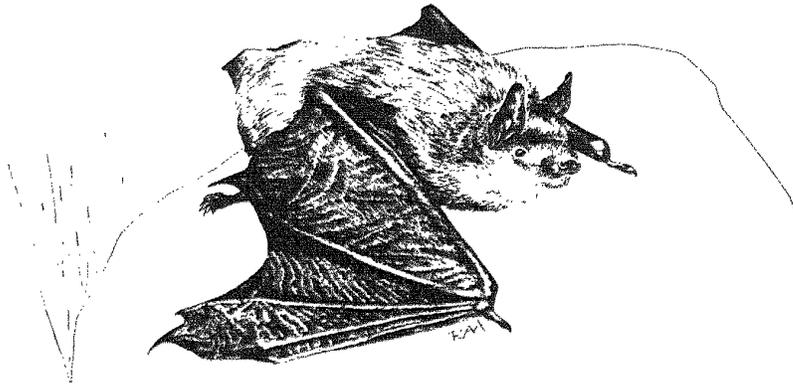
COMMENTS: Band recoveries revealed seasonal movement of up to 320 miles (512 km) (Hall 1960). Hibernation

period may last from mid-September to early June (averages mid-October to mid-April). 97 percent of total population of Indiana myotis hibernates in four large caves in southern Indiana, Illinois, Missouri, and Kentucky (Hall 1962). Population has decreased by 28 percent in 15 years (Humphrey 1978). It may now be extinct in New England.

KEY REFERENCES: Barbour and Davis 1969; Godin 1977; Hall 1960, 1962.

Small-footed Myotis

(*Myotis leibii*)



RANGE: Southeastern Canada w. through the Midwestern United States to e. Washington s. to Mexico, w. Texas and n. Georgia.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Godin 1977, Hitchcock 1949, Mohr 1936.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: In or near woodland in caves, mine tunnels, buildings, crevices in rocks. Maternity colonies have been observed in buildings (Hitchcock 1955).

SPECIAL HABITAT REQUIREMENTS: Tolerates cold, dry places for hibernation from mid-November to March (Barbour and Davis 1969:104).

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: Single young found at the end of May in California; a pregnant female found in mid-July in Nebraska (Quay 1948). Litter size: Probably 1.

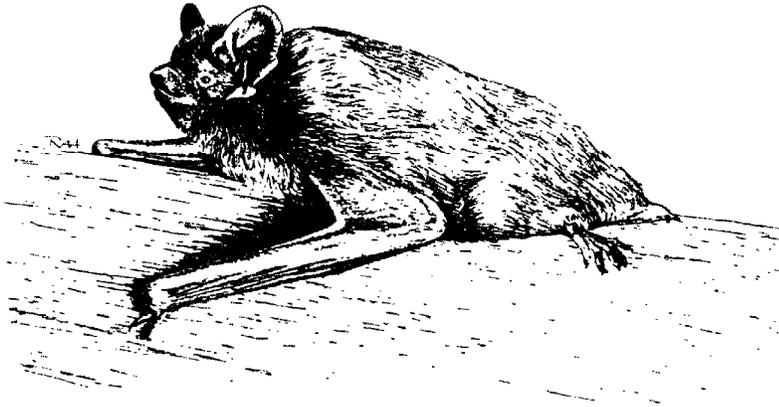
HOME RANGE: Unknown.

FOOD HABITS: Unknown. Probably similar to other myotids. Flies, bugs, beetles, and ants found in stomachs of two specimens (Cockrum 1952:62).

COMMENTS: Hibernates in cold, dry caves or mines from November to April (Pennsylvania). Associated with caves in the foothills of mountains up to 2,000 feet (610 m) in coniferous woodlands (hemlock, spruce, white cedar) (Hitchcock 1949).

Silver-haired Bat

(*Lasionycteris noctivagans*)



RANGE: Southern Canada w. to s. Alaska s. to c. California, c. Texas and South Carolina.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Godin 1977.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Forested areas near lakes or streams. Roosts in foliage of trees, in tree cavities and under loose bark as well as in buildings or caves. Frequently found in coniferous forests of mountains.

SPECIAL HABITAT REQUIREMENTS: Dead trees with loose bark or cavities for summer roosting sites, water courses.

REPRODUCTION: Age at sexual maturity: First summer. Breeding period: Late September with delayed fertilization. Gestation period: 50 to 60 days (Druecker 1972). Young born: June or July. Litter size: 2 (occasionally 1). Litters per year: 1.

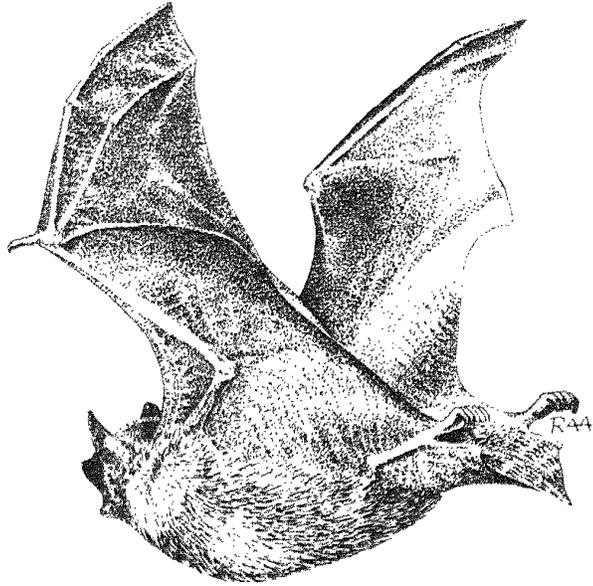
HOME RANGE: Unknown.

FOOD HABITS: Feeds among trees and over ponds and streams often less than 20 feet above surface; may prefer emerging aquatic insects (Banfield 1974:54).

COMMENTS: Solitary in summer. Sexes remain separated except during breeding period. Migrates to southern parts of range, generally hibernates under loose bark or in tree cavities or buildings. Erratic in abundance throughout its wide range.

Eastern Pipistrelle

(*Pipistrellus subflavus*)



RANGE: Southeastern Canada w. to Minnesota, s. to e. Mexico and Central America. Absent from n. New England, Michigan, and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Open woods near water, crevices in cliffs, buildings, caves. Avoids deep woods. Commonly roosts in trees during summer days.

SPECIAL HABITAT REQUIREMENTS: Warm, draft free, damp sites for hibernation (Banfield 1974:57), open woods (Godin 1977:54).

REPRODUCTION: Age at sexual maturity: Probably first summer. Breeding period: October to November and frequently in early spring. Gestation period: About 45 days (Hall 1956:3). Young born: Late June to mid-July. Litter size: Usually 2.

HOME RANGE: Believed to feed within a radius extending at least 5 miles (8 km) from roosting site.

FOOD HABITS: Usually solitary feeder. Prefers to feed over rivers, pastures (if large trees are nearby) and high in bordering trees in search of flies, beetles, ants, bugs, moths, wasps (Banfield 1974:57, Godin 1977:54). Leaf hoppers are important food (Whitaker 1972a).

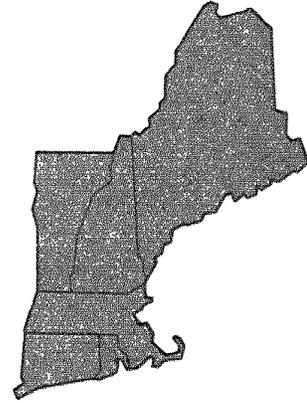
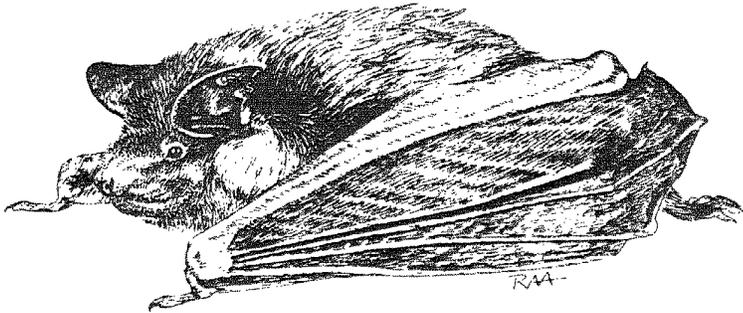
COMMENTS: Selects warm draftless spots for hibernation (mid-October to May) (Banfield 1974:57) in caves,

mines, and rock crevices (Godin 1977:54). Usually hangs singly or in pairs.

KEY REFERENCES: Banfield 1974, Barbour and Davis 1969, Davis and Mumford 1962, Hall 1956.

Big Brown Bat

(*Eptesicus fuscus*)



RANGE: Southern Canada w. to Alaska s. to n. Florida and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Buildings, bridges, caves, tunnels, hollow trees in wooded areas; avoids hot attics.

SPECIAL HABITAT REQUIREMENTS: Seems to require cold, dry areas of caves or buildings for hibernation (Hitchcock 1949).

REPRODUCTION: Age at sexual maturity: Females: first autumn. Males: 1 year. Breeding period: September through March. Peak: September. Fertilization occurs in April. Gestation period: About 2 months. Young born: June. Litter size: Usually 2 in the East, 1 in the West. Litters per year: 1.

HOME RANGE: Probably travels less than 30 miles (48 km) from birthplace (Barbour and Davis 1969:127) and often uses the same site for summer roosting and hibernation.

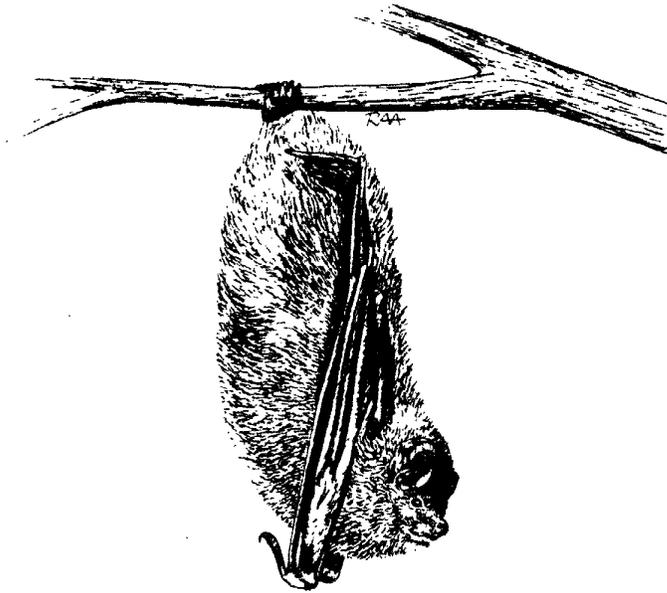
FOOD HABITS: Beetles, wasps, flies, bugs, and other flying insects (Hamilton 1933a). Beetles accounted for the highest percentage of diet in Indiana (Whitaker 1972a). Individuals may use the same feeding ground each night (Barbour and Davis 1969:121). General in foraging habitat (Humphrey 1982).

COMMENTS: Hibernation begins in November. Nursery colonies are relatively small, usually with a maximum of 700 individuals (Mills et al. 1975). In New England, nursery colonies seldom exceed 200 individuals.

KEY REFERENCES: Barbour and Davis 1969, Godin 1977, Mills et al. 1975, Phillips 1966.

Red Bat

(*Lasiurus borealis*)



RANGE: Southern Canada from Nova Scotia w. to British Columbia s. to Texas and n. Florida, also n. California s.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Wooded areas where it roosts in trees 5 to 40 feet (1.5 to 12.2 m) above ground (McClure 1942). Solitary except females with young. Rarely found in buildings or caves except during migration. In Maryland, bats favored deciduous woodlands (Paradiso 1969:54). Greatest numbers were found along fence rows and forest edges, in roosting areas open only from below (Constantine 1966). Most active over water early in evening (Kunz 1973).

SPECIAL HABITAT REQUIREMENTS: Possibly trees for roosting.

REPRODUCTION: Age at sexual maturity: Second summer. Breeding period: August to October, fertilization occurs in spring. Gestation period: 60 to 70 days. Young born: Late May to early July, mid-June in Indiana (Whitaker and Mumford 1972) and Iowa (Kunz 1971). Litter size: 1 to 5, average 2.3. Litters per year: 1.

HOME RANGE: Unknown, however, known to forage 600 to 1,000 yards (546 to 910 m) from day roosts (Jackson 1961:95).

SAMPLE DENSITIES: 1 individual per acre (2.4/ha) in Iowa (McClure 1942).

FOOD HABITS: Feeds at height of tree foliage to ground, sometimes in pairs and often repeatedly follows the same route about 100 yards (91 m) in length (Burt and Grosenheider 1976:37). Eats moths, beetles, bugs, flies, crickets, and other insects.

COMMENTS: Migrates south in autumn wintering from Maryland and Washington, D.C., to the Gulf States (Banfield 1974:62, Paradiso 1969:55).

KEY REFERENCES: Barbour and Davis 1969, Godin 1977, Layne 1958, McClure 1942.

Hoary Bat

(*Lasiurus cinereus*)



RANGE: Southern Canada s. to c. Florida and South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare.

HABITAT: Wooded areas where it roosts 10 to 15 feet (3 to 4.5 m) above ground in trees (Constantine 1966). Prefers coniferous forests but also uses deciduous woods and woodland edges, hedgerows and trees in city parks (Godin 1977:60).

SPECIAL HABITAT REQUIREMENTS: Forest edge.

REPRODUCTION: Age at sexual maturity: Most become mature during first summer (Druecker 1972). Breeding period: September to November. Peak: Early September. Gestation period: Believed to be about 90 days (Jackson 1961). Young born: Mid-May to early July. Litter size: 1 to 4, average 2. Litters per year: 1.

HOME RANGE: Feeding range may extend a mile (1.6 km) or more from roosting site (Paradiso 1969:58).

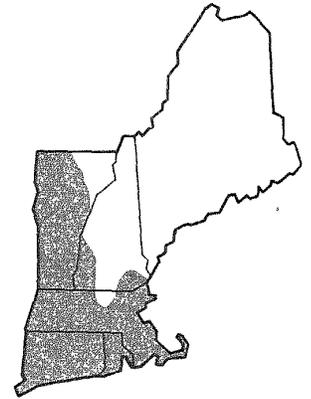
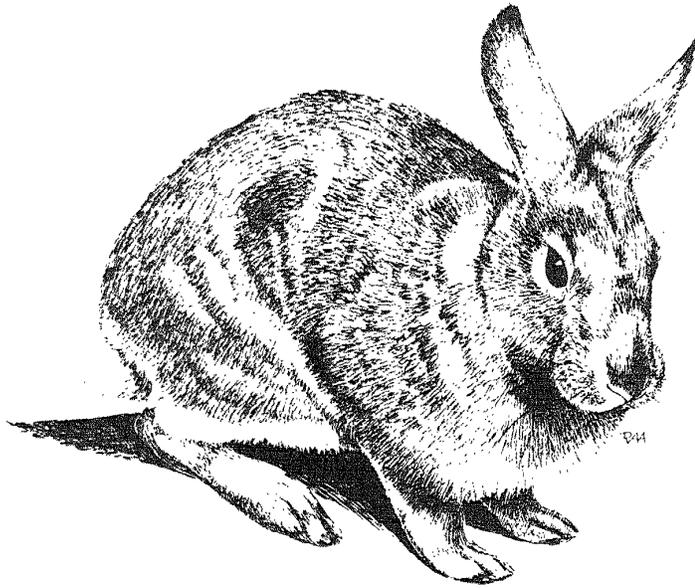
FOOD HABITS: Forages for insects over lakes and forest clearings (Banfield 1974:64). Out of 139 hoary bats examined in New Mexico, 136 contained moths, up to 25 individuals per bat (Ross 1967). Has been seen attacking pipistrelles in New York (Bishop 1947) and in California (Orr 1950).

COMMENTS: Largest of eastern bats. Females do not form maternity colonies. Sexes separate when young are born and remain segregated most of summer (Godin 1977:61). Migrates in waves to Southern United States and Central America. Individuals have been found in the North during the winter months (Whitaker 1967).

KEY REFERENCES: Barbour and Davis 1969, Bogan 1972, Godin 1977, Seton 1909.

Eastern Cottontail

(*Sylvilagus floridanus*)



RANGE: Eastern United States including extreme s. Canada s. through e. Mexico and parts of Central America. Is spreading into New Hampshire at the expense of the New England cottontail (E. Franco, personal communication).

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Farmlands, pastures, fallow fields, open woodlands, thickets along fence rows and stone walls, edges of forests, swamps and marshes, suburban areas with adequate food and cover. Avoids dense woods.

SPECIAL HABITAT REQUIREMENTS: Brush piles, stone walls, dens or burrows for year-round protection from storms and cold weather. Herbaceous and shrubby cover.

REPRODUCTION: Age at sexual maturity: 2 to 3 months. Most females breed the first spring following birth. Breeding period: March to September. Peak: April to August. Gestation period: 26 to 32 days. Young born: March to September. Young disperse at about 7 weeks. Litter size: 3 to 8, typically 5 or 6. Litters per year: 3 to 4.

HOME RANGE: Sizes range from about a half-acre to 40 acres (0.2 to 16.2 ha) or more (Godin 1977:68). Average 1.4 acres (0.57 ha) for adult males and 1.2 acres (0.48 ha) for adult females in Massachusetts (McDonough 1960). Approximately 8 acres (3.2 ha) (Banfield 1974:77).

SAMPLE DENSITIES: 0.46 animal per acre (1.1/ha) on 75-acre (30.4-ha) plot in Iowa during month of June, increasing to 1.65 per acre (4/ha) in August, followed by a drop to 0.89 per acre (2.2/ha) in October (Banfield 1974:77).

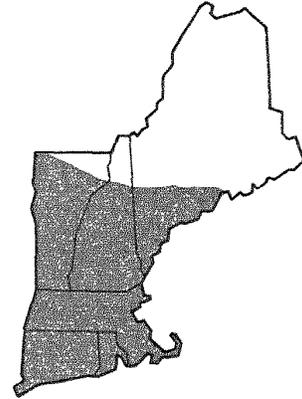
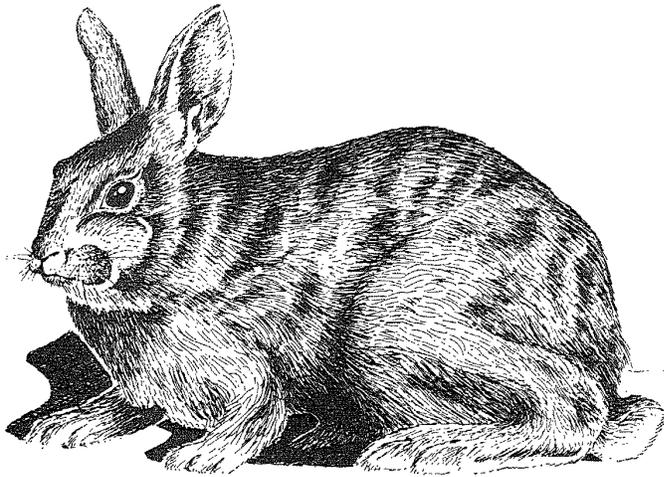
FOOD HABITS: Crepuscular and nocturnal feeder. Most feeding takes place 2 to 3 hours after sunrise and within the hour following sunset. Summer foods: tender parts of grasses and herbs. Winter foods: Bark, twigs and buds of shrubs and young trees such as maple, birch, and oak. Coprophagic.

COMMENTS: The eastern cottontail was introduced into New England in the late 1800's. Female does not dig a burrow—uses abandoned woodchuck hole or digs a shallow nest in soft earth that is well concealed by surrounding vegetation.

KEY REFERENCES: Beule and Studholme 1942, Chapman et al. 1977, Dalke and Sime 1938, Haugen 1942.

New England Cottontail

(*Sylvilagus transitionalis*)



RANGE: Central and s. New England s. through e. New York, Pennsylvania, n. New Jersey and the Appalachian Mountains (to slightly above 4,000 feet, 1,220 m) to Alabama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon (southern New England) to rare (New Hampshire and Vermont).

HABITAT: Brushy areas, open woodlands, swamps, mountains (Fay and Chandler 1955). Reported at beaches, saltmarshes, and open land (Johnston 1972). Also in young woods associated with clearcuts and in hayfields or other grasslands. Dense cover and conifers are frequently components of habitats used by this species (Chapman et al. 1982).

SPECIAL HABITAT REQUIREMENTS: Young woodlands with thick cover. Seldom ventures far from dense cover (Pringle 1960).

REPRODUCTION: Age at sexual maturity: Probably during second year (Dalke 1942:73). Breeding period: March to September. Peak: March to July (Chapman et al. 1977). Gestation period: 28 days (Dalke 1942: 70). Young born: End of March to early April extending through July (Pringle 1960:14). Litter size: 3 to 8, average 5. Litters per year: 2 or 3.

HOME RANGE: 0.5 to 1.8 acres (0.2 to 0.7 ha) (McDonough 1960). Average 3 acres (1.2 ha) for 17 females and 8.3 acres (3.4 ha) for 10 males in swamp and upland woods (Dalke 1942:42).

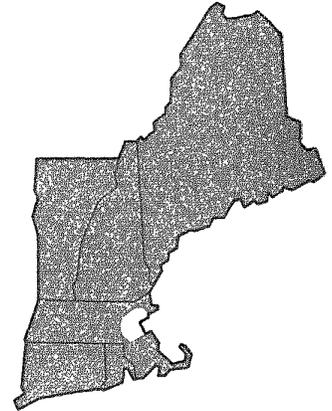
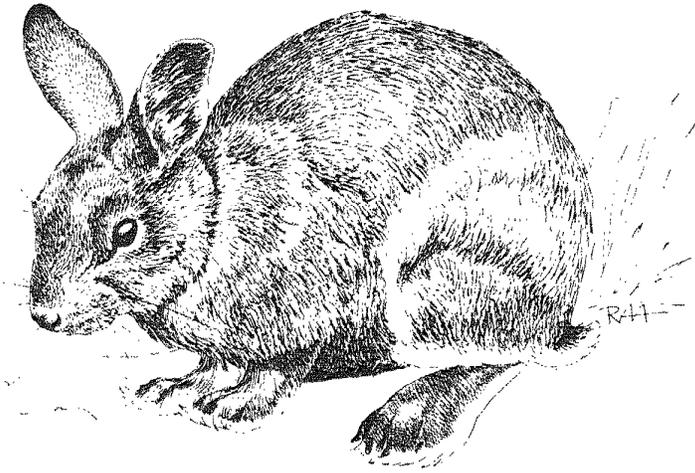
FOOD HABITS: Summer: grasses and herbs. Winter: seedlings, bark, twigs, buds (prefers maple and oak). Coprophagic. Food preference related to availability.

COMMENTS: Crepuscular and nocturnal feeder. No obvious differences were found in the habitat used by the Eastern and New England cottontails (Johnston 1972:38).

KEY REFERENCES: Chapman et al. 1977, Dalke 1942, Fay and Chandler 1955, McDonough 1960, Pringle 1960.

Snowshoe Hare

(*Lepus americanus*)



RANGE: Newfoundland w. to Alaska s. along the n. United States border, and s. in the Sierras, Rockies, and Appalachians.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in suitable habitat.

HABITAT: Deciduous, coniferous, and mixed woodlands (less often deciduous) with dense brushy understory, coniferous swamps, cut-over areas, burns, nearly all types of forests, but favors second growth aspen-birch in vicinity of conifers. In eastern Maine, hare showed a significant shift in activity from coniferous understory in winter to hardwood understory in summer (O'Donoghue 1983).

SPECIAL HABITAT REQUIREMENTS: Dense brushy cover.

REPRODUCTION: Age at sexual maturity: During the spring following birth. Breeding period: March to July. Gestation period: About 37 days. Young born: May to August. Litter size: 1 to 6, average 3. Litters per year: 1 or 2, occasionally 3.

HOME RANGE: Probably about 10 acres (4 ha) (Burt 1957). About 25 acres (10.1 ha) for adult males and 19 acres (7.7 ha) for adult females on an island in northwestern Montana (Adams 1959). Daily ranges for both sexes were about 4 acres (1.6 ha) in mixed woodland-old field habitat in Canada (Bider 1961).

SAMPLE DENSITIES: Populations follow 10- or 11-year cycles with densities ranging from 1 square mile (0.4 km²) to several hundred per square mile (approximately 100 per km²).

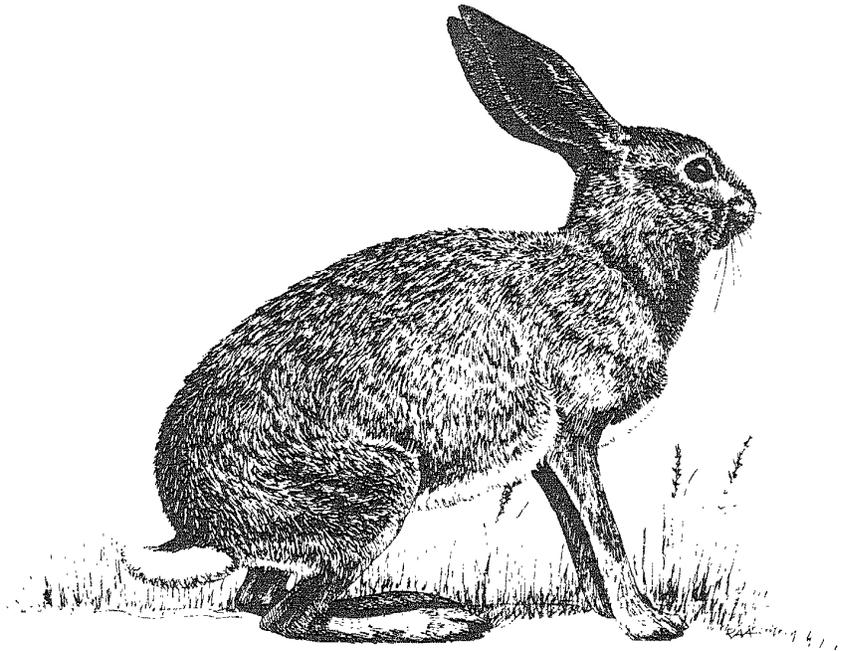
FOOD HABITS: Mainly crepuscular and nocturnal. Summer: succulent vegetation such as clover, grasses, and ferns. Winter: twigs, buds and bark of small trees and seedlings such as alder and balsam. Coprophagic.

COMMENTS: Pelage turns white in winter following fall molt and returns to brown after spring molt. Young are precocial.

KEY REFERENCES: Aldous 1937, Bider 1961, Dodds 1965, Godin 1977.

European Hare

(*Lepus capensis*)



RANGE: Western Connecticut, e. New York, e. Pennsylvania, and w. New Jersey. Introduced to New York from Europe between 1890 and 1910.

RELATIVE ABUNDANCE IN NEW ENGLAND: Probably uncommon.

HABITAT: Open country (mainly agricultural land) with low vegetation and rolling hills. Occasionally uses open woodlands with little ground vegetation.

SPECIAL HABITAT REQUIREMENTS: Open land.

REPRODUCTION: Age at sexual maturity: Probably first spring following birth. Breeding period: January. Gestation period: About 42 days. Young born: March. Litter size: 1 to 3. Litters per year: Unknown.

HOME RANGE: 11 square miles (28.5 km²) (Eabry 1970). About 12 acres (4.9 ha) (Banfield 1974).

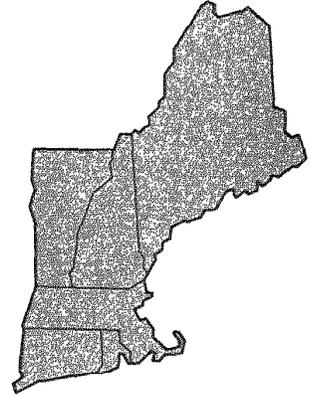
SAMPLE DENSITIES: Average population density was about 25 hares per square mile (10/km²) in Ontario with a potential density of 100 hares per square mile (39/km²) under ideal conditions (Banfield 1974).

FOOD HABITS: Summer: grass, clover, corn, fruits such as raspberries, apples. Winter: buds, bark and twigs of young trees and seedlings. Coprophagic.

COMMENTS: Builds no nest. Scrapes a hollow in ground near protective vegetation, rocks.

KEY REFERENCES: Banfield 1974, Dean and DeVos 1965, Godin 1977.

Eastern Chipmunk (*Tamias striatus*)



RANGE: Quebec w. to Manitoba s. through most of e. United States to Louisiana and nw. Florida. Absent from most of Coastal Plain.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Edges or interiors of deciduous woodlands with abundant cover of undergrowth, old logs, stone walls. Semi-open brushlands with ample cover.

SPECIAL HABITAT REQUIREMENTS: Tree or shrub cover, elevated perches.

REPRODUCTION: Age at sexual maturity: Females: 3 months (rarely) to 1 year. Males: 7 months to 1 year. Breeding period: Mid-March to early April and early July to early August. Gestation period: About 31 days. Young born: Mid-April to mid-May and mid-July to mid-August. Litter size: 1 to 8, average 4 or 5. Litters per year: 1 or 2.

TERRITORY: A female defended a 50-yard (45.5 m) radius surrounding the living quarters in oak-hickory woodland in Michigan (Burt 1940). Individuals maintain dominance in a core area that covers about 20 percent of home range (Ickes 1974).

HOME RANGE: Less than 100 yards (91 m) in diameter (Burt 1957). 0.5 to 1.0 acre (0.2 to 0.4 ha) in northern hardwoods in the Adirondacks of New York (Elliott 1878:9).

SAMPLE DENSITIES: 2 individuals per acre (5/ha) at onset of breeding season increasing to 4 individuals or more per acre (10+/ha) at end of breeding season (Burt 1957). Up to 30 individuals per acre (74/ha) in good habitats (Seton 1929). Varies geographically and temporally from 0.1 to 15.2 per acre (0.3 to 37.6/ha) (Yerger 1953).

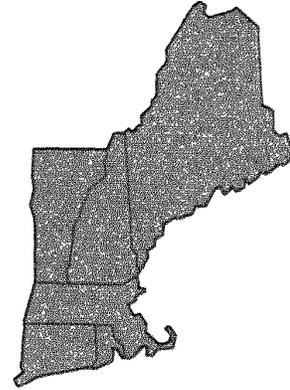
FOOD HABITS: Many kinds of seeds, fruits, nuts, bulbs, insects, meat, and eggs. Feeds during daylight hours.

COMMENTS: Hibernates but may become active for short periods in winter. Largely terrestrial. Den is located in underground tunnel system.

KEY REFERENCES: Allen 1938; Burt 1940, 1957; Elliott 1978; Forbes 1966; Yahner 1978; Yerger 1953, 1955.

Woodchuck

(*Marmota monax*)



RANGE: Newfoundland w. across the s. Canadian provinces to Alaska s. in the e. United States to Arkansas and Alabama.

KEY REFERENCES: Fall 1971, Grizzell 1955, Snyder and Christian 1960.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Edges of woodlands (seldom in interior), open cultivated land, pastures, meadows, open brushy hillsides.

SPECIAL HABITAT REQUIREMENTS: Open land.

REPRODUCTION: Age at sexual maturity: 1 year, but commonly breeds during second year. Breeding period: Early March to mid-April. Gestation period: 31 to 32 days. Young born: Early April to mid-May. Litter size: 2 to 6, average 4. Litters per year: 1.

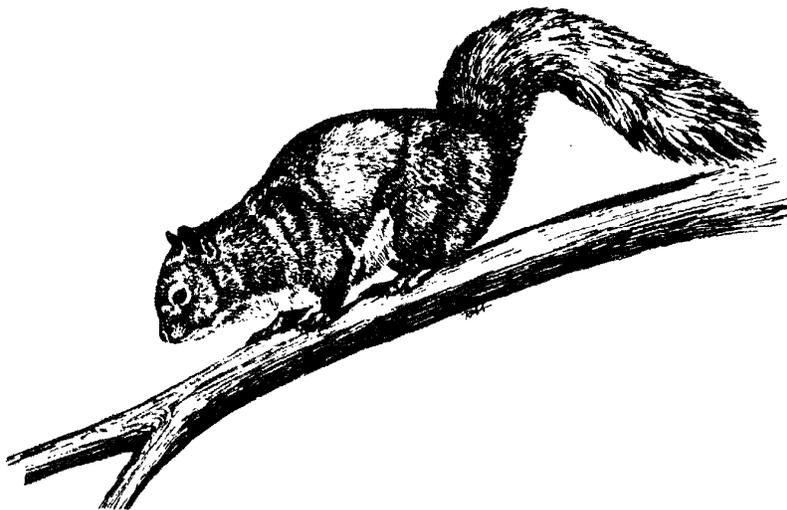
HOME RANGE: 0.25 to 0.50 mile (0.4 to 0.8 km) in diameter (Burt 1957). In alfalfa and clover the home range boundaries are often within 20 yards (18.2 m) of den (Godin 1977:89).

FOOD HABITS: Succulent green vegetation such as alfalfa, clover, grasses, and herbs. Occasionally eats small amounts of insects. Diurnal feeder.

COMMENTS: Fossorial except when feeding. Digs extensive system of burrows including a hibernation and nest chamber. Sometimes uses separate summer and winter dens.

Gray Squirrel

(*Sciurus carolinensis*)



RANGE: Southern Quebec to Manitoba s. to Texas and Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to abundant.

HABITAT: Deciduous and mixed forests, especially those with trees that produce mast. River bottomland, woodlots in town, city parks.

SPECIAL HABITAT REQUIREMENTS: Oaks, tall trees for dens or leaf nests (nests are usually 25 feet (7.6 m) or more above ground).

REPRODUCTION: Age at sexual maturity: About 3 months (Smith and Barkalow 1967) to 1 year (Allen 1954). Breeding period: January to February, occasionally May and June (second litter). Gestation period: 44 days. Young born: March to April, August. Litter size: 2 to 5, typically 2 or 3. Litters per year: 1 or 2.

HOMERANGE: 2 to 7 acres (0.8 to 2.8 ha) (Burt and Grosenheider 1976:118). The average minimum home range of 43 individuals in mature oak-hickory woods in West Virginia was 1.24 acres (0.50 ha) (Pack et al. 1967). 1.20 acres (0.49 ha) was the average range of 55 squirrels in mature to over-mature oak-hickory stand in West Virginia (Doebel and McGinnis 1974). 1.40 acres (0.57 ha) in mature oak-hickory, beech and poplar woodlots in Maryland (Flyger 1960).

FOOD HABITS: Diurnal feeder. Consumes nuts, buds, seeds and grains, fungi, fruits, birds' eggs, inner bark of trees. Commonly caches food for future use. Will eat insects and then pupae in spring and summer when preferred foods are scarce (H. Smith, personal communication).

COMMENTS: Arboreal, seldom wandering far from trees. In autumn squirrels often move home ranges short distances to areas with greater food supplies (Sharp 1960) and may occasionally migrate in large numbers over many miles (Larson 1962). Usually several squirrels share winter dens.

KEY REFERENCES: Godin 1977, Pack et al. 1967, Uhlig 1955.

Red Squirrel

(*Tamiasciurus hudsonicus*)



RANGE: Quebec w. to Alaska s. in the Appalachians to Tennessee and in the Rockies to New Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Coniferous, mixed and occasionally deciduous forests, rural woodlots.

SPECIAL HABITAT REQUIREMENTS: Woodlands with mature trees, conifers preferred.

REPRODUCTION: Age at sexual maturity: 1 year. Breeding period: January to September. Peak: Mid-February to March and June to July. Gestation period: 36 to 40 days. Young born: March to May, August to September. Litter size: 1 to 7, typically 4 or 5. Litters per year: 1 or 2.

HOME RANGE: About 1 acre (0.4 ha) when food is plentiful (Hamilton 1939b). 2.73 to 6.03 acres (1.1 to 2.4 ha) (Banfield 1974:139). Less than 200 yards (182 m) in diameter (Burt and Grossenheider 1976:121). Defends feeding and den sites.

FOOD HABITS: Diurnal and crepuscular. Feeds on seeds of conifers, nuts, buds, sap, tender leaves, fruits, flowers, fungi, insects, birds' eggs, and the young of small vertebrates. Caches food for winter use.

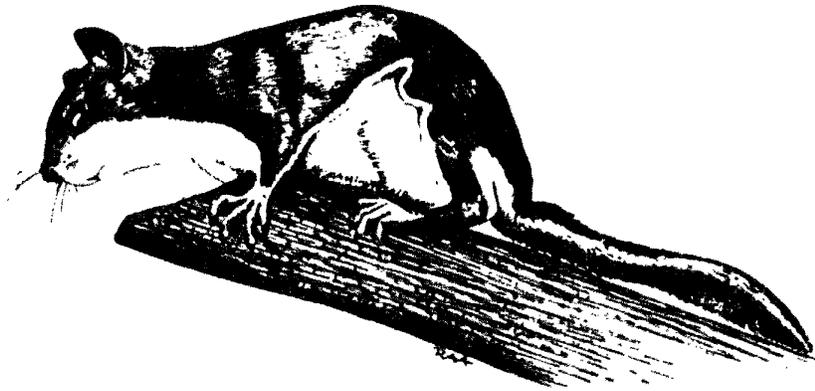
COMMENTS: Prefers to nest in natural cavity or abandoned woodpecker hole. When unavailable, squirrels may construct globular leaf nests near top of tree or next

to trunk or use ground burrows. Become inactive for short periods in winter to avoid cold and storms.

KEY REFERENCES: Hamilton 1939b, Hatt 1929, Klugh 1927, Layne 1954.

Southern Flying Squirrel

(*Glaucomys volans*)



RANGE: Eastern North America from Nova Scotia w. to the Great Lakes and s. to East Texas and s. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mature deciduous and mixed forests especially beech-maple, oak-hickory and aspen.

SPECIAL HABITAT REQUIREMENTS: Several nest sites per individual (Muul 1968), mature woodland with cavity trees. Favors cavities with entrance diameters of 1.6 to 2 inches (40 to 50 mm) (Dolan and Carter 1977).

REPRODUCTION: Age at sexual maturity: About 6 months. Breeding period: Late February to early March; June to July. Gestation period: About 40 days. Young born: April and May; July and August. Peaks: April and August (Massachusetts). Litter size: 2 to 6, average 3 to 4. Litters per year: 2.

HOME RANGE: Average 0.41 acre (0.17 ha) for females (may defend entire home range) and 0.53 acre (0.21 ha) for males (no defense) in oak-maple habitat in New York (Madden 1974).

SAMPLE DENSITIES: Densities of up to 5 individuals per acre (12/ha) have been reported in woodland in New York (Sollberger 1943).

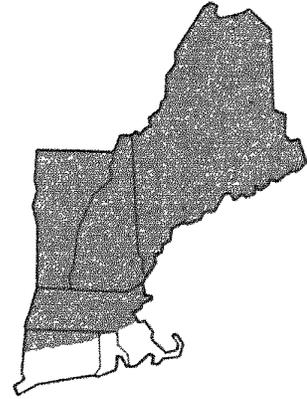
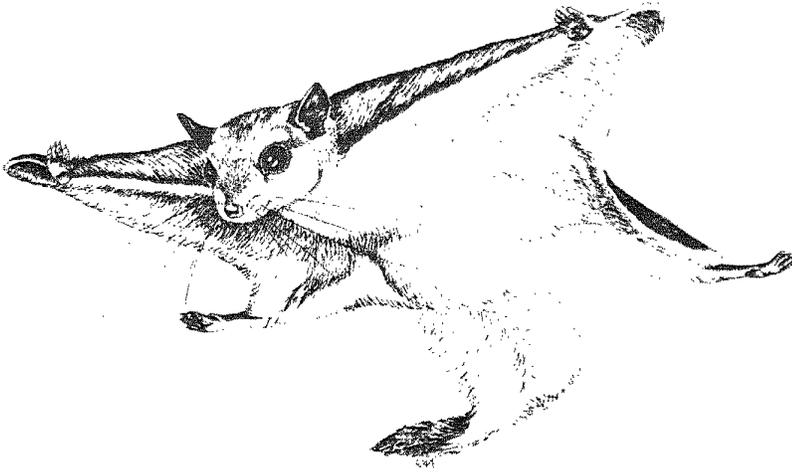
FOOD HABITS: Hickory and other nuts, acorns, seeds and fleshy fruits. Also takes insects and occasionally

birds' eggs and fledglings. Most carnivorous of the squirrels. Stores food in den for winter use.

COMMENTS: Nocturnal feeders; highly sociable—several squirrels may occupy same den at once, especially in winter. Favors abandoned woodpecker holes for den sites. Active throughout the year except during extreme winter cold.

KEY REFERENCES: Burt 1940; Jordan 1948; Muul 1968; Sollinger 1940, 1943.

Northern Flying Squirrel
(*Glaucomys sabrinus*)



RANGE: Canada w. to Alaska, s. in the Eastern United States to s. New England, and in the Appalachians to North Carolina. To the w. the range extends s. to North Dakota, Utah (Rocky Mountains), and n. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Forests of mixed mature conifers and deciduous trees; less often in purely hardwood forests. Favors cool, heavily wooded areas above 1,000 feet (305 m) in elevation.

SPECIAL HABITAT REQUIREMENTS: Mature trees, cavities for winter dens. Arboreal lichens for winter food.

REPRODUCTION: Age at sexual maturity: Probably 6 months to 1 year. Breeding period: February to May and July. Gestation period: About 37 days. Young born: Late March to early July; late August or early September (Godin 1977:103). Litter size: 2 to 6, typically 4 or 5. Litters per year: 1 or 2.

HOME RANGE: Unknown.

FOOD HABITS: Nocturnal feeder. Eats a variety of nuts, especially acorns; also takes seeds, catkins, fruits, buds, insects, mushrooms, birds' eggs, and nestlings. Caches food in tree cavities.

COMMENTS: Summer nest may be constructed on a limb next to tree trunk (usually a conifer). Winter nest is in a

cavity, often an old woodpecker hole. Active throughout year except during extreme winter cold. Often highly social in winter dens.

KEY REFERENCES: Banfield 1974, Cowan 1936, Godin 1977.

Beaver

(*Castor canadensis*)



RANGE: Most of North America with the exception of the high arctic, parts of the sw. United States, Florida, and Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Small to large slowly flowing brooks, streams, or rivers that are usually, but not necessarily, bordered by woodland.

SPECIAL HABITAT REQUIREMENTS: Wetlands that provide an adequate food supply and sufficient water depths.

REPRODUCTION: Age at sexual maturity: 1-1/2 to 2 years (Larson 1967). Breeding period: Mid-January to mid-March. Peak: Mid-February. Gestation period: About 106 days. Young born: Mid-May to early June. Litter size: 1 to 9, typically 3 to 5. Litter size may be related to type and amount of available food (Huey 1956). Litters per year: 1.

HOME RANGE: Beavers have been known to range in excess of 450 feet (137 m) from water in search of food (Híner 1938) but generally remain much closer to lodge.

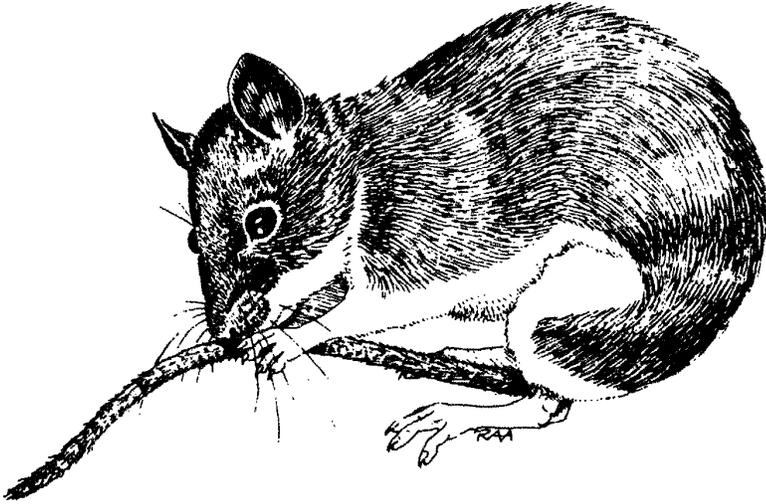
FOOD HABITS: Mainly a nocturnal feeder. Consumes bark of deciduous trees especially aspen, balsam poplar, alder, willow, birch, and maple. Also takes herbaceous vegetation especially aquatics, and some grasses. Caches food under ice for winter use.

COMMENTS: Monogamous pair bond is life-long. Constructs dams to retain water and large lodge of mud and sticks to enclose den for raising of young and winter shelter or digs burrows in banks.

KEY REFERENCES: Godin 1977, Hodgdon and Larson 1973, Jenkins and Busher 1979.

Deer Mouse

(*Peromyscus maniculatus*)



RANGE: Most of North America except n. Canada, w. Mexico, the se. United States and the Atlantic Coastal Plain.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Mainly occurs in interiors or along edges of coniferous or mixed forests, along field borders, stone walls, in out-buildings near areas with small trees and dense ground cover (Godin 1977:111). Uses recent forest clearcuts (Kirkland 1977b).

REPRODUCTION: Age at sexual maturity: Females: 40 to 50 days. Males: about 60 days. Breeding period: March through October. Gestation period: About 23 days. Young born: April to October. Litter size: 3 to 7, average 4. Litters per year: 3 or 4.

HOME RANGE: Average 2.3 acres (0.9 ha) for adult males and 1.4 acres (0.6 ha) for adult females in virgin hardwood forest in Michigan (Blair 1942). 0.10 to 0.31 acre (0.04 to 0.13 ha) for adult males and 0.12 to 0.25 acre (0.05 to 0.10 ha) for adult females (Manville 1949).

SAMPLE DENSITIES: Density normally ranges from a low of 1 mouse per 2 acres (1/0.8 ha) in spring to a high of 22 mice per 2 acres (22/0.8 ha) in autumn (Banfield 1974:165).

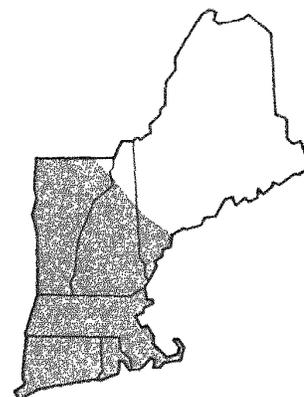
FOOD HABITS: Nuts, seeds, grains, fruits, mushrooms. Also eats small invertebrates such as worms, snails, insect larvae, and occasionally carrion. Caches food in fall for winter use.

COMMENTS: Nocturnal. Active throughout the year except during severe cold spells or winter storms. Nests in a variety of places including stone walls, buildings, old burrows of small mammals, under logs or in tree cavities.

KEY REFERENCES: Blair 1942, Choate 1873, Godin 1977, King 1968, Klein 1960.

White-footed Mouse

(*Peromyscus leucopus*)



RANGE: Throughout most of the Eastern United States except n. Maine, n. Minnesota, n. Wisconsin, Florida and coastal sections of the se. United States. Does not occur w. of Arizona and Montana.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Interiors and edges of deciduous, mixed, and coniferous forests from sea level to above treeline. Clear-cuts, brushy woodland clearing, pastures, streamside thickets, buildings.

REPRODUCTION: Age at sexual maturity: 6 to 7 weeks. Breeding period: Late February to November. Gestation period: 22 to 25 days. Young born: March to December. Litter size: 1 to 7, typically 3 to 4.

HOME RANGE: Sizes ranged from 0.16 to 0.54 acre (0.06 to 0.22 ha) for adult males and 0.06 to 0.36 acre (0.02 to 0.15 ha) for adult females in mature oak-hickory in southern Michigan (Burt 1940).

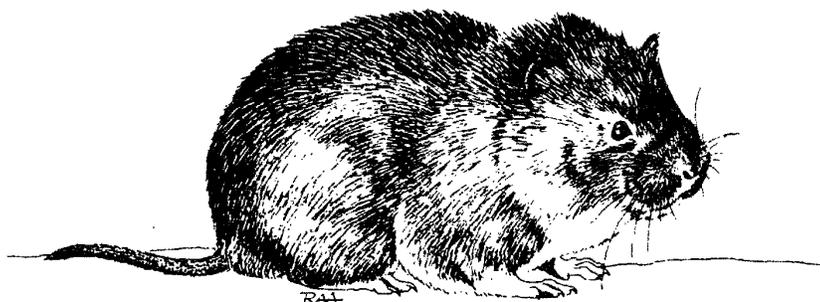
FOOD HABITS: Seeds, acorns, nuts, fruits, tender green plants, insects, and small amounts of meat (carrion). Commonly stores food for future use.

COMMENTS: Nests in a variety of places including stone walls, tree cavities, under stumps or logs or in buildings. Nocturnal and active in all seasons.

KEY REFERENCES: Burt 1940, King 1968, Snyder 1956, Svihla 1932.

Southern Red-backed Vole

(*Clethrionomys gapperi*)



RANGE: Canadian Provinces s. in the United States in the Appalachians to n. Georgia and in the Rockies to sw. New Mexico. Also occurs in the n. border states.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Cool moist deciduous, mixed, or coniferous forests among mossy rocks, logs, tree roots, or other cover. Less commonly found near stone walls at woodland edges or near talus slopes. Favors damp situations in coniferous or mixed woods. Highest densities found in subclimax communities (Cameron 1958:46). Uses young clearcuts in deciduous or coniferous woodlands (Kirkland 1978) and mixed forest (Lovejoy 1975).

SPECIAL HABITAT REQUIREMENTS: Water sources such as springs, brooks or bogs, debris cover (fallen trees, stumps, rocks, slash).

REPRODUCTION: Age at sexual maturity: Possibly 3 or 4 months (Blair 1941:683). Breeding period: Mid-January to late November. Peak: February to October. Gestation period: 17 to 19 days. Young born: February to December. Litter size: 1 to 8, typically 4 to 6. Litters per year: Probably 2 or more.

HOME RANGE: About 0.25 acre (0.10 ha) (Burt and Grosenheider 1976:182); about 0.57 acre (0.23 ha) for 1 female, and 3.56 acres (1.44 ha) for 1 male in virgin hardwood forest in northern Michigan (Blair 1941).

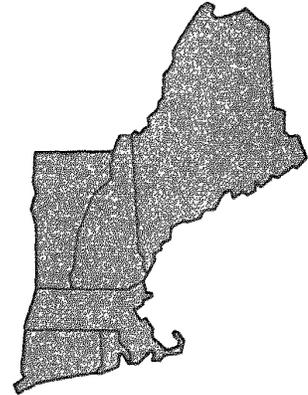
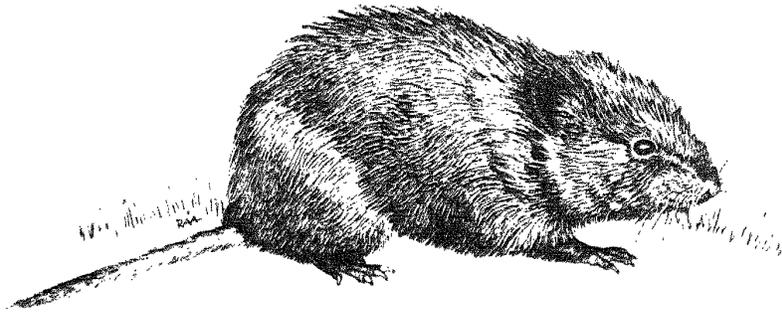
FOOD HABITS: Mainly green vegetation but also eats seeds, nuts, fungi, bark, insects, and carrion.

COMMENTS: Mainly nocturnal, active year long. Commonly uses burrow systems of moles or other mammals. Nests under logs, stumps, roots, or snow (winter).

KEY REFERENCES: Criddle 1932; Miller and Getz 1972, 1973; Svihla 1930.

Meadow Vole

(*Microtus pennsylvanicus*)



RANGE: Southern two-thirds of Canada and s. Alaska, s. to Washington, n. New Mexico, Missouri and n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Fields, pastures, orchards, freshwater and salt water marshes and meadows, borders of streams and lakes, open and wooded swamps, bogs; less commonly in open woods and clearcuts.

SPECIAL HABITAT REQUIREMENTS: Herbaceous vegetation, loose organic soils.

REPRODUCTION: Age at sexual maturity: Females: about 25 days. Males: about 45 days. Breeding period: Throughout the year, if snow provides insulating cover. Peak: April to October. Gestation period: About 21 days. Young born: Throughout the year. Litter size: 1 to 9, typically 4 or 5. Litters per year: May produce 5 to 10. Known to produce 17 (Hamilton 1941).

HOME RANGE: Seldom exceeded 0.06 acre (0.02 ha) in New York in good habitat (Hamilton 1937). Sizes may vary range from 0.08 to 0.23 acre (0.03 to 0.09 ha) (Banfield 1974). Defensive behavior displayed during male encounters may indicate that they defend territories (Getz 1961b).

FOOD HABITS: Eats mainly vegetable material especially tender grasses, bulbs, cambium of roots and stems, seeds, and grains. Occasionally caches food when supply is abundant and takes small amounts of meat when available.

COMMENTS: Active day and night throughout the year. Builds extensive tunnel and runway systems. Nests under boards, rocks, logs, and in other sheltered spots including tunnels. May damage nursery and orchard stock. There is a cyclic fluctuation in populations of about 4 years (Hamilton 1937). The beach vole, found only on Muskeget Island, Massachusetts, is here considered the meadow vole. Burt and Grossenheider (1976:183) indicated that it may be a separate species, *M. breweri*; Godin (1977:124) gives the beach vole species status.

KEY REFERENCES: Bailey 1924, Blair 1940b, Getz 1961b, Hamilton 1937.

Rock Vole

(*Microtus chrotorrhinus*)



RANGE: Cape Breton Island and e. Quebec w. to ne. Minnesota. The mountains of n. New England, s. in the Appalachians to North Carolina.

RELATIVE ABUNDANCE IN NEW ENGLAND: Unknown, possibly rare, but may be locally common in appropriate habitat.

HABITAT: Coniferous and mixed forests at higher elevations. Favors cool, damp, moss-covered rocks and talus slopes in vicinity of streams. Kirkland (1977a) captured rock voles in clearcuts in West Virginia, habitat not previously reported for this species. Timm and others (1977) found voles using edge between boulder field and mature forest in Minnesota. They have been taken at a new low elevation (1,509 feet, 460 m) in the Adirondacks (Kirkland and Knipe 1979).

SPECIAL HABITAT REQUIREMENTS: Cool, moist, rocky woodlands with herbaceous groundcover and flowing water.

REPRODUCTION: Age at sexual maturity: Females and males are mature when body length exceeds 140 mm and 150 mm, respectively, and total body weight exceeds 30 g for both sexes (Martin 1971). Females born in late spring produce litters in first summer (Timm et al. 1977). Breeding period: Late March to mid-October (Martin 1971). Gestation period: Unknown. Young born: Early spring to fall; peak: June. Litter size: 1 to 7, typically 3 or 4. Litters per year: Up to 3.

HOME RANGE: Unknown.

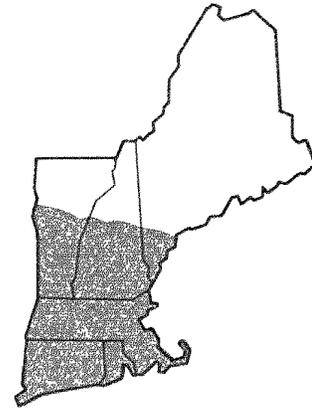
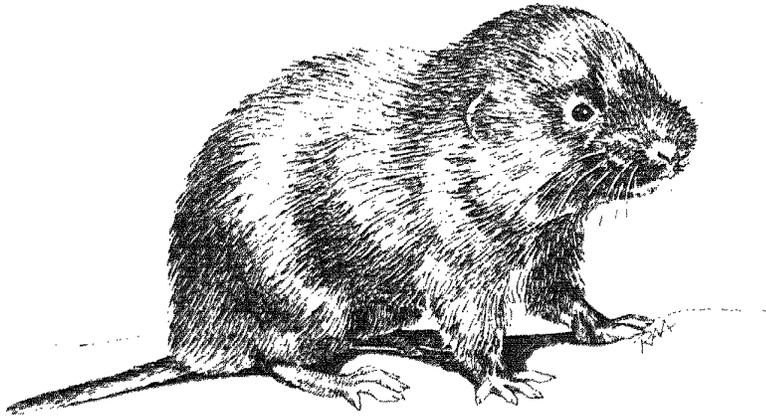
FOOD HABITS: Bunchberry, wavy-leaved thread moss, blackberry seeds (Martin 1971). May browse on blueberry bushes (twigs and leaves), mushrooms, and Clinton's lily. A captive subadult ate insects (Timm et al. 1977). Seems to be diurnal with greatest feeding activity taking place in morning (Martin 1971). Less active in afternoon in northern Minnesota (Timm et al. 1977).

COMMENTS: Occurs locally in small colonies throughout its range. Natural history information is lacking for this species. Habitat preferences seem to vary geographically.

KEY REFERENCES: Banfield 1974, Burt 1957, Kirkland 1977a, Martin 1971, Timm et al. 1977.

Woodland Vole

(*Microtus pinetorum*)



RANGE: Northcentral New England, w. to c. Wisconsin s. to e. Texas and n. Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Deciduous forests, grasslands, meadows, and orchards. Occurs in marshes and swamps but favors well-drained uplands.

SPECIAL HABITAT REQUIREMENTS: May require ground-cover of leaves (duff) or grass; moist well-drained soils.

REPRODUCTION: Age at sexual maturity: 2 months (Hamilton 1938). Breeding period: Mid-February to mid-November. Gestation period: About 24 days. Young born: Early March to early December. Litter size: 2 to 4.

HOME RANGE: About 0.25 acre (0.10 ha) in oak-hickory woods in Michigan (Burt 1940). Home ranges of voles in Connecticut had average maximum diameters of 30.7 yards (33.7 m) for females and 30 yards (32.7 m) for males (Miller and Getz 1969).

SAMPLE DENSITIES: Densities ranged from 0 to 6 individuals per acre (0 to 14.6/ha) in upland oak woods (Miller and Getz 1969).

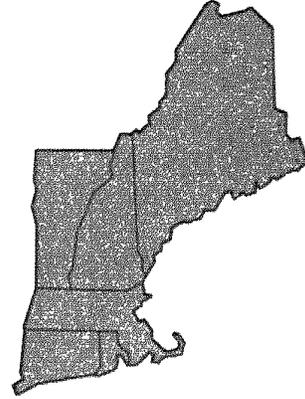
FOOD HABITS: Subterranean tubers, roots and bulbs; seeds, nuts, fruits, bark, and leaves. Often caches large amounts of food in burrows.

COMMENTS: Highly fossorial spending much time digging tunnel systems and foraging below ground. Tunnels may be dug as deep as 12 inches (30.5 cm) but are generally 3 or 4 inches (7 to 10 cm) below ground surface. Nests are built under logs or rocks or in burrows well below ground. Active throughout the year. May be a severe pest species in nurseries and orchards in the Northeast. Also called the pine vole.

KEY REFERENCES: Benton 1955, Burt 1940, Hamilton 1938, Miller and Getz 1969.

Muskrat

(*Ondatra zibethicus*)



RANGE: Throughout most of Canada except portions directly e. and nw. of Hudson Bay. In most of the United States except parts of California, Texas, South Carolina, Georgia, and all of Florida.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Marshes, shallow portions of lakes, ponds, swamps, sluggish streams, drainage ditches. Most abundant in areas with cattails.

SPECIAL HABITAT REQUIREMENTS: Wetlands with dense emergent vegetation and stable water levels.

REPRODUCTION: Age at sexual maturity: Possibly 6 months, and perhaps as early as 4 months (H. Smith, personal communication). Breeding period: Late February to August (H. Smith, personal communication). Mid-March to September (Chamberlain 1951) in Massachusetts. Gestation period: 28 or 30 days (Godin 1977:133). Young born: April or May and June or July; September and early October litters have been observed (H. Smith, personal communication). Litter size: 1 to 8, typically 5 or 6. Litters per year: Average 3 (H. Smith, personal communication). Litter size positively correlates with latitude while number of litters per year is inversely related (Boyce 1977 cited in Perry 1982).

HOME RANGE: Usually within 200 yards (182 m) of den (Errington and Errington 1937). Territorial. Females with young will defend nest site. Most foraging within 15 meters (50 ft.) of the primary lodge and few movements exceeded 150 meters (500 ft.) (MacArthur 1978).

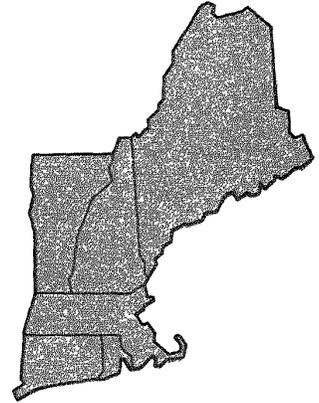
FOOD HABITS: A variety of aquatic plants especially cattails, reeds, pondweeds, bulrushes, and water lilies, fresh water clams, and other small aquatic animals. Builds roofed feeding platforms near house.

COMMENTS: May construct a dome-shaped chamber of weeds over water (less than 2 feet (0.6 m) deep) for nest or may dig a den in stream or ditch bank. Mainly nocturnal but often seen in daylight. Active throughout the year. Populations tend to follow a 10-year cycle (Eiton and Nicholson 1942).

KEY REFERENCES: Errington 1961, 1963; Godin 1977; Johnson 1925; Shanks and Arthur 1952.

Southern Bog Lemming

(*Synaptomys cooperi*)



RANGE: Quebec w. to Manitoba, s. to Kansas, Arkansas, Virginia, and Maryland.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon, in very scattered colonies.

HABITAT: Uses a variety of habitat including marshes, open meadows and orchards, moist deciduous and mixed forests. Favors sphagnum bogs and deciduous woodlands with a thick layer of loose duff. Uses clearcuts and other small forest openings with adequate ground-cover (Kirkland 1977b, McKeever 1952).

SPECIAL HABITAT REQUIREMENTS: Moist soils.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Throughout the year. Peak: April to September. Gestation period: 21 to 23 days. Young born: Throughout the year; most young are born between May and September. In New Jersey, females produced a litter every 67 days (average) in spring and summer (Conner 1959). Litter size: 1 to 8, typically 2 to 5.

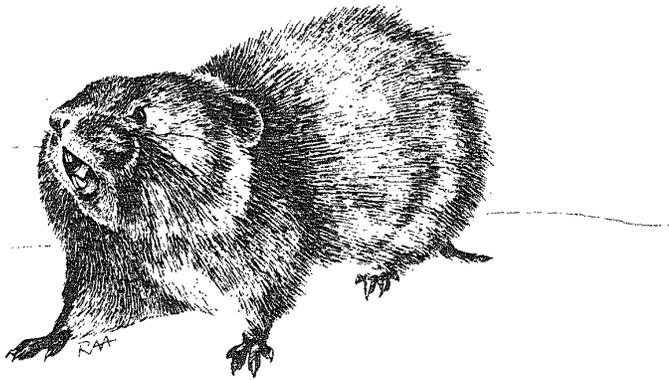
HOME RANGE: 1 acre (0.40 ha) for 1 individual in sphagnum bog with tamarack and black spruce forming a dense canopy (Buckner 1957). 0.20 to 0.50 acre (0.08 to 0.20 ha) (Banfield 1974:188). Females defend nest.

FOOD HABITS: Tender parts of herbaceous plants, especially leaves, stems and seeds of grasses and sedges, fruits. Occasionally takes fungi, bark, and insects.

COMMENTS: Tunnel systems are deep, 6 to 12 inches (15 to 30 cm) below ground and complex with many side chambers for resting, feeding, and storing of food. Surface runways serve as travel lanes. Winter nest may be located in burrow, summer nest may be on surface in tuft of grass. Active during the day and night at all seasons of the year. Life history is poorly known.

KEY REFERENCES: Buckner 1957, Conner 1959, Godin 1977.

Northern Bog Lemming
(*Synaptomys borealis*)



RANGE: Labrador w. to c. Alaska, s. to Washington, se. Manitoba and n. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Rare and local.

HABITAT: Sphagnum bogs, damp weedy meadows, mossy spruce woods, hemlock and beech forests.

SPECIAL HABITAT REQUIREMENTS: Moist to wet loose soils or leaf mold.

REPRODUCTION: Age at sexual maturity: Unknown. Breeding period: Unknown. Gestation period: Unknown. Young born: May to August. Litter size: 4 to 8, typically 4.

HOME RANGE: Unknown.

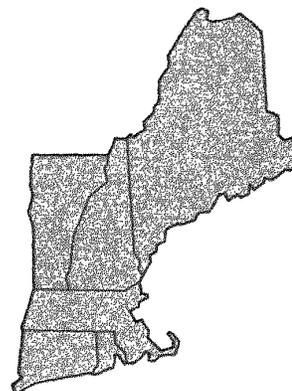
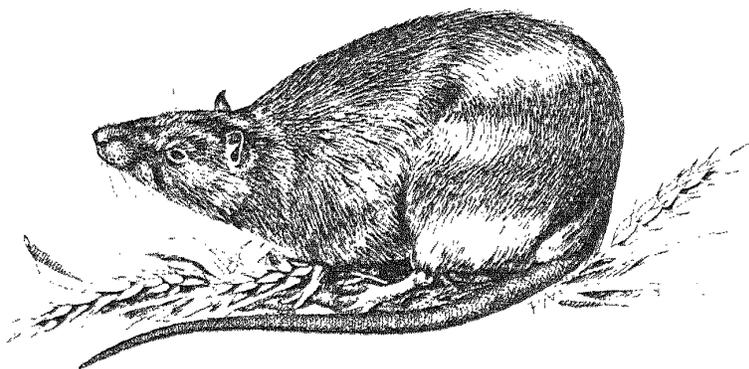
FOOD HABITS: Succulent parts of grasses and sedges, seeds, fungi.

COMMENTS: Uses burrows several inches below ground and shallow runways on surface. This species' life history is poorly known. Two reported New England specimens are from Mt. Katahdin, Maine, and Fabyans at the base of Mt. Washington, New Hampshire (Godin 1977: 136). T. French (personal communication) reported a third record from Mt. Moosilauke, New Hampshire.

KEY REFERENCES: Banfield 1974, Godin 1977.

Norway Rat

(*Rattus norvegicus*)



RANGE: Throughout most of North America with numbers varying with climate and habitat.

KEY REFERENCES: Calhoun 1962, Davis 1953.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Concentrates in areas where food is abundant such as waterfronts, farms, cities, and dumps. They may also inhabit rural and suburban residences.

SPECIAL HABITAT REQUIREMENTS: Buildings, dumps, or loose soil for digging burrows near food supply.

REPRODUCTION: Age at sexual maturity: 80 to 85 days. Breeding period: Throughout the year. Peaks: Spring and autumn. Gestation period: 21 to 22 days. Young born: In all seasons of year. Litter size: 2 to 14, average 9. Litters per year: 3 to 12, average 6.

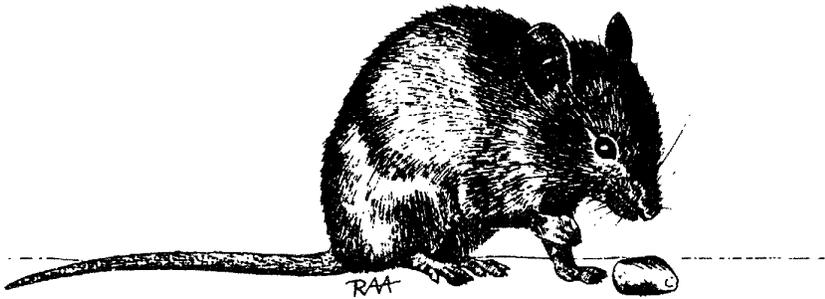
HOME RANGE: About 25 to 50 yards (23 to 46 m) in diameter (Banfield 1974: 222). Movements were confined to an area 100 to 150 feet (30 to 46 m) in diameter both in residential and farm areas (Davis 1953).

FOOD HABITS: Omnivorous, taking fruits, vegetables, grains, carrion and fresh meats, garbage.

COMMENTS: Colonial and closely associated with man. Probably the most economically important of the rodents because of the damage they cause to buildings and the diseases they spread to humans. Active mainly at night throughout the year. May dig extensive burrow systems for nesting and escaping predators.

House Mouse

(*Mus musculus*)



RANGE: Throughout North America from s. Canada to Mexico.

RELATIVE ABUNDANCE IN NEW ENGLAND: Abundant.

HABITAT: Buildings, fields, corncribs, and so on. Often burrows in fields and uses existing mouse runways during warm seasons of year and moves indoors to escape winter cold.

SPECIAL HABITAT REQUIREMENTS: Buildings in winter.

REPRODUCTION: Age at sexual maturity: 8 weeks (females) (Godin 1977:142), 5 weeks (Banfield 1974:224). Breeding period: Throughout the year. Peak: Early spring to late summer. Gestation period: 19 to 21 days. Young born: Throughout the year. Litter size: 3 to 12, typically 4 or 5. Litters per year: 5 to 8, typically 6.

HOME RANGE: Average 1,560 square feet (145 m²) for males and females (Lidicker 1966) in brush-grass habitat (on an island) with high population of *Microtus*. 3,925 square feet (365 m²) in area with low (1 individual) *Microtus* population (Quadagno 1968).

SAMPLE DENSITIES: Densities of 300 or more mice per acre (741 + /ha) were reported on an island (Lidicker 1966).

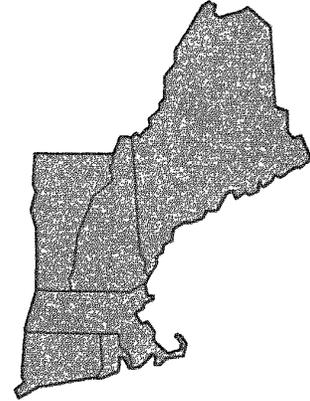
FOOD HABITS: Fruits, grains, seeds, vegetables, plant roots, insects, almost any sweet or high protein food. Occasionally caches food.

COMMENTS: Mainly nocturnal, active throughout the year. Colonial and highly social—may construct communal nests.

KEY REFERENCES: Godin 1977, Lidicker 1966, Quadagno 1968.

Meadow Jumping Mouse

(*Zapus hudsonius*)



RANGE: Most of Canada, Alaska and the continental United States, s. to n. Georgia and w. to Colorado.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Moist, open grassy and brushy marshes and meadows, willow alder thickets occurring along water courses, swamps and transition areas between lowlands and wooded uplands and mixed), occasionally dry meadows. Seems to prefer areas with numerous shrubs and small trees.

SPECIAL HABITAT REQUIREMENTS: Herbaceous ground-cover, loose soils for burrowing.

REPRODUCTION: Age at sexual maturity: Less than 1 year. Young females of first litter may breed during first year (Quimby 1951). Breeding period: Late April to early September. Peaks: Early June, July, and August (Hamilton and Whitaker 1979:248). Gestation period: 18 days. Young born: May to early October. Litter size: 2 to 8, average 5 to 6. Litters per year: 2 possibly 3.

HOME RANGE: Average 0.38 acre (0.15 ha) for females and average 0.43 acre (0.17 ha) for males in Itasca Park in Minnesota (Quimby 1951). Approximately 0.89 acre (0.36 ha) (average) for males and 0.92 acre (0.37 ha) (average) for females in grassy area in Michigan (Blair 1940c).

FOOD HABITS: Invertebrates, especially beetles and cut-worms are taken in spring followed by seeds, fruits,

nuts, and subterranean fungi as summer progresses. Feeds on rootlets exposed by stream erosion (Cameron 1958:49).

COMMENTS: Mainly nocturnal and solitary. Hibernates for longer periods in winter than most mammals (Godin 1977:144) in chambers 1 to 3 feet below ground, usually in a bank or hill (Banfield 1974:227).

KEY REFERENCES: Blair 1940c; Quimby 1951; Sheldon 1934; Whitaker 1963a, 1972b.

Woodland Jumping Mouse

(*Napaeozapus insignis*)



RANGE: Canadian maritime provinces s. to n. New Jersey and w. Maryland w. to ne. Ohio.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common.

HABITAT: Areas with herbaceous groundcover and low woody plants in both deciduous and coniferous forests, frequently in brush and herbaceous vegetation bordering streams, lakes, or ponds. Uses recent clearcuts with herbaceous cover (Kirkland 1977b). Seldom ventures into bare open areas.

SPECIAL HABITAT REQUIREMENTS: Moist cool woodland, loose soils for burrowing, herbaceous cover (Whitaker and Wrigley 1972).

REPRODUCTION: Age at sexual maturity: Possibly as early as 38 days (Layne and Hamilton 1954). Breeding period: May to August. Gestation period: 21 to 25 days. Young born: Late May to late August. Occasionally a second litter born in September (Godin 1977:148). Litter size: 1 to 8, typically 5. Litters per year: 1 or 2.

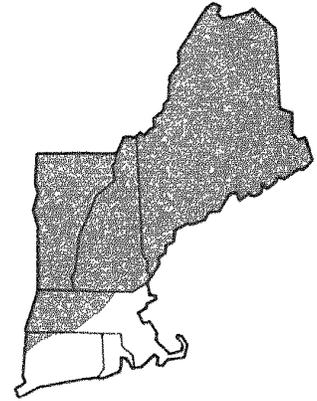
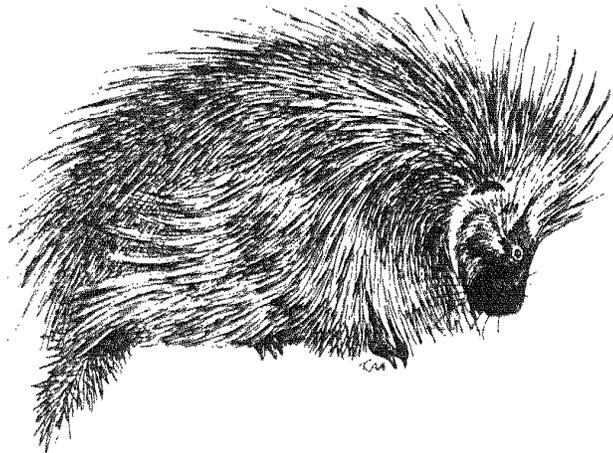
HOME RANGE: Average 8.96 acres (3.63 ha) for an adult male and 6.55 acres (2.65 ha) for an adult female (Banfield 1974:230). 1.0 to 6.5 acres (0.40 to 2.63 ha) for females and 1.0 to 9.0 acres (0.40 to 3.64 ha) for males in virgin hardwood forest in Michigan (Blair 1941).

FOOD HABITS: Tender parts of herbaceous plants, roots, fruits, underground fungi, seeds, insect larvae and adults. Does not cache food.

COMMENTS: Nocturnal feeder, hibernates from October or November until April or May. Nest may be built in excavated chamber within burrow system usually about 4 inches (10 cm) below the surface of ground or under log or stump.

KEY REFERENCES: Blair 1941; Brower and Cade 1966; Hamilton 1935; Lovejoy 1973; Preble 1956; Sheldon 1934, 1938; Whitaker 1963b, Wrigley 1972.

Porcupine
(*Erethizon dorsatum*)



RANGE: Nova Scotia and Quebec w. across boreal Canada to Alaska, s. in the Appalachian to n. Virginia; in the Midwest to n. Minnesota and Wisconsin, and in the West to nw. Texas, Arizona, and e. California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mixed or coniferous forests especially northern hardwood-hemlock, with adequate denning sites. Not restricted to any plant or edaphic community (Dodge 1982).

SPECIAL HABITAT REQUIREMENTS: Den sites in rock ledges, trees or other protected places.

REPRODUCTION: Age at sexual maturity: 15 to 16 months. Breeding period: October through December, occasionally later. Gestation period: 205 to 217 days, average 210 days (Shadle 1951). Young born: April to June. Litter size: 1, rarely more. Litters per year: 1.

HOMERANGE: Winter ranges averaged 6 acres (2.4 ha) in New Hampshire (Faulkner and Dodge 1962) and 13.3 acres (5.4 ha) in the Adirondacks of New York (Shapiro 1949). Spring and summer ranges ranged from 32 to 36 acres (13.0 to 14.6 ha) in conifer-hardwood forest in Minnesota (Marshall et al. 1962). Varies with climate and habitat (Dodge 1982).

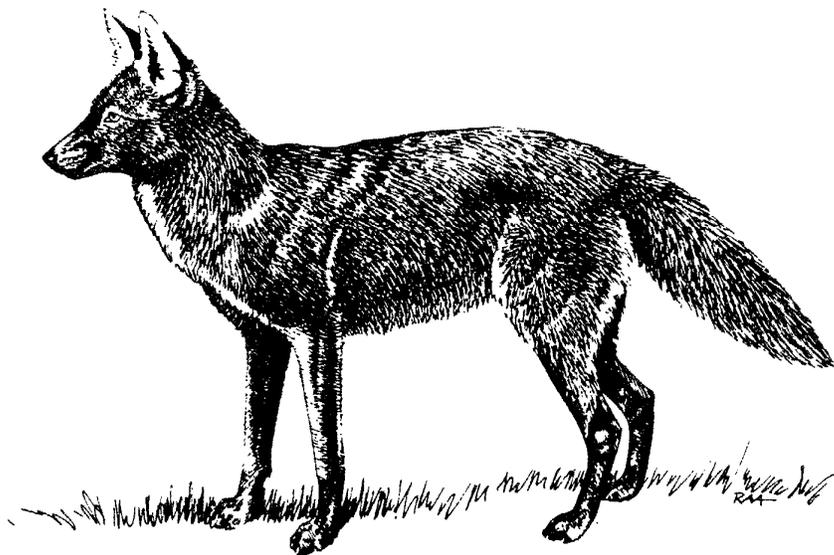
FOOD HABITS: Herbaceous and woody vegetation. Eats large quantities of grasses, leaves, twigs, buds, mast, and bark. Hemlock is a major winter food in the Northeast (Dodge 1967).

COMMENTS: Mainly nocturnal, remaining active throughout the year. Den may be in rocky cavern of ledge, in hollow log, abandoned building, or abandoned fox or beaver den; winter denning may be in groups (Dodge 1982). Generally is solitary throughout the year, may spend the winter in a "station tree," usually a hemlock or white spruce. May damage commercially grown trees or buildings.

KEY REFERENCES: Costello 1966, Curtis and Kozicky 1944, Dodge 1967, Shapiro 1949.

Coyote

(*Canis latrans*)



RANGE: New England (except Rhode Island), New York, n. Pennsylvania, n. Ohio, s. to Texas and w. to California.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to common.

HABITAT: Edges of second growth forests, open brushy fields, fallow agricultural land, forest openings created by fire or logging.

WINTER HABITAT: Coyotes may concentrate in low-lying areas with abundant snowshoe hares and deer (Ozoga and Harger 1966).

SPECIAL HABITAT REQUIREMENTS: Open or semiopen country for hunting, secluded den sites.

REPRODUCTION: Age at sexual maturity: 1 to 2 years. Breeding period: February (in northern part of range). Gestation period: 60 to 65 days. Young born: April or May. Litter size: 4 to 8, occasionally more, typically 5 to 7.

HOME RANGE: Size may exceed an area 5 miles (8 km) in diameter depending on food supply and time of year (Godin 1977). Range sizes of radio-tracked individuals were greater for males (average 26.3 mi², 68 km²) than females (6.3 mi², 16 km²) in Minnesota (Berg and Chessness 1978). Pack animals defend well-defined territories, pairs and solitary individuals do not (Bekoff and Wells 1980).

SAMPLE DENSITIES: The winter density of coyotes on an island in Lake Michigan was estimated at 1 animal per 2 square miles (5.2 km²) (Ozoga and Harger 1966).

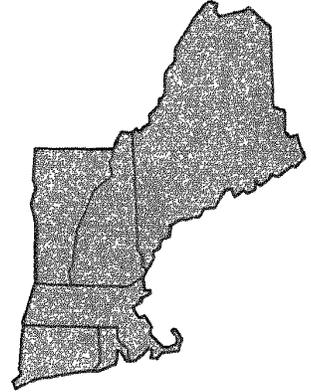
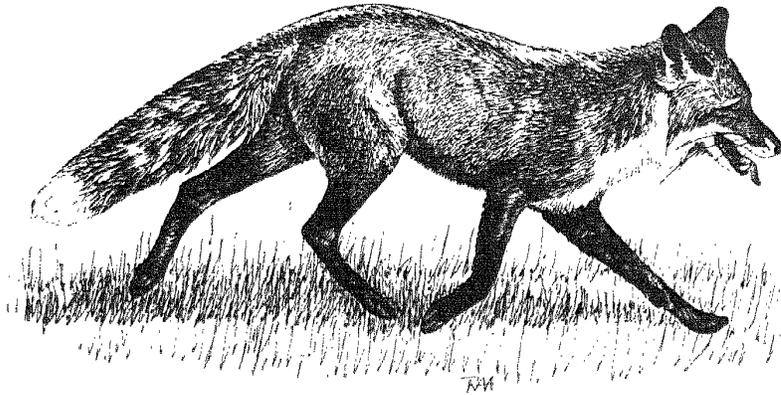
FOOD HABITS: Opportunistic feeders consuming mainly carrion, small live vertebrates, invertebrates, and vegetation. Winter food in the Northeast is mainly snowshoe hare and carrion of deer.

COMMENTS: Mainly crepuscular and nocturnal, hunting alone or in small packs. Den is usually in an excavated burrow that is well hidden by vegetation, a rock, or stump. Dens of other animals frequently used (Bekoff 1982). Several dens may be used by families while pups are less than 10 weeks of age (Harrison and Harrison 1983).

KEY REFERENCES: Banfield 1974; Bekoff 1977, 1978; Hilton 1978; Ozoga and Harger 1966; Stebler 1951.

Red Fox

(*Vulpes vulpes*)



RANGE: North America from Baffin Island s. to c. Texas, excluding se. United States, the West Coast from Canada to California, the sw. desert, and the Great Plains.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Found in a variety of habitats. A mixture of forest and open areas is preferred. Unbroken fields and dense forests avoided. Edges used heavily (Ables 1974).

SPECIAL HABITAT REQUIREMENTS: Suitable den sites.

REPRODUCTION: Age at sexual maturity: Winter after birth. Breeding period: mid-January to late February, sometimes extending to March. Peak: Late January. Gestation period: 51 to 56 days, average 53 days. Young born: March or April. Litter size: 1 to 10, average 4 or 5.

HOME RANGE: Less than 3 miles (4.8 km) in diameter (Ables 1969, Sargeant 1972, Scott 1943, Storm 1965). Phillips and others (1972) found that 70 percent of the juvenile males on study areas in Iowa and Illinois and 30 percent of the females moved more than 5 miles (8 km) from their natal ranges during their first year. Distances of 15 to 20 miles (24 to 32km) were common. Home range is shared by a male-female pair and seasonally by their pups (Sargeant 1972, Scott 1943). Seven foxes collared in Wisconsin had home ranges from 57.5 to 161.9 ha (142 to 400 acres) (Ables 1969).

FOOD HABITS: Opportunistic feeder consuming animals ranging from insects to small mammals. Commonly takes

birds, turtles, frogs, snakes and their eggs. Berries and fruits are eaten when available. Surplus food may be buried or cached under snow and marked with urine. In eastern Maine, Halpin (1983) found snowshoe hare was the most abundant winter food item in a diet that also included deer and porcupine.

COMMENTS: May dig dens but prefers to use existing burrows for rearing young and escaping predators. Red fox dens may have an underground tunnel system 25 feet (8 m) long or more (Godin 1977:203).

KEY REFERENCES: Godin 1977, Seagears 1944, Seton 1929.

Gray Fox

(*Urocyon cinereoargenteus*)



RANGE: Throughout the United States except Idaho, Montana, Wyoming, most of Washington, and the w. plains s. to Texas. Recently extended n. to se. Canada.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon. Presently is reoccupying range in New England.

HABITAT: Dense northern hardwood or mixed forests. May inhabit thickets and swamps. Prefers a mixture of fields and woods (Wood 1958).

SPECIAL HABITAT REQUIREMENTS: Den sites such as hollow logs, tree cavities, rock crevices, or cavities beneath deserted buildings, rarely in ground burrows.

REPRODUCTION: Age at sexual maturity: First year after birth. Breeding period: Mid-January to May. Peak: Early March (latitude-dependent). Gestation period: 51 to 63 days, average 53 days. Young born: March or April. Litter size: 2 to 7 pups, average 3 to 5 (Wood 1958).

HOME RANGE: Varies with food supply, disturbances, denning, and season. Range varies from a mile (1.6 km) wide during denning to 5 miles (8 km) in the fall (Godin 1977:206). Yearsley and Samuel (1980) found home ranges from 75 to 185 ha (185 to 457 acres).

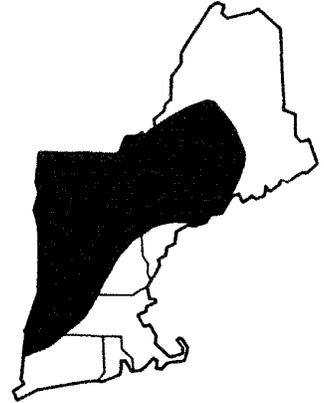
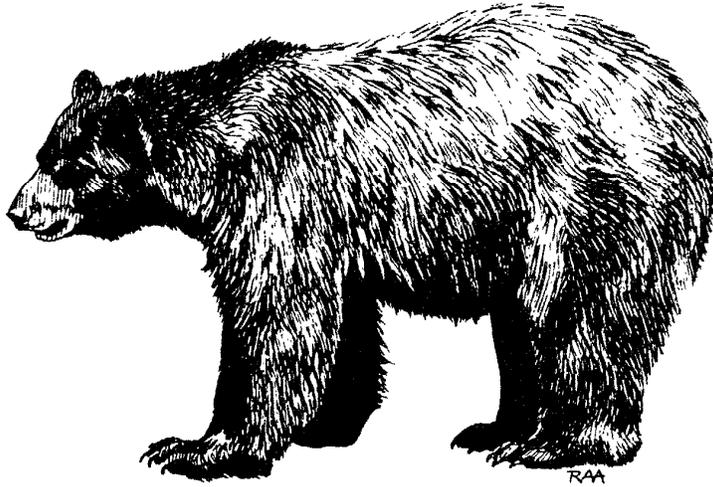
FOOD HABITS: Crepuscular and nocturnal. Chiefly small mammals, particularly cottontails, but includes birds, reptiles and amphibians and their eggs. Acorns, insects, fruits, and carrion are also eaten.

COMMENTS: Hunts prey and escapes enemies by climbing trees. The northward spread corresponds to that of the cottontail.

KEY REFERENCES: Burt and Grossenheider 1976, Godin 1977, Sullivan 1956.

Black Bear

(*Ursus americanus*)



RANGE: Throughout Canada except the n. coast. In the United States it occurs in the Sierras, Idaho, and Montana, s. through the Rockies into Mexico, n. Great Lakes area, Ozarks, Gulf Coast, Florida, and New England s. through the Appalachians to n. Georgia.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common in north to uncommon farther south. Increasingly reported from nw. New Jersey (R. Lund, personal communication.).

HABITAT: Primarily in fairly remote forests and swamps. Prefers mixed deciduous-coniferous woodlands with a thick understory. Requires abundant sources of hard or soft mast within its habitat (Pelton 1982).

SPECIAL HABITAT REQUIREMENTS: Den sites located under fallen trees, in hollow logs, rock ledges, slash piles, or other protected areas.

REPRODUCTION: Age at sexual maturity: Females: 3-1/2 years to 5 years (Pelton 1982). Breeding period: Early June through mid-July. Peak: mid-June. Gestation period: 7 to 8 months, average 220 days. Young born: Mid-January in Pennsylvania (Alt 1981) to February. Litter size: 1 to 5, average 2 (varies with year and locality, females breed once every 2 years).

HOME RANGE: Home range size varies with many factors and is presently unknown. There is probably a greater seasonal range in the male black bear than the female (Godin 1977:209). Most widely accepted range is a 15-

mile (24 km) average radius for adult males and a somewhat smaller radius for females (Cahalane 1947).

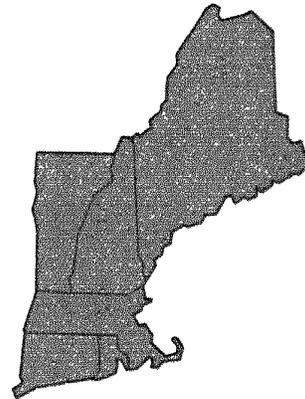
FOOD HABITS: Plant material is the major food; forbs and grasses eaten in spring, soft mast (fruit) in summer, and hard and soft mass in fall (Pelson 1982). Omnivorous feeder consuming insects, especially grubs and ants under the bark of rotten logs and stumps, mice, frogs, fish acorns and beechnuts, apples and numerous berries. Also takes carrion and garbage.

COMMENTS: Nocturnal. Trails are used repeatedly and prominent trees are often marked by either sex by clawing and ripping off bark. Several individuals may mark the same tree. Usually solitary except mother and cubs. Cubs are born during the winter while the female is in the den. At birth they weigh less than 1 pound (448 g) and are poorly developed. Females are inactive (semi-hibernate) during the coldest months of the year.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Cardoza 1976, Godin 1977, Jonkel and Cowan 1971, Spencer 1961.

Raccoon

(*Procyon lotor*)



RANGE: Throughout most of s. Canada and the United States except for the deserts of the Southwest and higher elevations of the Rocky Mountains. Also occurs from Mexico to Panama.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Wooded areas interrupted by fields and water courses. Not usually found in dense forests, commonly found in wetlands near human habitation. Areas where water is available (Kaufman 1982).

SPECIAL HABITAT REQUIREMENTS: A den in any protected area from a culvert to an abandoned woodchuck burrow. Prefers hollow trees. Dens are usually located in trees 10 feet (3 m) or more above ground (Banfield 1974:314) and are located near water.

REPRODUCTION: Age at sexual maturity: 50 percent of females breed as yearlings (Stuewer 1942); remaining breed when 2 years old. Breeding period: Late January to mid-March, peak in February. Gestation period: 63 days to 65 days. Young born: Late April to early May (if the female is not fertilized, a second breeding cycle may begin 2 to 4 months later (Whitney and Underwood 1952). Litter size: 3 to 7 cubs, average 2 to 5 (Asdell 1964). Litters per year: 1.

HOME RANGE: The home range is usually between 0.6 and 1.8 miles, 1 and 3 km in diameter (Kaufman 1982). Size varies with the individual, food availability, and weather. Raccoons have traveled up to 165 miles (264 km) in 164 days (Lynch 1967).

SAMPLE DENSITIES: Densities in New Jersey ranged from 1 raccoon per 1.8 ha (4.4 acres) in woodlands near suburban areas, to 1 raccoon per 18.9 ha (47 acres) in mixed forest and agricultural land (Slate et al. 1982).

FOOD HABITS: Omnivorous and opportunistic. Animal matter is the major food in spring and early summer. Fruits and seeds are eaten in summer, fall, and winter. Crayfish, worms, insects, carrion, tender buds and shoots, grass, and garbage are typical foods.

COMMENTS: Primarily nocturnal, may be seen in daylight. Dormant through the winter remaining in dens but not hibernating. An entire family may den together. Raccoons are alert, intelligent animals with a well-developed sense of touch.

KEY REFERENCES: Godin 1977, Hamilton 1936, Lotze and Anderson 1979, Stuewer 1942.

Marten

(*Martes americana*)



RANGE: Boreal forests of Canada to Alaska s. in the Cascade-Sierra Nevada ranges, and the Rockies into New Mexico; extreme n. Minnesota and Wisconsin and n. New England and New York.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon.

HABITAT: A diversity of wooded habitats including coniferous forests of fir, spruce and hemlock, dense mixed hardwood-conifer forests, cedar swamps. Softwood dominated mixed stands preferred in undisturbed forest in Maine (Soutiere 1978). In the Adirondacks martens are found in 30-year-old mixed stands, and in pole and mature hardwood stands at elevations of 530 m to 1463 m (1,740 to 4,800 feet) (Brown 1980).

SPECIAL HABITAT REQUIREMENTS: Den sites (hollow trees or logs are most commonly used). Martens seem to have no permanent den site (Godin 1977:217).

REPRODUCTION: Age at sexual maturity: Females: 2 to 3 years old. Males: 1 year. Breeding period: Mid-summer. Peak: July. Gestation period: 220 to 275 days, 27-day delayed implantation. Young born: Early April to mid-May. Litter size: 1 to 5, typically 3 to 4.

HOME RANGE: Average home range is 1 square mile (2.6 km²) for males and 0.25 square mile (0.65 km²) for females (Godin 1977:218). Recent work in Maine found that home ranges were 5.5 to 23.5 km² (0.7 to 1.1 square miles) for females determined by the modified minimum

area polygon method (Major et al. 1981). Adults have been found to range up to 15 square miles (39 km²) (Marshall 1951). A seasonal altitudinal migration may occur in the mountains (Banfield 1974:316).

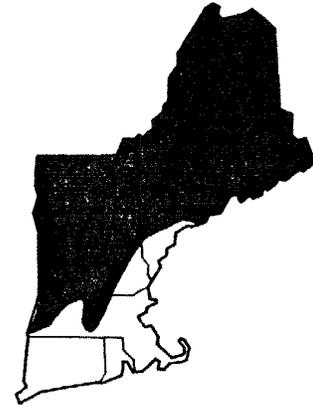
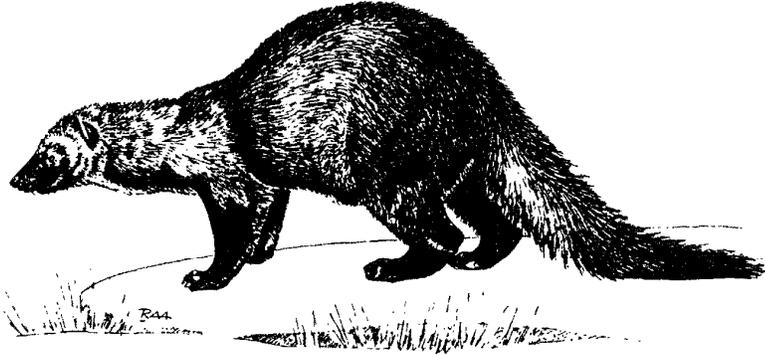
FOOD HABITS: Small mammals, especially voles and mice (staples), red squirrels, and chipmunks. Snowshoe hare, grouse, small birds and their eggs, insects and fruits are taken when available, and frogs, toads, reptiles and carrion are also eaten. Active night and day during all seasons. Much of winter hunting is done below snow's surface (Clark and Campbell 1977 cited in Strickland et al. 1982).

COMMENTS: Martens are easily trapped, which may partially explain their decline in the Northeast. Loss of habitat through logging, burning and land clearing are factors contributing to the range and population decrease (Godin 1977:217). Soutiere (1978) found clear-cuts reduced marten use for up to 15 years; adequate habitat was provided in selective timber cuts that maintained a pole stage and older residual stand of basal area 20 to 25 m²/ha (90 to 110 square feet per acre). Currently being reintroduced in the White Mountain National Forest of New Hampshire. This species is commonly called the pine marten.

KEY REFERENCES: Banfield 1974, Burt 1957, Burt and Grossenheider 1976, Godin 1977.

Fisher

(*Martes pennanti*)



RANGE: Southeastern Labrador w. to se. Alaska s. in the Sierra Nevadas of California and the Rocky Mountains to Wyoming. Also in n. Minnesota, the Adirondacks of New York and the mountain ranges of New England. It is reoccupying former range in the Northeast.

RELATIVE ABUNDANCE IN NEW ENGLAND: Probably common to uncommon.

HABITAT: Extensive forests of mixed hardwoods and conifers. Found less frequently in more open stands or burned areas. Favors wetlands (alder) and mixed softwood-hardwood forest types (Kelly 1977:77). Diverse reports of preferred habitats (Strickland et al. 1982).

SPECIAL HABITAT REQUIREMENTS: Dens in hollow trees, logs, ground holes under large boulders, or vacant porcupine dens. Rarely digs burrow. Dens may be lined with leaves and are often used as temporary shelters during winter storms; does not hibernate.

REPRODUCTION: Age at sexual maturity: Both sexes become mature before their 12th month of age. Females produce first litter when 2 years old (Wright and Coulter 1967). Breeding period: Late February to April. Peak: March. Gestation period: 46 to 51 weeks (Hall 1942), with implantation delayed 9 to 10 months; average 51 weeks. Young born: March to early April. Litter size: 1 to 4 kits, average 3.

HOME RANGE: Kelly (1977) found that yearly ranges averaged 4,747 acres (1,922 ha) and monthly ranges averaged 2,794 acres (1131 ha) in northern New Hampshire.

Home range was from 8 to 15 miles (12.8 to 24.0 km) in diameter (Jackson 1961). Hunting circuits may be 60 miles (96 km) in length (Banfield 1974:319). Males range farther than females. Fishers commonly travel along ridges crossing small streams to reach the next ridge (Coulter 1959).

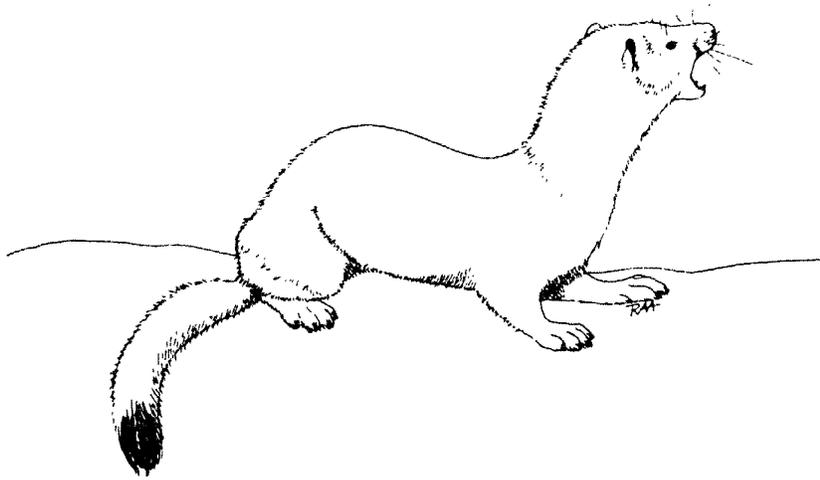
FOOD HABITS: About 80 percent of the fisher's diet is mammals (Banfield 1974:319). They are opportunists taking shrews, mice, squirrels, birds, toads, insects, berries, nuts, and carrion. Porcupines are common and preferred prey of fishers.

COMMENTS: Fishers are good climbers and are as agile in trees as on ground. Active both day and night, throughout the year.

KEY REFERENCES: Banfield 1974, Burt 1957, Coulter 1966, Godin 1977, Kelly 1977.

Ermine

(*Mustela erminea*)



RANGE: Throughout Alaska and most of Canada, s. in the United States to s. Pennsylvania and w. Maryland, the Great Lakes region and the nw. quarter of the country.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Wooded or open country with thickets, rock piles or other heavy cover; often close to watercourses.

SPECIAL HABITAT REQUIREMENTS: Small rodents, dense brushy cover.

REPRODUCTION: Age at sexual maturity: Males: Probably 1 year. Females: 3 or 4 months (Jackson 1961:341). Breeding period: July or August. Gestation period: Possibly 9 months (Hamilton 1933b), about 255 days (Jackson 1961:341). Young born: Mid-April to early May. Litter size: 4 to 9, typically 6 or 7.

HOME RANGE: Approximately 30 to 40 acres (12.1 to 16.2 ha) under normal conditions but may extend for 2 or 3 linear miles (3.2 to 4.8 km) per night during periods of food shortage (Jackson 1961:341).

SAMPLE DENSITIES: May reach 20 individuals per square mile (8/km²) in favorable habitat (Jackson 1961:341).

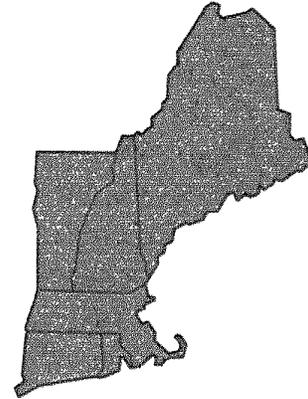
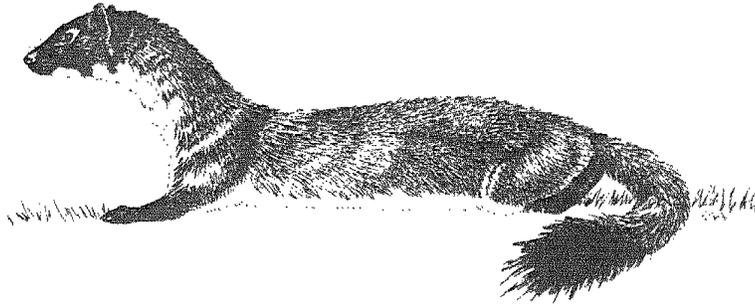
FOOD HABITS: Mice (staple), chipmunks, moles and shrews, occasionally birds and insects, and rarely snakes, frogs, or fish.

COMMENTS: Den is usually below ground under fallen tree or stump but may also be in abandoned building, stone wall, hollow log, or almost anywhere there is a small dry enclosure. Nocturnal and active throughout the year. Molts to white in winter throughout the Northeast. Formerly short-tailed weasel.

KEY REFERENCES: Hall 1951, Hamilton 1933b, Jackson 1961.

Long-tailed Weasel

(*Mustela Irenata*)



RANGE: Southern Canada to South America. Not found in the sw. deserts of the United States, nw. Mexico or the Baja Peninsula.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Open woods and woodland edges, grasslands, river bottomlands, fencerows. Found in elevations from sea level to the alpine tundra zone. Prefers to be near water.

SPECIAL HABITAT REQUIREMENTS: Uses previously excavated burrows or natural holes or crevices for dens.

REPRODUCTION: Age at sexual maturity: Females: 3 to 4 months. Males: 1 year. Breeding period: July to August. Gestation period: 205 to 337 days, average 279 days (Wright 1942) (approximately 7-1/2 months delayed implantation). Young born: April to May. Litter size: 1 to 12, average 6 to 9 (Wright 1948).

HOME RANGE: Size varies with food availability, cover type, and season. Studies in Wisconsin showed ranges of 30 to 40 acres (12.1 to 16.2 ha) (Jackson 1961) and in Missouri, 400 acres (162 ha) (Schwartz and Schwartz 1959). About 300 acres (121.5 ha) in mixed agricultural-wooded-marsh habitat in southern Michigan. Average cruising radius was 0.3 miles (0.5 km) from den, and the average daily distance traveled by 1 large male was 2 miles (3.2 km) (Quick 1944).

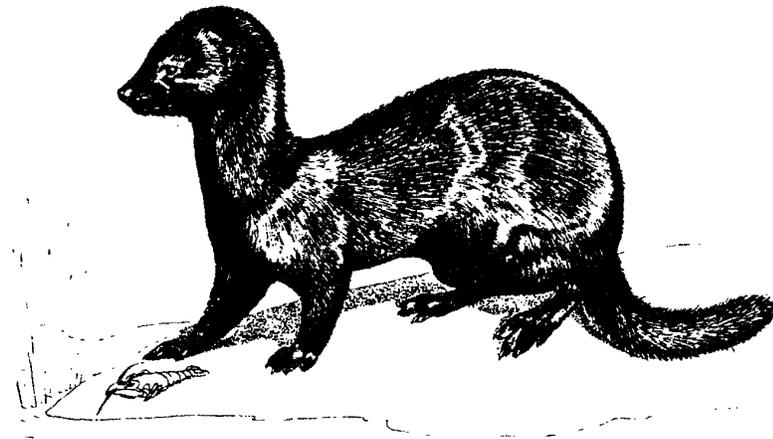
FOOD HABITS: Primarily small mammals including voles, mice, rabbits, shrews; some birds, especially ground nesting species; a few insects and an occasional snake. Small prey is eaten entirely. May climb trees to catch prey.

COMMENTS: Active year long; commonly thought to be mainly nocturnal but often seen active during daylight hours. Some individuals turn white in winter where climate is cold. Molting occurs from mid-October to mid-November and mid-February to mid-April.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Hall 1951, Hamilton 1933b.

Mink

(*Mustela vison*)



RANGE: Canada (except high Arctic) w. through Alaska and s. throughout the United States (except the sw. deserts).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Streambanks, lakeshores, and marshes. Favors forested wetlands with abundant cover such as thickets, rocks, or windfalls.

SPECIAL HABITAT REQUIREMENTS: Den sites inside hollow logs, natural cavities under tree roots or in burrows along stream, marsh, or lake edges.

REPRODUCTION: Age at sexual maturity: 10 months. Breeding period: Late February to early April. Peak: March (Mitchell 1961). Gestation period: 40 to 75 days, average 51 days, 30- to 32-day delayed implantation (Enders 1952). Young born: April or May. Litter size: 2 to 10 kits, average 3 to 4.

HOME RANGE: The average range is 2 to 3 miles (3.2 to 4.8 km) in diameter for males along river in Montana. Two females had home ranges of 19.3 and 50.4 acres (7.8 and 20.4 ha) in similar river habitat. Long distance travel is common along waterways, and in winter mink may swim under the ice. Home ranges often overlap between juveniles and adults (Mitchell 1961).

FOOD HABITS: Aquatic and terrestrial prey. Importance of prey items varies with season and habitat (Linscombe et al. 1982). Small mammals, particularly muskrats,

voles, rabbits, fish, frogs, salamanders, crayfish, clams and insects. Trails prey by scent and often caches food.

COMMENTS: Molts twice a year. Mainly nocturnal, active year long.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Mitchell 1961.

Striped Skunk

(*Mephitis mephitis*)



RANGE: Occurs throughout s. Canada, except coastal British Columbia and throughout the United States except the desert regions of the Southwest.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Semi-open country, woods and meadows, agricultural lands, suburban areas, and trash dumps. Occurs from sea level to timberline.

SPECIAL HABITAT REQUIREMENTS: Dens; may be under houses, stumps, in stone walls, rock cavities, or abandoned burrows.

REPRODUCTION: Age at sexual maturity: Spring following birth (Verts 1967). Breeding period: February to late March. Peak: Mid-February. Gestation period: 62 to 68 days. Young born: Late April to early June. Litter size: 2 to 10 kits, typically 6 or 7.

HOME RANGE: Nightly movements cover 0.25 to 0.50 square miles (0.6 to 1.35 km²) increasing to 4 or 5 square miles (10.4 or 13 km²) at night during breeding season (Schwartz and Schwartz 1959).

SAMPLE DENSITIES: 31 skunks per square mile (12/km²) during autumn peak on a 1.13-square-mile (2.93 km²) area of farmland, shrub and wooded ravine habitat in Pennsylvania (Jones 1939). 58 square miles (22/km²) in winter on good habitat in Michigan (Burt 1948:149).

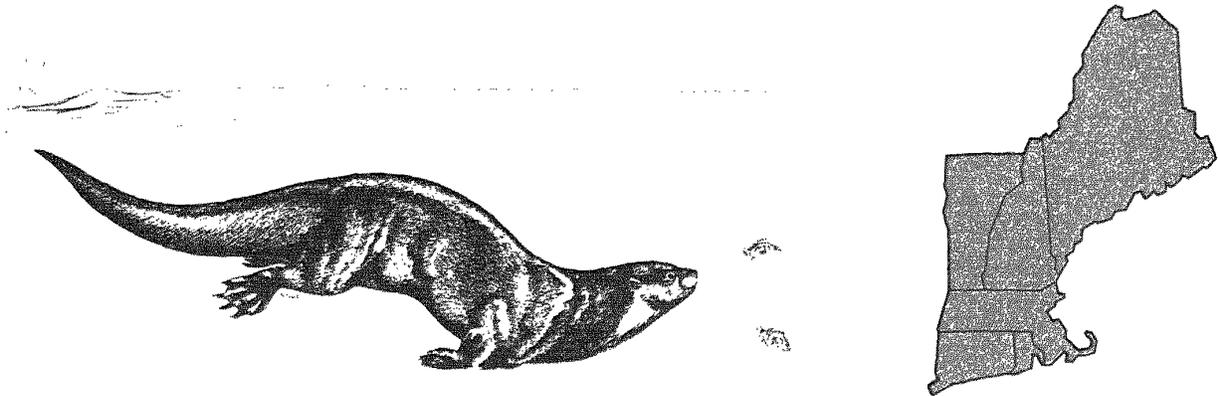
FOOD HABITS: Omnivorous diet includes insects, snails, small rodents, birds eggs, fruits, grains, nuts, corn, grasses, buds, berries, garbage, and carrion. In summer diet may be as much as 43 percent insects (Banfield 1974:339).

COMMENTS: Semi-hibernates during the winter months; young may remain in den with mother. Crepuscular or nocturnal, sometimes active during daylight hours. Not efficient burrowers but can excavate dens.

KEY REFERENCES: Banfield 1974, Burt and Grossenheider 1976, Godin 1977, Verts 1967.

River Otter

(*Lutra canadensis*)



RANGE: Throughout all but northernmost portions of Canada and Alaska and in all states of the United States. Does not occur in deserts or treeless regions.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon, but probably more common than sightings and trapping would indicate.

HABITAT: Borders of streams, lakes or other wetlands in forested areas.

SPECIAL HABITAT REQUIREMENTS: Body of water such as stream, pond, lake, river; suitable den sites.

REPRODUCTION: Age at sexual maturity: Possibly 2 years (Hamilton and Eadie 1964). Breeding period: March or April, followed by a 10- or 11-month delayed implantation. Gestation period: 9 to 12 months (Hamilton and Eadie 1964). Young born: March or April. Litter size: 1 to 5, average 2 or 3. Litters per year: 1.

HOME RANGE: 15 or more linear miles (24 km) (Burt and Grossenheider 1976), 20 or 30 linear miles (32 or 48 km) for a pair or male but usually less than 1 mile (1.6 km) for females with young (Jackson 1961:384). Territories maintained within home range (Erlinge 1968).

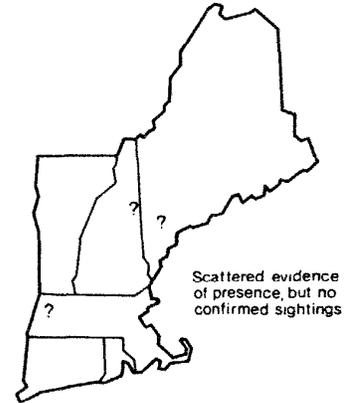
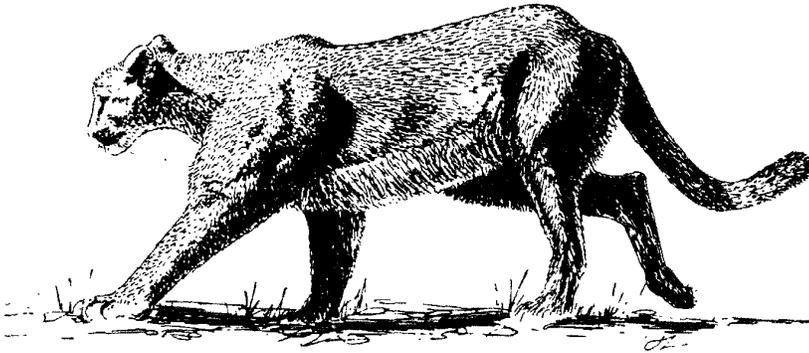
FOOD HABITS: Aquatic animals especially fish, frogs, crayfish, salamanders, and turtles. Also takes snakes, small birds, mammals, earthworms, and insects.

COMMENTS: May be active at any time; dawn to midmorning and evening hours are the periods of most activity (Melquist and Hornocker 1979). Active throughout the year. Den may be in crevice in rocky ledge, under fallen tree, in abandoned beaver lodge or muskrat house or in dense thickets bordering water.

KEY REFERENCES: Jackson 1961, Hamilton and Eadie 1964, Liers 1951.

Mountain Lion

(*Felis concolor*)



RANGE: Southern Canada s. in the w. mountains of the United States to South America, with remnant populations in Florida and possibly New Brunswick.

RELATIVE ABUNDANCE IN NEW ENGLAND: Extirpated. No known breeding population.

HABITAT: Historically used a variety of habitat. If stragglers are present today, they probably inhabit remote mountain forests, swamps, and wooded watercourses.

SPECIAL HABITAT REQUIREMENTS: Isolation from man. Requires abundant supply of deer for prey.

REPRODUCTION: Age at sexual maturity: 2 or 3 years. Breeding period: Throughout the year (every 2 or 3 years). Gestation period: About 3 months. Young born: Throughout the year (spring-born cubs have highest survival rates in the North). Litter size: 1 to 6, typically 2 or 3.

HOME RANGE: May range 20 or 30 linear miles (32 to 48 km) during hunting trips (Hamilton and Whitaker 1979:310). Home ranges in the Northeast are not known. Western home ranges may exceed 30 square miles (78 km²) (Wright 1973). Separate home ranges maintained in summer and winter, following movements of deer and elk (Dixon 1982).

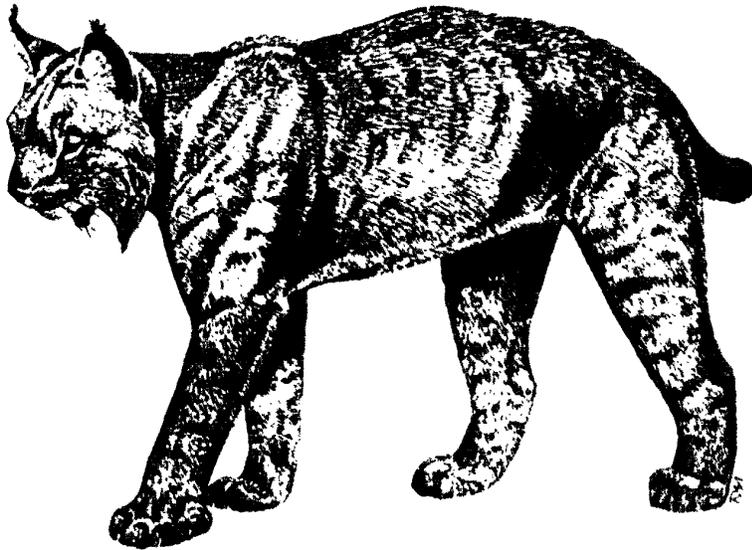
FOOD HABITS: Nocturnal. Feeds on deer, foxes, beavers, porcupine, raccoons, skunks, rabbits, and smaller mammals. Caches large prey.

COMMENTS: There is little if any evidence of a breeding population in the northeastern United States. A sparse population may exist in the southeastern states although evidence is not clear. There is a small population in Florida (Dixon 1982). Many unconfirmed sightings in New England and one confirmed track cast (R. Downing, personal communication). Some stragglers may be escapees from zoos or others may be kept illegally as pets. Also called the cougar.

KEY REFERENCES: Hamilton and Whitaker 1979, Young and Goldman 1946.

Lynx

(*Felis lynx*)



RANGE: Newfoundland w. to Yukon Territory and Alaska s. in the United States to n. Oregon, n. Wisconsin, and n. New England.

RELATIVE ABUNDANCE IN NEW ENGLAND: Uncommon to rare.

HABITAT: Interiors of extensive, unbroken forests well removed from human activity. Favors swamps, bogs, or rocky areas. Selected successional habitat on Cape Breton Island (Parker 1982).

SPECIAL HABITAT REQUIREMENTS: Secluded den sites, extensive forests.

REPRODUCTION: Age at sexual maturity: 1 year, may vary with prey abundance (McCord and Cardoza 1982). Breeding period: January to February. Gestation period: About 62 days. Young born: May to early June. Litter size: 1 to 4. Litters per year: 1.

HOME RANGE: About 5 square miles (13 km²) during breeding season (Burt and Grossenheider 1976). 6 to 8 square miles (16 to 21 km²) with 2.6-mile (4.2-km) daily cruising radius (Banfield 1974:350). Adult home ranges were larger in summer 25 to 32 km² (9.6 to 12.3 square miles) than winter 12 to 18 km² (4.6 to 6.9 square miles) on Cape Breton Island. Cruising distance was 9 km (5.6 miles) in summer and 8 km (4.9 miles) in winter (Parker 1982).

FOOD HABITS: Mainly snowshoe hare (staple), rodents, and birds. Occasionally carrion of deer or caribou. Lynx

populations fluctuate with snowshoe hare abundance reaching peak numbers about once every 10 years.

COMMENTS: Mainly nocturnal and solitary; active throughout the year. Rears young in den which may be among rocks, under fallen tree, in a hollow log, or other sheltered place.

KEY REFERENCES: Banfield 1974, Godin 1977, Saunders 1963a, 1963b, Siegler 1971.

Bobcat

(*Felis rufus*)



RANGE: Southern Canada s. throughout the w. half of the United States and through the e. uplands and mountains. Also occurs along the Gulf Coast and in Florida. Reintroduced to n. New Jersey in 1978 (Lund 1980).

RELATIVE ABUNDANCE IN NEW ENGLAND: Common to uncommon.

HABITAT: Mixed deciduous-coniferous and hardwood forests and brushy and rocky woodlands broken by fields, old roads and farmland. Frequently found in cedar swamps and spruce thickets. Favors areas with thick undergrowth. Softwood cover preferred in winter (May 1982).

SPECIAL HABITAT REQUIREMENTS: Rocky ledges critical in Massachusetts (McCord and Cardoza 1982). Prefers to den in rock crevices, under windfalls, or in hollow logs. The den is usually lined with dried grasses, leaves, and moss.

REPRODUCTION: Age at sexual maturity: Females mature within a year after birth. Males mature during second year (Crowe 1975). Breeding period: Late February to March, sometimes extending into June. Gestation period: About 62 days. Young born: Late April to mid-May. Litter size: 1 to 4 kittens, average 2. Litters per year: Second litter sometimes born in early August. May be regularly polyestrous in the southern portion of the range (Banfield 1974:353).

HOME RANGE: 2 to 5 linear miles (3.2 to 8 km) for nightly travel in Massachusetts (Pollack 1951). McCord (1977) estimated 26 to 31 acres (10.5 to 12.5 ha) in Massachusetts. In Maine, mean annual home range was 23 km² (8.9 square miles), winter ranges were 30 percent larger than summer ranges (May 1982). In the Catskills, home range was approximately 36 km² (14 square miles) for males and 31.0 km² (12 square miles) for females; Adirondack ranges were estimated to be 325 km² (125 square miles) for males and 86 km² (33 square miles) for females (Fox and Brocke 1983). Ranges farther to find mates or follow prey. In Minnesota, Bobcats traveled 3 to 7 miles (4.8 to 11.2 km) while hunting (Rollings 1945).

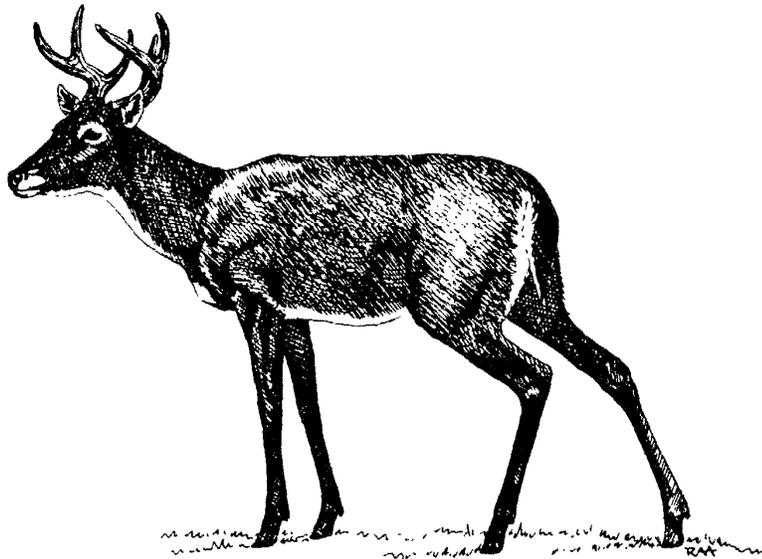
FOOD HABITS: Small mammals, especially snowshoe hare, cottontails, squirrels, mice, birds and their eggs. Deer is a principal winter diet component in New York (Fox and Brocke 1983). Carrion (untainted), snakes, fish, crustaceans, insects, and some vegetation are also eaten. Most prey is taken by stalking.

COMMENTS: Favors established routes and uses scent posts. Solitary and elusive, mainly nocturnal but in winter is active during daylight. Avoids crossing bodies of water (generally) but can swim well (Godin 1977:241).

KEY REFERENCES: Banfield 1974, Godin 1977, McCord 1974, Rollings 1945, Siegler 1971.

White-tailed Deer

(*Odocoileus virginianus*)



RANGE: Across s. Canada to c. British Columbia and throughout the United States, except for most of California, Nevada, Utah, and w. Colorado. Range extends into South America.

RELATIVE ABUNDANCE IN NEW ENGLAND: Common.

HABITAT: Forest edges, swamp borders, areas interspersed with fields and woodland openings. During winter months when snow depth exceeds 16 inches (40.6 cm) Deer will "yard" in stands of conifers, forming a central resting area with trails packed through the snow.

SPECIAL HABITAT REQUIREMENTS: Dense cover for winter shelter, adequate browse.

REPRODUCTION: Age at sexual maturity: Some females mate as yearlings, most males and females are mature at 18 months. Breeding period: Late October to mid-December. Peak: November. Gestation period: 201 days. Young born: May and June with an extreme spread from March to September. Litter size: 1 to 4 fawns, average 2.

HOME RANGE: 2 to 3 square miles (5.2 to 7.8 km²). Size depends on the quality of the habitat. Home range is from 40 acres (16.2 ha) in excellent habitat to 300 acres (121.5 ha) in poor habitat (Banfield 1974:392).

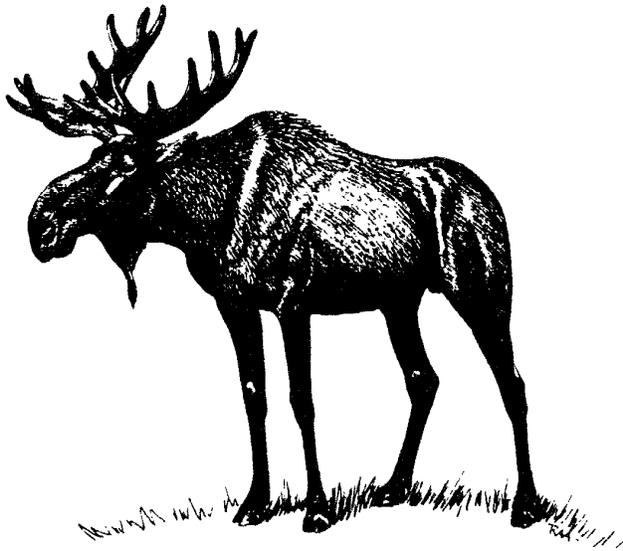
FOOD HABITS: Mainly crepuscular. Deer browse on a variety of woody deciduous plants and some coniferous growth, feeding on twigs and stripping young bark. Also graze on grasses, herbs and mushrooms, and grub for roots. Adaptable in its food habits.

COMMENTS: Gregarious, usually forming small groups. Family groups consisting of a doe with her fawns and yearlings are (sometimes) common in the late fall.

KEY REFERENCES: Banfield 1974, Godin 1977, Taylor 1956.

Moose

(*Alces alces*)



RANGE: Alaska, the s. half of Canada, n. New England and the n. Rockies into Utah.

RELATIVE ABUNDANCE IN NEW ENGLAND: Locally common to uncommon.

HABITAT: Second-growth boreal forests interspersed with semi-open areas and swamps or lakes that offer cover and aquatic plants for food. Climax stands of balsam fir, white birch, and aspen seral stands are preferred habitat. Summers are spent near water; winters in drier mixed hardwood-conifer forests.

SPECIAL HABITAT REQUIREMENTS: Wetlands preferred in summer for relief from mosquitos and flies and for aquatic plant food items.

REPRODUCTION: Age at sexual maturity: Some females may mature at 16 months and produce young in their second year (Peterson 1955:99). Most males probably mature at 1-1/2 years but are unable to breed until 5 or 6 years old due to competition from older bulls. Breeding period: Early September to late October. Peak: Mid-September. Gestation period: 240-246 days. Young born: Late May to early June. Litter size: 1, rarely 2.

HOME RANGE: Probably a radius of 2 to 10 miles (3.2 to 16 km) if adequate year-round food supply is available (Peterson 1955:113). Seasonal home ranges of 5 to 10 km² (2 to 4 square miles) throughout North America (LeResche 1974). In an area with 5- to 50-year-old patch clearcuts in northern Maine, the home range of females was 11 to 43

km² in summer and 3.37 km² in winter (Crossley and Gilbert 1983). Bulls will range farther during breeding season.

SAMPLE DENSITIES: In Eastern North America, the average density is 1 moose per 5 square miles (13 km²) over much of its range; 2 or more moose per square mile (0.8/km²) approaches carrying capacity (Peterson 1955:202).

FOOD HABITS: During summer they prefer to feed in or near clearings, burns or shoreline areas where they browse on tender leaves, twigs and bark of deciduous trees, and semi-aquatic and aquatic vegetation. They also graze on grasses, lichens, mosses, mushrooms, and herbaceous plants. Winter diet is restricted to conifer (especially balsam fir) and hardwood twigs.

COMMENTS: Populations are increasing in Maine and northern New Hampshire. Moose in mountainous regions generally seek lower elevations in autumn (Edwards and Ritcey 1956). They may gather together in yards during winter and congregate in lily ponds during summer months but are mainly solitary animals. They are most active at dawn and dusk.

KEY REFERENCES: Banfield 1974, Godin 1977, Murie 1934, Peterson 1955.

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