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Squirrels and relatives II

Ground squirrels

Class Mammalia
Order Rodentia
Suborder Sciuragnathi
Family Sciuridae
Subfamily Sciurinae

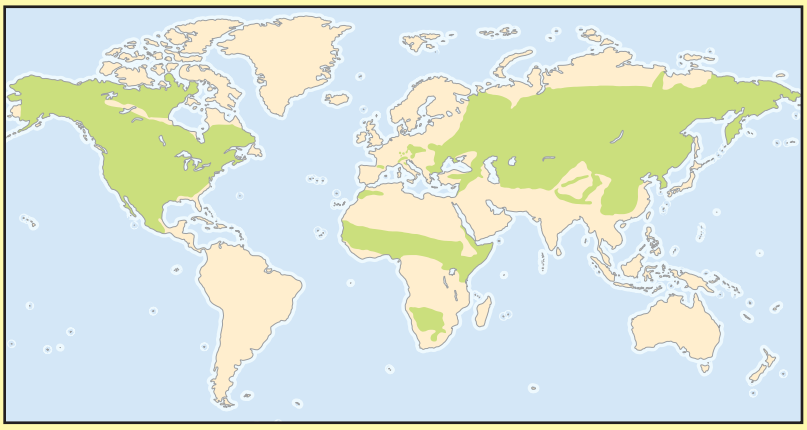
Thumbnail description
Short and stout short-haired rodent with a slender or bushy tail that is one quarter to one half the total squirrel's length; coloration varies between species from uniform to distinctive contrasting patches, dark and light stripes, or speckled with small light spots

Size
7.2–30 in (18.3–75 cm); 0.09–24 lb (0.04–11 kg)

Number of genera, species
9 genera; 95 species

Habitat
Desert, prairie, savanna, shrub, temperate forests, subalpine forests, rocky slopes, alpine meadows, and arctic tundra

Conservation status
Endangered: 4 species; Vulnerable: 6 species; Lower Risk/Near Threatened: 6 species; Lower Risk/Conservation Dependent: 2 species; Data Deficient: 1 species



Distribution
North America, north Africa, sub-Saharan Africa, central to eastern Europe, west and central Asia, north Asia, and east Asia

Evolution and systematics

The ground-dwelling squirrels are grouped into three tribes: 1. Xerini—the African ground squirrels (*Xerus* and *Atlantoxerus*) and a central-Asian ground squirrel (*Spermophilopsis*); 2. Marmotini—the marmots (*Marmota*), antelope squirrels (*Ammospermophilus*), prairie dogs (*Cynomys*), ground squirrels (*Spermophilus*), and Chinese rock squirrels (*Sciurotamias*); and 3. Tamiini—the chipmunks (*Tamias*). The classification of the 25 species of chipmunks has a long history of debate over whether the group should be one, two, or three genera. Jameson, in 1999, recommended that the single genera *Tamias* is incorrect and that the group should be split into three genera (*Tamias*, *Eutamias*, and *Neotamias*) based on the evolutionary relationships of chipmunk ectoparasites. The molecular work of Piaggio and Spicer in 2001 support Jameson's recommendation.

Climate change, plate tectonics and fluctuations in sea level produced pulses of rapid evolution in the Sciuridae beginning with the initial divergence of the Sciuridae in the late Eocene to early Oligocene. Global cooling and the expansion of grasslands during the late Oligocene gave rise to the evolution of the early ground squirrels. According to Mercer and Roth in 2003, African ground squirrels arose from a single colonization by an Eurasian ancestor after the joining of Africa with Asia approximately 18 to 20 million years ago (mya). Asia and North America were joined across the Bering land bridge allowing the exchange and radiation of tree squirrels, however forests followed by the formation of a marine barrier (7.4 to 4.8 mya) prevented the movement of North American *Marmota* sp. and *Spermophilus* sp. into Asia until after an unforested land bridge was established as glaciers expanded and sea level declined. *Tamias* crossed the land bridge at this time as well but a North American or Eurasian origin of this group is still debated.

Physical characteristics

Ground squirrels are diverse in size with the largest (*Marmota*) being more than 100 times the mass of the smallest (*Tamias*). All ground squirrels are generally short legged with stout bodies and a tail that is generally one third to one half the length of the body.

Fur is typically short and coloration varies among species and groups. Chipmunks have alternating dark and light stripes on both sides of their face and along their backs. The stripes vary in contrast among the species. All the Antelope squirrels and African squirrels, except for one from each group, have a single white stripe down either side of their bodies. Striping is not as common in the *Spermophilus* sp. except in golden mantled ground squirrels *S. lateralis* and *S. saturatus*, which is why they are often confused for chipmunks. However, they lack facial striping that distinguishes them from the chipmunks. One of the most striking patterns for a mammal

Black-tailed prairie dogs (*Cynomys ludovicianus*) basking in the sunshine. (Photo by John Shaw. Bruce Coleman, Inc. Reproduced by permission.)

belongs to the thirteen-lined ground squirrel (*S. tridecemlineatus*), which has 13 alternating dark and light stripes along the back and a row of spots that runs down each dark stripe.

Distribution

The ground-dwelling squirrels are widespread throughout North America, Africa, and Eurasia except for Southeast Asia. Ground squirrels have not invaded South America unlike tree squirrels. More than 70% of the world's ground-dwelling squirrels are endemic to North America, including two genera *Cynomys* and *Ammospermophilus*. Only one species, the arctic ground squirrel *Spermophilus parryii*, is found in North America and Asia. All except one of the 25 species of chipmunks (*Tamias sibericus*) are found in North America.

The Chinese rock squirrels *Sciurotamias* and the long-clawed squirrel *Spermophilopsis* are the only genera endemic to Asia. *Xerus* and *Atlantoxerus* are endemic to Africa. There are no ground squirrel genera endemic to Europe.

An alpine marmot (*Marmota marmota*) showing its teeth, used to eat berries, nuts, grass, and roots. (Photo by Frank Krahmer. Bruce Coleman, Inc. Reproduced by permission.)

A hoary marmot (*Marmota caligata*) carrying nesting material in Glacier National Park, Montana, USA. (Photo by Erwin & Peggy Bauer. Bruce Coleman, Inc. Reproduced by permission.)

Habitat

The ground-dwelling squirrels occupy a wide variety of habitat types including desert, prairie, savanna, shrub, temperate forests, subalpine forests, rocky slopes, alpine meadows, and arctic tundra. Chipmunks are most often associated with forests and some will nest in trees. The rest of the ground-dwelling squirrels are mostly terrestrial but are capable of climbing trees or shrubs for access to food or fleeing predators. Nearly all ground-dwelling squirrels construct underground burrows and therefore prefer well-drained sandy or gravelly soils that are not compacted. In cold alpine or arctic climates, permafrost limits the extent of burrowing habitat.

Except for the chipmunks, dense shrubs or closed forests are typically avoided. Ground-dwelling squirrels largely rely on visual detection of their predators and dense vegetation obscures their vision putting them at risk of attack by predators. Stumps, boulders, and other climbable objects provide perches for ground squirrels to survey their surroundings for predators.

Behavior

All of the ground-dwelling squirrels are diurnal. Temperate ground squirrels tend to have bimodal daily activity pat-

Young black-tailed prairie dogs (*Cynomys ludovicianus*) play in Tucson, Arizona, USA. (Photo by © George D. Lepp/Corbis. Reproduced by permission.)

terns during the hot summer months. During the hot periods above-ground activities tend to be concentrated in the mornings and late afternoons to early evening. The animals avoid the heat of the day by escaping below ground to their cool burrows.

The degree of sociality varies widely in the ground-dwelling squirrels from the solitary chipmunks to the highly social marmots. Although there are exceptions, the degree of sociality tends to increase with body size and shortness of the growing season where they live. Large-bodied squirrels, such as the marmots, living at high elevations with short growing seasons tend to be highly social. For example, the hoary marmot (*Marmota caligata*) lives in large family groups of up to 35 animals that include an adult male, several females, and several offspring cohorts. The short growing season prevents large-bodied squirrels from reaching adult size for several years and therefore they tend to delay the age at which they disperse until they reach a sufficient size that improves their success. Other factors influence grouping behavior in squirrels as well. The Cape ground squirrels (*Xerus inauris*) of Africa are unusual among the ground-dwelling squirrels in that the males form groups despite the increase in competition for females. Waterman in 1997 suggested that males live in groups to increase their safety from predators.

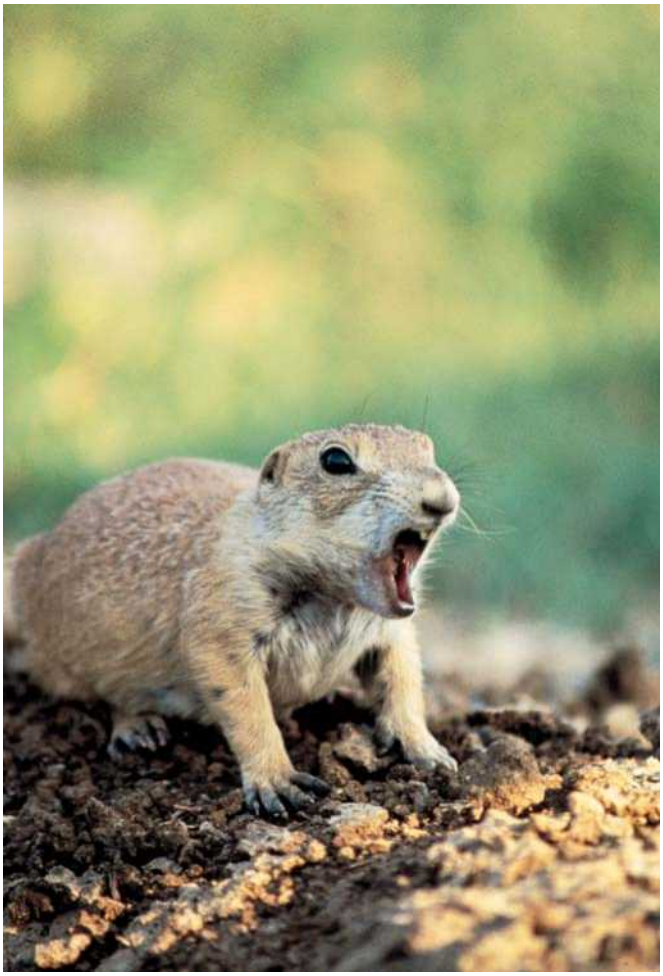
Hibernation is a feature that is prominent in many of the ground-dwelling squirrels. However, the degree of hibernation varies from those that do not hibernate at all such as the Cape ground squirrel (*Xerus inauris*), those that undergo estivation in summer such as Nelson's antelope squirrel, to the majority of ground-dwelling squirrels that hibernate for up to nine months. Although marmots are the largest true hibernating mammal, the arctic ground squirrel is the most extreme. According to Barnes in 1989, the arctic ground squirrel can survive a core body temperature as low as 26.8°F (−2.9°C).

Feeding ecology and diet

Morphologically, the ground-dwelling squirrels are herbivores, however, nearly all of the ground-dwelling squirrels have omnivorous diets to a degree. The diet of some squirrels, such as the chipmunks, are composed primarily of seeds and nuts while the diet of *Spermophilus* and *Marmota* species tend to be composed of mainly grasses and forbs. However, fungi, berries, shrub, and tree buds are important items in the diet of many species. Several species will raid bird's nests for eggs or chicks, and kill and eat small mammals, amphibians, and reptiles. Insects are a small supplement for many species but the Nelson's antelope squirrel will eat primarily insects during the dry season.

Himalayan marmots (*Marmota caudata*) watch for predators. (Photo by Harald Schütz. Reproduced by permission.)

Black-capped marmot (*Marmota camtschatica*) with a cub near its den in the Lena Reserve, Russia. (Photo by L. Veisman. Bruce Coleman, Inc. Reproduced by permission.)



A black-tailed prairie dog (*Cynomys ludovicianus*) threatens an intruder. (Photo by Karen McGougan. Bruce Coleman, Inc. Reproduced by permission.)

Townsend's chipmunk (*Tamias townsendii*) nibbles on a wildflower in Olympic National Park, Washington, USA. (Photo by © Darrell/Corbis. Reproduced by permission.)

Yellow-bellied marmots (*Marmota flaviventris*) exploring abondonded farm equipment, Montana, USA. (Photo by E & P Bauer. Bruce Coleman, Inc. Reproduced by permission.)

Many of the hibernating species, such as *Spermophilus* and *Marmota*, forage intensively during the summer to store fat, sometimes doubling their mass before entering hibernation. Chipmunks hibernate, but most tend not to store fat; instead they cache nuts and seeds that they will access periodically throughout the winter.

Reproductive biology

Hibernation imposes a constraint on reproduction. The preparation and duration of hibernation allow for only a single litter per year. For some species of marmots, many females will skip a year in order to build the necessary energy reserves for reproduction. Remaining spring seed caches allow chipmunks to initiate mating early in the season relative to non-caching hibernating ground squirrels. This early start ensures chipmunks have the opportunity to reproduce again if the first litter fails, or they may successfully raise more than one litter in a good year. Non-hibernating ground squirrels can reproduce more than once per year in good years as they are not constrained by hibernation.

A Belding's ground squirrel (*Spermophilus beldingi*) family emerging from burrow. (Photo by J. VanWormer. Bruce Coleman, Inc. Reproduced by permission.)

Litters tend to be born in underground chambers. The pups are born naked and helpless and remain in the natal nest for 3–5 weeks depending on the species. Weaning usually occurs shortly after pups emerge from the natal chamber and begin foraging for themselves. Mating systems are not well-known.

Conservation status

Ten species of ground-dwelling squirrels are considered threatened, four of which are Endangered. The most critical case is the Vancouver Island marmot (*Marmota vancouverensis*), which has declined severely from the late 1980s possibly owing to changes in landscape from climate and forestry practices. Predation is considered a significant threat to the remaining small colonies. In 2002, only 25 animals were known to live in the wild on Vancouver Island, Canada. Another 63 marmots are in captive breeding facilities with the goal to reintroduce marmots in the near future. The other three endangered species are also in North America and have declined mainly owing to habitat loss from agriculture (*Ammospermophilus nelsoni* and *Cynomys mexicanus*) or fire suppression (*Spermophilus brunneus*). One of the six Vulnerable species is in Europe (*S. citellus*), two are in Asia (*Marmota menzbieri* and *Sci-*

A group of black-tailed prairie dogs (*Cynomys ludovicianus*). (Photo by Scott Nielsen. Bruce Coleman, Inc. Reproduced by permission.)

An eastern chipmunk (*Tamias striatus*) with cheek pouches filled. (Photo by Leoard Lee Rue III. Bruce Coleman, Inc. Reproduced by permission.)

urotamias forresti), and three are in North America (*Spermophilus mohavensis*, *S. washingtoni*, and *Tamias palmeri*). All suffer from habitat loss and fragmentation.

Six species are Near Threatened, two of which are in Asia and four in North America. Most are threatened from habitat loss primarily from agriculture, however, the sylvatic plague is a major threat to the persistence of the black-tailed prairie dog (*Cynomys ludovicianus*).

Significance to humans

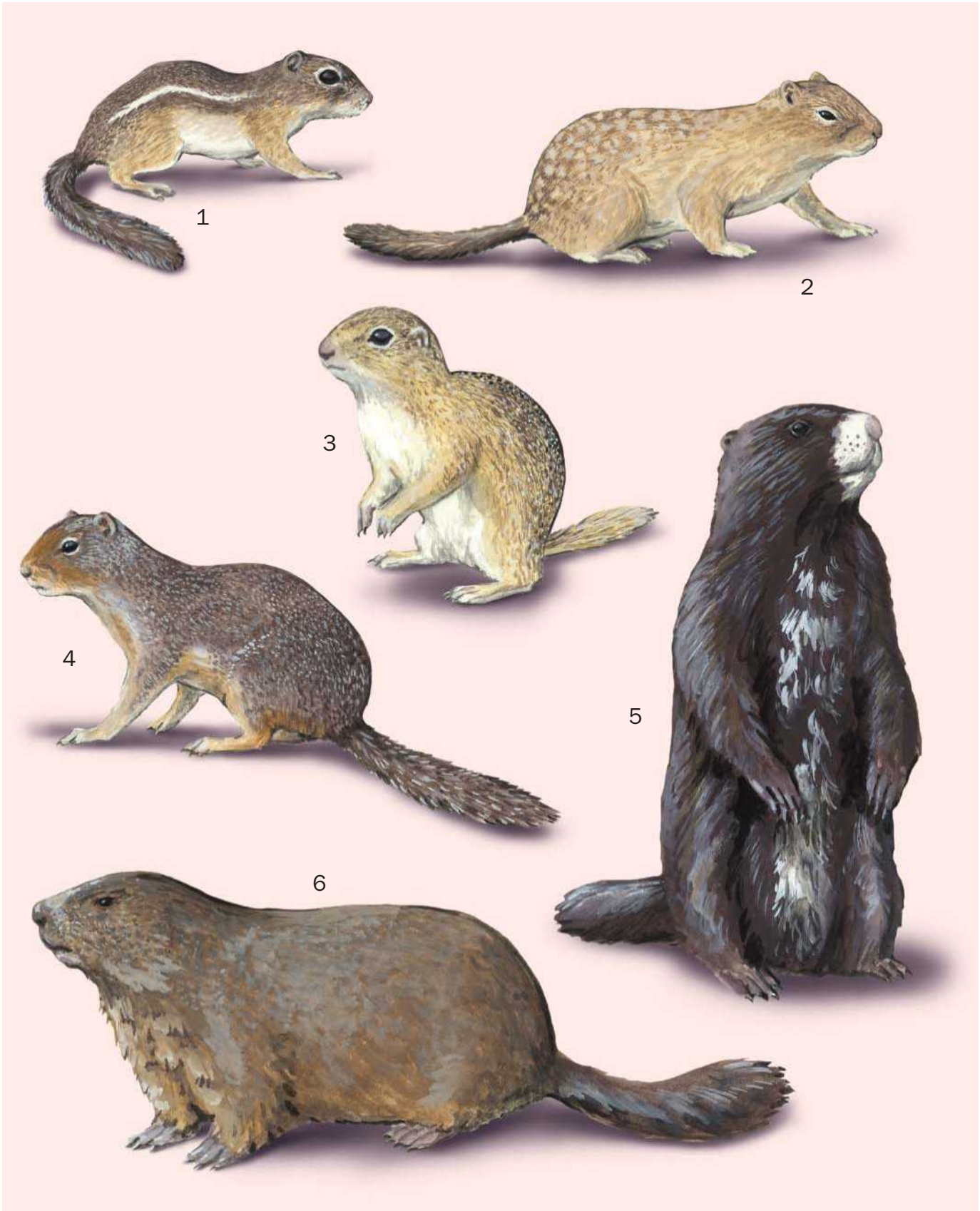
Cave paintings of marmots in France provide evidence that ground-dwelling squirrels and humans interacted as long ago as the mid to late Pleistocene. Historically, marmots were an important source of fat, fur, and meat for early Europeans and an important source of food in Asia. Mongolians did not use marmot skins traditionally but during the twentieth century marmot fur became fashionable in Europe. It is estimated that from 1906 to 1994, Mongolians prepared approximately 132,700 marmot skins per year.

Many of the ground squirrel species are considered agricultural pests. They raid crops, compete with domestic livestock for food, and dig burrows that are hazardous to livestock resulting in government sponsored large scale extermination programs.

Some ground-dwelling squirrels are vectors for human diseases such as Rocky Mountain spotted fever and the bubonic plague. Marmots in central Asia are a significant carrier of the plague and therefore a risk to marmot hunters. In Mongolia, marmot hunting is banned in areas known to have plague, yet, without hunting, marmot populations and the area of plague increase. At the same time, plague-free marmot populations are hunted and decreasing—therefore new management policies are required to reduce plague while conserving marmot populations.

An Olympic marmot (*Marmota olympus*) basking in the sun in Grand Valley, Idaho, USA. (Photo by Lee Rentz. Bruce Coleman, Inc. Reproduced by permission.)

1. Eastern chipmunk (*Tamias striatus*); 2. Least chipmunk (*Tamias minimus*); 3. Woodchuck (*Marmota monax*); 4. Arctic ground squirrel (*Spermophilus parryii*); 5. Black-tailed prairie dog (*Cynomys ludovicianus*); 6. South African ground squirrel (*Xerus inauris*). (Illustration by Brian Cressman)



1. Harris's antelope squirrel (*Ammospermophilus harrisii*); 2. Idaho ground squirrel (*Spermophilus brunneus*); 3. European ground squirrel (*Spermophilus citellus*); 4. Columbian ground squirrel (*Spermophilus columbianus*); 5. Vancouver Island marmot (*Marmota vancouverensis*); 6. Alpine marmot (*Marmota marmota*). (Illustration by Brian Cressman)

Species accounts

Arctic ground squirrel
Spermophilus parryii

TAXONOMY
Arctomys parryii (Richardson, 1825), Hudson Bay, Canada. Seventeen subspecies.

OTHER COMMON NAMES
English: Parka squirrel, Arctic souslik; French: Spermophile arctique; German: Arktisches Erdhörnchen; Spanish: Ardilla terrestre ártica.

PHYSICAL CHARACTERISTICS
Females: 13.7–16.7 in (34.8–42.5 cm), 17.8–35.6 oz (506–1,010 g). Males: 14.8–17.1 in (37.7–43.5 cm), 26.1–36.2 oz (740–1,026 g). Head and shoulders cinnamon or tawny colored; back is grayish or buffy brown with white spots. Melanistic forms that are completely black occur in high frequency in the south central Yukon Territory, Canada.

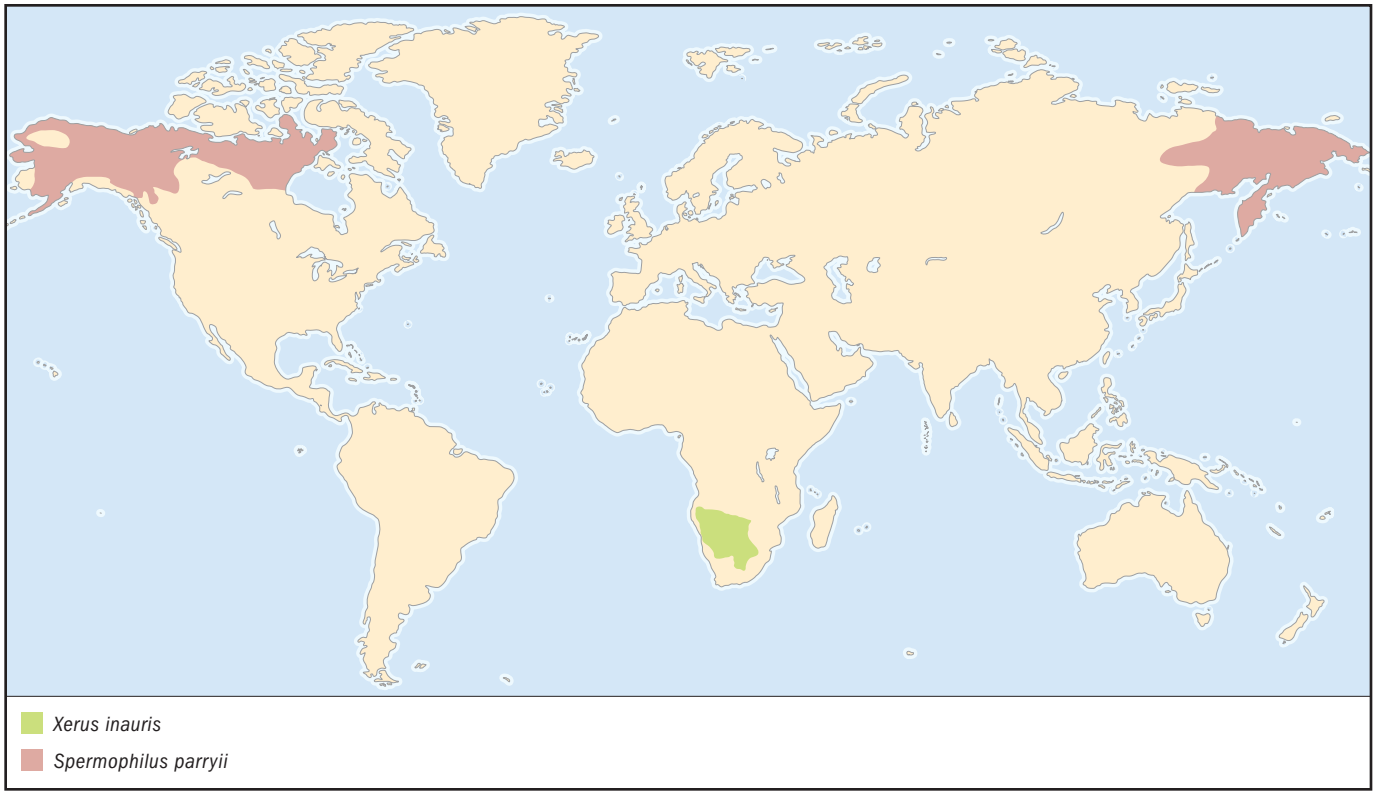
DISTRIBUTION
Eastern Siberia including the Kamtchatka peninsula; northwest North America from Alaska to Hudson Bay, Canada. In Canada, occurs as far south as northwest British Columbia.

HABITAT
Restricted to gravel and sandy areas with good drainage. In arctic habitats burrows are constructed along river banks, lake shores and on moraines and eskers; in alpine habitats, burrows are constructed on stream banks, slopes, and the leading faces of solifluction lobes; in the northern boreal forests, habitat preference is similar to that of the arctic and alpine habitats but also lives along forest edges and clearings.

BEHAVIOR
Lives in small clusters of related females that overlap with the home range of at least one territorial male. Males establish breeding territories immediately after emergence from hibernation in mid April and defend them aggressively against other males. Nearly half of the males die during this period. Males that survive disperse to new territories before hibernation. Juvenile dispersal is male biased and occurs before their first winter hibernation. Adult females enter hibernation beginning in August followed by adult males and juveniles through September.

FEEDING ECOLOGY AND DIET
Eats mainly forbs with a preference for legumes. Will prey upon lemmings (*Dicrostonyx torquatus*), newborn snowshoe hares (*Lepus americanus*), and birds' nests. Will consume insects and carrion. Males collect and cache seeds below ground for access during early spring.

REPRODUCTIVE BIOLOGY
Females emerge 2–3 weeks after males. Breeding occurs 3–4 days later during late April to early May. Nearly the entire population breeds, including yearlings. Promiscuous, but first



male sires approximately 90% of pups. Four to ten pups (maximum 12) are born in an underground natal chamber after 25 days gestation. Young appear above ground 27 days after birth.

CONSERVATION STATUS
Three subspecies restricted to a few islands off the coast of Alaska (*S. p. kodiacensis*, *S. p. lyratus*, and *Citellus undulatus nebulicola*) are classified by the IUCN as Data Deficient. Populations of subspecies *S. p. plesius* in the boreal forest cycle in abundance from 0.2 to 6.9 per acre (0.1 to 2.8 per ha) over an 8-year period. Local extinctions may occur when squirrels are at their cyclic low. Persistent organic pollutants and heavy metals have been detected in squirrels from northern Alaska but levels were low compared with other arctic species.

SIGNIFICANCE TO HUMANS
Northern indigenous people hunt squirrels for food and fur for clothing. ◆

Least chipmunk
Tamias minimus

TAXONOMY
Eutamias minimus (Bachman, 1839), Sweetwater County, Wyoming, United States. Twenty-two subspecies.

OTHER COMMON NAMES
English: Western chipmunk, little chipmunk; French: Tamia mineur; German: Kleiner Chipmunk.

PHYSICAL CHARACTERISTICS
Smallest squirrel. 7.2–9.4 in (18.3–23.9 cm); 1.3–1.8 oz (35.9–50.3 g). Varies in color seasonally and regionally. Yellowish gray to brownish gray. Three dark brown stripes on each cheek separated by two narrow white stripes running nose to ear. Dorsally there are five black stripes edged in brown and separated by four narrower gray stripes.

DISTRIBUTION
Throughout the boreal forests of Canada from the western Yukon to east of the Ontario-Quebec border and south through the Rocky Mountains to Arizona and New Mexico.

HABITAT
Primarily associated with open coniferous forests and forest edges but occurs in a wide range of other habitats including deciduous forests, sagebrush, riparian areas, and alpine tundra. Winter nests are constructed below ground for protection from cold. Summer nests can be in hollow logs, stumps, tree cavities, rock piles, under debris, or in excavated burrows. Entrances of excavated burrows are preferentially constructed under a rock or other object for protection.

BEHAVIOR
Active from late April or May to September. Gives a distinctive high pitched "chip-chip" call. While foraging among buried seed caches, these chipmunks will often urinate on the patch before leaving. A study at the University of Oklahoma by Lynn Devenport and others has shown that this behavior acts to deter the marker and other chipmunks from visiting that patch again. They believe that this increases foraging efficiency by advertising seed caches that are already depleted.

FEEDING ECOLOGY AND DIET
Forages primarily for seeds, nuts, berries, and acorns. Fruit and berries are harvested only for their seeds, the rest is discarded. Also will prey upon insects, bird's eggs, and chicks. Instead of storing fat like other hibernating rodents such as marmots, least chipmunks store seeds in their winter chamber. They interrupt torpor throughout the winter to feed from these seed caches.

REPRODUCTIVE BIOLOGY
Breeding occurs soon after emergence from hibernation. Gestation is 28–30 days. Litters with an average of 5 pups (maximum 7) arrive in mid-May. A second litter is attempted if the first one is lost.

CONSERVATION STATUS
Two subspecies are of special conservation concern because of their restricted distributions. *T. m. astristriatus* is classified as Critically Endangered and consists of a small population restricted to a single glacial cirque in New Mexico. *T. m. selkirki* classified as Vulnerable and is restricted to less than 40 mi^2 (100 km^2) within the Purcell Mountains in British Columbia, Canada.

SIGNIFICANCE TO HUMANS
None known. ◆

Woodchuck
Marmota monax

TAXONOMY
Mus monax (Linnaeus, 1758), Maryland, United States. Eleven subspecies.

OTHER COMMON NAMES
English: Groundhog, forest marmot, whistle pig; French: Marmotte commune; German: Waldmurmeltier; Spanish: Marmota canadiense.

PHYSICAL CHARACTERISTICS
16.5–26.2 in (41.8–66.5 cm), females 6.8–10.6 lb (3.1–4.8 kg); males 6.8–11.2 lb (3.1–5.1 kg). The underfur is gray with yel-

low tips, and the guard hairs are banded yellowish to reddish brown with white tips.

DISTRIBUTION
Central Alaska through Yukon and below Great Slave Lake, Northwest Territories to Labrador. The eastern range extends south to Georgia, Alabama, northwestern Louisiana, and Arkansas. The western range extends south through central British Columbia into northern Idaho.

HABITAT
Generally found in low elevation woodland-field ecotones, foraging in meadows, orchards, and pastures. Hibernacula preferentially constructed in soils with good drainage in hedgerows, woods, south-facing inclines, rocky areas, and even haystacks.

BEHAVIOR
The Latin word *monax* means solitary and is appropriately assigned to the woodchuck because it is the only asocial marmot except during breeding and raising of pups. Dominant males aggressively defend hibernacula of females while subordinate males are transient. Approximately 65% of juvenile females and 90% of juvenile males disperse before their first hibernation, the rest remain within the natal home range and disperse the following year. Activity peaks in mid-day during spring and late summer. Although the woodchuck can facilitate heat loss through their feet and nose they will avoid the afternoon heat during mid-summer by seeking refuge in their burrows.

FEEDING ECOLOGY AND DIET
Alfalfa, clover, and dandelions are highly preferred but also forage on a wide variety of other plants and grasses. They have also been observed foraging for bark, twigs, and leaves in various shrubs and trees. Invertebrates and birds' eggs are also eaten.

REPRODUCTIVE BIOLOGY
Breeding occurs shortly after emergence from hibernation, which varies from February to March in southern areas of its range (New York and Pennsylvania) and March to April in more northern areas (Ontario). Pregnancy rates are lower for yearling females (10–25%) than for adult females (56–80%). Gestation is 31–32 days. Only a single litter of 3.4 to 4.6 pups are born per year per female. Litters up to nine pups have been observed. Young are weaned at 44 days.

CONSERVATION STATUS
Not threatened. Populations have proliferated in response to agriculture.

SIGNIFICANCE TO HUMANS
The woodchuck is celebrated annually in North America on Groundhog Day, February 2, for its spring prophecy. The folklore is that if the woodchuck sees its shadow on that day then the woodchuck will stay above ground because spring is close. If the woodchuck see its shadow, it will return to its den since there will be another six weeks of winter. Woodchucks are used as an animal model in studies of many human medical concerns in metabolism, endocrinology, reproduction, and neurology. They are used extensively in research on the hepatitis B virus (HBV) that can cause chronic liver damage in humans. A related virus known as woodchuck hepatitis virus causes a similar disease in woodchucks as HBV does in humans and therefore serves as a good animal model for studying infection and treatments of HBV in humans. Woodchucks are considered an agricultural pest. ◆

Eastern chipmunk
Tamias striatus

TAXONOMY
Sciuris striatus (Linnaeus, 1758), Upper Savannah River, South Carolina, United States. Eleven subspecies.

OTHER COMMON NAMES
English: Chipping squirrel; French: Suisse, tamia rayé, tamia strié; German: Östliches Chipmunk.

PHYSICAL CHARACTERISTICS
Largest chipmunk. 8.9–10.6 in (22.5–26.8 cm); 2.8–4.4 oz (80–125 g). Grayish to reddish brown with five black stripes from neck to base of tail. Two lateral black stripes are separated by a cream-colored stripe while the median stripe is bordered on each side by a grayish to reddish orange stripe.

DISTRIBUTION
Ranges from southern Manitoba east to Nova Scotia and from James Bay south to the states bordering on the gulf of Mexico.

HABITAT
Mainly lives in deciduous forests with cover provided by rocks, stumps, logs, banks, bushes, and brush piles, but will live in more open bushy areas. Extensive burrow systems are constructed below ground.

BEHAVIOR
A solitary chipmunk with only one individual in a burrow system except when offspring are present. Home ranges, 0.07 to 1.0 acre (0.03–0.40 ha), overlap but core areas are defended by their owner with short chases of the intruder. Natal dispersal is male biased such that only 15% of juvenile males settle near their mothers while 26% of females settle within one home range of their mothers.

FEEDING ECOLOGY AND DIET
Diet consists mainly of seeds, nuts, and vegetation but will also eat fungi, invertebrates, amphibians, snakes, birds, and other small mammals. Although chipmunks hibernate, they do not store energy for hibernation as fat, but instead they hoard large quantities of seeds and nuts from oak, beech, and maple from which they will forage from intermittently during the winter. Chipmunks can accumulate up to 165 acorns per day and they store far more acorns then is required for hibernation. At peak hoarding periods during late September to early October, the entire hibernation energy budget equivalent in acorns can be accumulated in only one to two days. This surplus food may be important for many reasons, such as insurance against spoilage or pilfering, or as a supplemental source of food during reproduction or possibly a subsequent hibernation period.

REPRODUCTIVE BIOLOGY
Breeding occurs between late February and April and again from late June to early July. Gestation is 31–32 days with litter size averages of four to five. Juveniles emerge from their natal burrows 5–7 weeks after birth. Adult size is reached within three months. Reproductive maturity is usually not obtained until after their first winter hibernation, however, some early born females can breed in the same year.

CONSERVATION STATUS
Not threatened. Responses of chipmunks to forest fragmentation are mixed however, studies showing negative responses point out the importance of maintaining or creating movement corridors.

SIGNIFICANCE TO HUMANS
None known. ◆

South African ground squirrel
Xerus inauris

TAXONOMY
Xerus inauris Zimmermann, 1780, 100 mi (160 km) north of Cape of Good Hope, South Africa. Seven subspecies.

OTHER COMMON NAMES
English: Cape ground squirrel; French: Écureuil foisseur de cap; German: Kap-erdhornchen.

PHYSICAL CHARACTERISTICS
11–15 in (28–38 cm); 1.1–2.4 lb (500–1,100 g). Tawny-yellow with a lateral white stripe on either side. Tail hairs have two dark bands.

DISTRIBUTION
Range includes Namibia, Botswana, Zimbabwe, and South Africa.

HABITAT
Open arid country with compacted sandy areas for digging communal burrows.

BEHAVIOR
South African ground squirrels do not hibernate. They are highly social, living in kin groups of one to three adult females and usually two to three, but up to nine male and/or female subadults. This species is interesting in that mature males form their own groups, referred to as bands, which can include up to 19 individuals. These bands roam over a home range that is shared with several groups. This is an unusual behavior in mammals because of typical male competition for females. Survival advantages of group living for detection and deterrence of predators outweigh the disadvantages to breeding opportunities from competition.

FEEDING ECOLOGY AND DIET
Diet of grasses, shrubs, roots, bulbs, seeds, and fruit. Also eats insects.

REPRODUCTIVE BIOLOGY
Breeding is asynchronous and can occur at any time of the year although fewer litters appear above ground from July through October. Gestation is 48 days and juveniles are weaned 52 days later. Litter sizes at emergence from the natal burrow range from one to three pups. Females become reproductively mature at age of ten months. Males become reproductive mature earlier at about 8 months. Females are capable of breeding several times during the year but fewer than 10% actually wean more than one litter during a year.

CONSERVATION STATUS
Not threatened.

SIGNIFICANCE TO HUMANS
None known. ◆

Black-tailed prairie dog
Cynomys ludovicianus

TAXONOMY
Arctomys ludoviciana (Ord, 1815), Upper Missouri River. Seven subspecies.

OTHER COMMON NAMES
French: Chien de prairie, cynomys social; German: Schwarz-schwanz-Präriehund; Spanish: Perrito de la pradera.

PHYSICAL CHARACTERISTICS
14.0–15.7 in (35.5–39.8 cm); males: 26.5–31.9 oz (750–905 g), females 24.3–28.9 oz (689–819 g). Brown or reddish brown, whitish below.

DISTRIBUTION
In Canada, restricted to southern Saskatchewan. In the United States, exists from Montana east to eastern Nebraska and as far south as Mexico; extirpated from Arizona.

HABITAT
Prefers open, flat, and arid short-grass plains. Can live in tall-grass prairies where grazing by other animals has lowered vegetation height.

BEHAVIOR
Live in family groups called coteries that are typically composed of a single adult male, two or three adult females and several nonbreeding yearlings and juveniles. Black-tailed prairie dogs do not hibernate for the winter but instead enter short one to three day torpor periods when under extreme cold and food deprived conditions.

FEEDING ECOLOGY AND DIET
Diet consists mainly of grasses, but other forbs are also eaten. Dietary preferences vary seasonally with strong preferences for prickly pear (*Opuntia*) during winter possibly because of its high lipid content relative to other plant species during winter.

REPRODUCTIVE BIOLOGY
Breeding is synchronous and occurs from February to March. Gestation is 35 days. Average length of lactation is 43 days but varies with litter size from 37–51 days. Average litter size of emerging pups is 3.1 and varies from one to six. Generally, prairie dogs are not sexually mature until after their second winter, although 9% of females and 2% of males breed as yearlings.

CONSERVATION STATUS
Although estimates of the historical habitat area occupied by black-tailed prairie dogs varies from 99 million to 384 million acres (40–155 million ha), the United States Fish and Wildlife Service in 2002 estimated the occupied habitat in 2001 at 1.4 million acres (0.6 million ha) indicating that less than 1.5% of the historical range is occupied. From 2000 to 2002, the United States Fish and Wildlife Service has identified the black-tailed prairie dog as a candidate for listing as threatened under the U. S. Endangered Species Act. In Canada, the species has been listed as Special Concern from 1978 to 2000 by the Committee on the Status of Wildlife in Canada (COSEWIC). Internationally, the IUCN lists the species as Lower Risk/Near Threatened as of 1998. Prairie dogs were initially threatened from 1880 to 1920 by conversion of grassland to prairie and from 1918 to 1972 by widespread chemical control to reduce competition between prairie dogs and livestock. The greatest threat from the late 1980s to 2001 has been sylvatic plague, an exotic disease first accidentally introduced in the early 1900s.

SIGNIFICANCE TO HUMANS
Viewed as a pest by ranchers and farmers because of threat of burrow to livestock and competition with livestock for food. In prairie dog towns, plant productivity and quality is better and wild ungulates prefer to graze there. ◆

European ground squirrel
Spermophilus citellus

TAXONOMY
Mus citellus (Linnaeus, 1766), Wagram Niederosterrich, Austria. Nine subspecies.

OTHER COMMON NAMES
English: European souslik; French: Souslik d'Europe, souslik tacheté; German: Europäischer Ziesel, Perlziesel; Spanish: Ardilla terrestre, suslik europeo.

PHYSICAL CHARACTERISTICS
8.4–12.0 in (21.4–30.4 cm), 6.3–12.3 oz (180–350 g). Yellow-gray with small dense cream-colored spots on back. Yellow underneath.

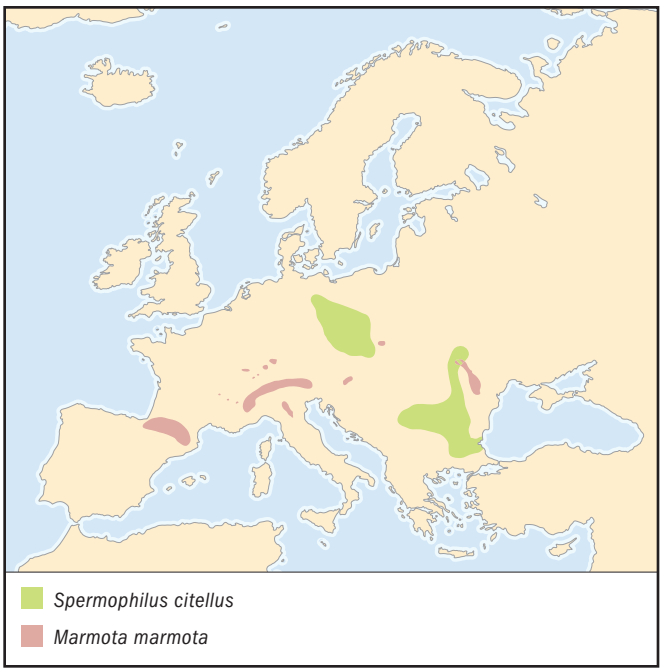
DISTRIBUTION
Central southeast Germany to western Ukraine.

HABITAT
Steppe and open woodland.

BEHAVIOR
A relatively asocial and non-territorial species that lives in loosely structured populations. More than 60% of the population is female because of higher mortality of juvenile and yearling males during hibernation and dispersal. Hibernation begins in late August–September and ends late March–April.

FEEDING ECOLOGY AND DIET
Primarily grasses and other herbs.

REPRODUCTIVE BIOLOGY
A polygynous mating system where males scramble for access to females shortly after the females emerge from hibernation. Females will mate with only one male during the annual 3- to 4-week breeding period. Gestation is 25 days. Litter size at emergence is 4–11. Lactation is approximately 30 days. Sexual maturity is obtained after the first hibernation. All adult males



and 78–90% of yearling males are capable of reproducing during the breeding season. More than 90% of yearling and adult females breed, although only about a third successfully wean their litter.

CONSERVATION STATUS
Assessed as Vulnerable in 1996 by the IUCN. Major threat is the loss of habitat from agricultural practices.

SIGNIFICANCE TO HUMANS
Considered an agricultural pest during second half of twentieth century. ◆

Harris's antelope squirrel
Ammospermophilus harrisii

TAXONOMY
Spermophilus harrisii Audubon and Bachman, 1854, Santa Cruz county, Arizona, United States. Two subspecies.

OTHER COMMON NAMES
English: Yuma antelope squirrel; German: Harris-Antilopen Zeisel.

PHYSICAL CHARACTERISTICS
9.0–9.7 in (22.9–24.6 cm), 4.3–5.3 oz (122–150 g). Brown to dark gray in winter, lighter in summer. White stripe along each side. No white under tail unlike the other *Ammospermophilus* sp.

DISTRIBUTION
Southern Arizona, extreme southwest New Mexico, and northwest Mexico.

HABITAT
Various open and sparsely vegetated desert habitats. Habitats include sandy, gravely, pebbly, and rocky substrates with various desert plant communities of grasses, shrubs, and cacti.

BEHAVIOR
An asocial species that is active all year, although may remain below ground during cold weather feeding on stored seeds. Often seen standing vigilant on top of cacti *Opuntia*.

FEEDING ECOLOGY AND DIET
Feeds on fruit, seeds, and fleshy parts of cacti, and seeds of shrubs. Seeds are transported in cheek pouches to burrows for consuming when environmental conditions are poor.

REPRODUCTIVE BIOLOGY
The mating system has not been described. Breeding period typically February to March but may be as early as December. Gestation is 30 days. Litters of 6–7 young emerge from natal burrows at 4–5 weeks and are weaned at 7 weeks. Sexual maturity is reached after first winter. Usually a single litter per year, sometimes two.

CONSERVATION STATUS
Listed as Imperiled in New Mexico by the New Mexico Natural Heritage Program in 1997.

SIGNIFICANCE TO HUMANS
Considered an agricultural pest. ◆

Vancouver Island marmot
Marmota vancouverensis

TAXONOMY
Marmota vancouverensis Swarth, 1911, Mt. Douglas, Vancouver Island, British Columbia.

OTHER COMMON NAMES
French: Marmotte de l'île Vancouver; German: Vancouver-Murmeltier.

PHYSICAL CHARACTERISTICS
Males: 27.4 in (69.5 cm), 7.7–15.0 lb (3.5–6.8 kg); females: 26.0 in (66.1 cm), 6.6–14.3 kg (3.0–6.5 kg). Dark brown fur fades during summer to a cinnamon color. Adults have dark and lighter brown patchy appearance during molt. White patches on chest, nose, and chin, and white streak on top of head.

DISTRIBUTION
Restricted to Vancouver Island, British Columbia, Canada.

HABITAT
Meadows and open forests from 3,600–3,750 ft (1,100–1,140 m) but will live at lower elevations above 2,300 ft (700 m) in clearings created by forests harvesting.

BEHAVIOR
The social structure of the Vancouver Island marmot is not well known. It is a highly social marmot that lives in colonies in natural subalpine and clearcut areas. A colony may be composed of one or more family groups. Colonies of adults, subadults, yearlings and juveniles in natural subalpine areas can have up to 15 individuals and in clearcut areas up to 27. A particular vocalization "kee-aw" is unique among the marmots.

FEEDING ECOLOGY AND DIET
Diet is mostly forbs and grasses, but will also eat ferns and some berries. Diet varies seasonally with grasses being dominant in early spring and forbs dominant during summer.

REPRODUCTIVE BIOLOGY
Litter size averages 3.4 with a range of 2–5. Average age of first reproduction is four years but can reproduce at age three. Although females are capable or producing litters in subsequent years, most females produce litters in alternate years.

CONSERVATION STATUS
Classified as Endangered by the IUCN and Committee on the Status of Endangered Wildlife in Canada (COSEWIC). According to the Vancouver Island Marmot Recovery Foundation only 25 marmots were known to exist in the wild in fall of 2002. Captive breeding programs began in 1997 for future reintroduction. As of fall 2002, 63 marmots were distributed among facilities in Toronto, Calgary, Vancouver, and on Mt. Washington on Vancouver Island for future reintroduction. The reason for the decline is not certain but may involve one or more factors including the gradual reduction of alpine habitat with climate change, landscape change from forestry practices, and changes in number or behavior of predators.

SIGNIFICANCE TO HUMANS
None known. ◆

Alpine marmot
Marmota marmota

TAXONOMY
Mus marmota (Linnaeus, 1758), Swiss Alps. Six subspecies.

OTHER COMMON NAMES
French: Marmotte des Alpes; German: Alpenmurmeltier; Spanish: Marmotta alpina.

PHYSICAL CHARACTERISTICS
Males: 26 in (67 cm); Males 5.1–12.6 lb (2.3–5.6 kg); females: 5.2–11 lb (2.3–4.9 kg). Fur color varies among populations from gray to red and sometimes blond. A white bridge occurs on the nose.

DISTRIBUTION
Swiss, Italian, and French Alps; western Austria and southern Germany; and Carpathian and Tatra Mountains. Has been introduced into French Pyrennes, eastern Austria, and former Yugoslavia.

HABITAT
Lives in subalpine clearings and alpine from 4,300 to 9,800 ft (1300–3000 m). Prefers southern exposures.

BEHAVIOR
Lives as family groups typically composed of an adult pair and their offspring, which can include newborn to up to 4-year old offspring. Hibernates from September to mid-April or May as a family group. Juveniles benefit from hibernating in a group especially in the presence of older male siblings. Closely related subordinate males assist in thermoregulating their younger offspring. Groups with only the adult pair and a litter of juveniles have a greater probability of dying out over winter.

FEEDING ECOLOGY AND DIET
Feeds on a wide variety of leaves and flowers of herbaceous plants and grasses.

REPRODUCTIVE BIOLOGY
Breeding occurs once a year a few days after emergence from hibernation. Gestation is 33–34 days. Average litter size of 3–4 with range of 1–7. Weaned at 40 days. Reproductively mature at two years old but reproduction in mature offspring of both sexes is suppressed by the parent of the same sex as long as the offspring remains in the family group. Monogamy is the dominant mating system for Alpine marmots in the French Alps, dominant males sire only two thirds of litters, the other litters are likely sired by lone males living outside of the family group.

CONSERVATION STATUS
Not threatened.

SIGNIFICANCE TO HUMANS
Evidence of the use of Alpine marmots by humans dates to the mid to late Pleistocene. In Europe they have been a source of fur, meat, and fat during most of the last millenium. However, as agriculture increased over the last 500 years marmots were less relied on as a source of food for people. Instead, they were considered agricultural pests and a source of food for shepherd's dogs. In an age of ecotourism, the Alpine marmot is a symbol of the Alps. Nowhere is this more evident then on Mount Roches de Nayes, near Montreux, Switzerland, where you will find an education facility built in 2001 that showcases the Alpine marmot and other marmots of the world. ◆

Columbian ground squirrel
Spermophilus columbianus

TAXONOMY
Arctomys columbianus (Ord, 1815), between the forks of the Clearwater and Kooskooskie Rivers, Idaho County, Idaho, United States. Four subspecies.

OTHER COMMON NAMES
French: Spermophile du Columbia; German: Columbia Ziesel.

PHYSICAL CHARACTERISTICS
12.8–16.1 in (32.5–41.0 cm), males: 14.3–24.7 oz (405–699 g); females: 12.2–18.7 oz (347–529 g). Nose and face are tawny and body is grayish to tawny, belly and feet are cinnamon.

DISTRIBUTION
Rocky Mountains of eastern British Columbia and western Alberta. South along the Rocky Mountains into western Montana and central Idaho. Lives as far west as south central British Columbia, eastern Washington, and northeastern Oregon.

HABITAT
Subalpine to alpine meadows with sandy to coarse substrates for burrowing. Prefers to hibernate in areas where snow accumulates, such as in shallow depressions, or under shrubs.

BEHAVIOR
Lives in clusters of related females that overlap in range with an adult male. Male home ranges overlap some but during the breeding season they defend a core territory that includes several reproductively mature females. Females will defend the natal burrow of pre-weaned young from all other squirrels, including the adult male. Dispersal is male-biased and occurs after a squirrel's first hibernation. Hibernation is from August–October to April. Adults are active above ground for approximately 100 days.

FEEDING ECOLOGY AND DIET
Polygymous. Consume a variety of forbs and grasses with preference for forbs. Will consume invertebrates and carrion. Males will cache seeds in the fall for consumption in early spring.

REPRODUCTIVE BIOLOGY
Breeding commences a few days after females emerge from hibernation. Gestation is 24 days and lactation lasts for about 30 days. A single litter per year averages 2.3–4.6 pups with a maximum of 7. Only about 15% of yearling females breed on average but more can breed if spring conditions are good.

CONSERVATION STATUS
Not threatened.

SIGNIFICANCE TO HUMANS
Considered an agricultural pest that competes with livestock for food. Intermediate host for the Rocky Mountain wood tick (*Dermacentor andersoni*), which can carry Rocky Mountain spotted fever in the United States. Can also carry the bubonic plague *Yersinia pestis*, which can be transmitted to humans through flea bites. ◆

Idaho ground squirrel
Spermophilus brunneus

TAXONOMY
Spermophilus brunneus Howell, 1928, Adams County, New Meadows, Idaho. Two subspecies.

OTHER COMMON NAMES
None known.

PHYSICAL CHARACTERISTICS
8.2–10.2 in (20.9–25.8 cm), 3.5–4.6 oz (99–131 g). Brown with small white spots. Legs, nose, and underneath of tail are rufous. Has prominent whitish eye ring.

DISTRIBUTION
Endemic to west central Idaho, United States.

HABITAT
Northern population lives in xeric meadows at 3,800–5,100 ft (1,150–1,550 m) surrounded by forest of Ponderosa pine and Douglas fir. Southern population lives in xeric meadows at 2,200–3,200 ft (670–975 m). Digs burrows often under rocks and logs in well-drained soils.

BEHAVIOR
An asocial species in which there is no association between males and females except for breeding. Young of both sexes disperse within several days after emerging from their natal chambers. The southern population at lower elevation is active above ground from late January–early February to late June–early July. The season is approximately 6–8 weeks later at the northern high elevation population.

FEEDING ECOLOGY AND DIET
Preferences for herbaceous leaves, flowers, bulbs and grasses. Diet shifts towards seeds later in the season. Will eat invertebrates and fungi.

REPRODUCTIVE BIOLOGY
Mating occurs shortly after emergence from hibernation. During the breeding season, males over two years old guard sexually receptive females from other males until they are mated, then they may search for other receptive females. Gestation is approximately three weeks and litters are weaned in approximately another three weeks. Average litter size is five but can be as high as 10.

CONSERVATION STATUS
The IUCN has classified the northern population (*S. b. brunneus*) as Critically Endangered, and the southern population (*S. b. endemicus*) as Vulnerable. According to Sherman and Runge in 2002, who studied the northern population from 1987 to 1999, the likely explanation for its collapse is a combination of fire suppression, exotic grasses, drying, and grazing that have reduced native seeds that are a critical component of their diet. The northern subspecies (*S. b. brunneus*) was listed as Threatened under the United States Endangered Species Act in April 2000. The southern subspecies (*S. b. endemicus*) was listed as a candidate for listing by the United States Fish and Wildlife Service in 2001.

SIGNIFICANCE TO HUMANS
None known. ◆

Common name / Scientific name/ Other common names	Physical characteristics	Habitat and behavior	Distribution	Diet	Conservation status
Yellow-bellied marmot *Marmota flaviventris* French: Marmotte à ventre fauve; German: Gelbbäuchiges Murmeltier	Yellow-brown to tawny with yellow or orange to russet belly. Cream colored bar across nose. Body length 18.5–27.6 in (47–70 cm), male weight 6.5–11.5 (3.0–5.2 kg), female weight 3.5–8.7 lb (1.6–4.0 kg).	Female kin groups with a dominant territorial male. Half of daughters remain in group, all sons disperse. Lives on 0.5–17.8 acre (0.2–7.2 ha) habitat patches of well drained soils, rocky outcrops, or boulders in open meadows from valley bottoms to alpine.	In Canada only in south-central British Columbia and extreme southern Alberta. In the United States from central Washington east to central Montana and south to mountains of central California and northern New Mexico.	Selectively forage among a variety of forbs and grasses.	Not threatened
Siberian chipmunk *Tamias sibiricus* English: Burunduk; French: Ecureuil rayé de Sibérie Burunduk, Sibirisches; German: Streifenhörnchen; Spanish: Ardilla terrestre de Siberia	Brown-gray to ochre-yellow with five black stripes separated by four lighter stripes running from neck to tail. Body length 4.8–6.8 in (12–17 cm), tail 3.2–4.6 in (8–11.5 cm), weight 1.8–4.3 oz (50–120 g).	Deciduous and coniferous forests. Can climb trees but spends most of time on ground. Nests in lodges constructed on the ground. Hibernate in pairs from October to April in underground burrows under tree roots or stumps.	Forests of northern Europe through Asia to Japan.	Variety of vegetables, seeds, nuts, berries, tree and shrub buds, and mushrooms. Will raid birds' nests for eggs and chicks. Also eats invertebrates, amphibians, and reptiles.	Not threatened
Hoary marmot *Marmota caligata* English: Mountain marmot, whistler; French: Marmotte des Rocheuses, marmotte grise, siffleux; German: Eisgraues Murmeltiere	Color varies widely over its range. Silver gray from shoulder to shoulder. Rump varies from blond, brown, to silver gray. Feet always black. A melanistic subspecies *M. c. vigilis* lives in Glacier Bay Alaska. Body length 26.8–29.6 in (68–75 cm), male weight 9.0–17.6 lb (4.1–8.0 kg), female weight 7.3–15.9 lb (3.3–7.2 kg).	Subalpine to alpine meadows with talus, boulders, or rocky cliffs. Near sea level in south-central Alaska. Lives and hibernates (September–May) as family groups (2–35 marmots) of one to four females with offspring (0–4 years old) and one adult male.	Alaska, United States, Yukon, and Northwest Territories, Canada, south along the Coastal and Rocky Mountains of Canada and the United States to eastern Washington, central Idaho, and western Montana.	Leaves, flowers, and seeds from a variety of forbs and grasses.	Two subspecies, *M. c. sheldoni* and *M. c. vigilis,* are listed as Data Deficient

[continued]

Common name / Scientific name/ Other common names	Physical characteristics	Habitat and behavior	Distribution	Diet	Conservation status
Unstriped ground squirrel *Xerus rutilus* French: écureuil foisseur; German: Erdhornchen	Pale tan to brown fur with whitish eye ring. Body length 12.6–17.3 in (32.0–44.0 cm), 9.2–14.8 oz (260–420 g).	Bushland thickets to savanna in arid and semi-arid environments. Isolated burrow systems are occupied by one to six squirrels. Non-hibernating.	East Africa from north-eastern Tanzania north to northeastern Sudan and east to Somalia.	Seeds, fruits, herbaceous material, and invertebrates.	Not listed by IUCN
Black-capped marmot *Marmota camtschatica* French: Marmotte du Kamtchatka; German: Kamtschatka Murmeltiere	Brownish fur with black spot from the nape to the head. Body length 17.1–21.4 in (42.7–53.5 cm), tail length 4.8–7.1 in (12–17.7 cm), weight 4.4–8.8 lb (2–4 kg).	Alpine and arctic tundra areas where permafrost is absent. Hibernate as family groups from mid-September to May.	Eastern Siberia.	Variety of plants, some invertebrates, and small mammals.	Not listed by IUCN, though listed as Vulnerable in the Red Book of Yakutia because of declining populations
Red-tailed chipmunk *Tamias ruficaudus* French: Tamia à queue rousse; German: Rotschwanz-Streifenhörnchen, Rotschwanz Chipmunk	Deep orange-brown with five black to fuscous stripes separated by four grayish to tawny and creamy white stripes running from neck to tail along back. Body length 8.8–9.8 in (22.3–24.8 cm), weight 1.9–2.1 oz (55.2–60.4 g).	Dense coniferous forests with shrubby undergrowth. Nest in tree branches up to 60 ft (18.3 m), bushes, in rock crevices, under logs, or underground.	Rocky Mountains of southeastern British Columbia and south-western Alberta, Canada, and from north-eastern Washington to western Montana, United States.	Variety of seeds and fruit from conifers, shrubs, and grasses. Also eats leaves and flowers of some herbaceous plants. Will eat meat.	Not listed by IUCN
Richardson's ground squirrel *Spermophilus richardsonii* English: Flickertail, picket pin; French: Spermophile de Richardson; German: Richardson's Ziesel	Pinkish buff or cinnamon buff shaded with fuscous, light spots on back. Body length 10.9–12.0 in (27.7–30.6 cm), male weight 9.2–23.6 oz (260–670 g), female weight 6.3–18.3 oz (180–520 g).	Open short-grass plains and croplands. Females and daughters will share a home range. Male home ranges only overlap during breeding. Active above ground typically March through September but varies regionally.	Central Alberta, Canada, western Montana to western Minnesota, United States.	Variety of leaves, flowers, and seeds. Also eats invertebrates and carrion.	Not listed by IUCN
Golden-mantled ground squirrel *Spermophilus lateralis* English: Copperhead; French: Spermophile à mante dorée; German: Geldmeantel-Ziesel, Gelgestreiftes Backenhörnchen	Tawny gray with reddish shoulders and russet mantle over the head. A whitish stripe bordered by two black stripes run down each side. Body length 9.3–11.6 in (23.5–29.5 cm), weight 4.2–12.0 oz (120–340 g).	Open coniferous forests, sparsely bushy areas in foothills, mountain slopes, rocky sagebrush country, and alpine tundra. Nests in burrows under rocks, stumps, logs, trees, bushes or in rock crevices. Active from late March–May to late August–November depending on elevation.	Rocky Mountains of Canada and south to New Mexico, United States. West to northern California and east to central Colorado.	Nuts, forbs, and invertebrates. Will raid nests for eggs and chicks.	Not listed by IUCN, though the subspecies *S. l. wortmani* is listed as Data Deficient
Long-clawed ground squirrel *Spermophilopsis leptodactylus* French: Spermophile leptodactyle; German: Langkrallenziesel	Body: 7.9 to 11.8 in (20 to 30 cm); tail: 2.8 to 3.9 in (7 to 10 cm).	Lives and hibernates in small family groups. Desert dwelling on stationary sand dunes.	Southeast Kazakstan, Turkmenistan, Uzbekistan, west Tadzhikistan, northeast Iran, and northwest Afghanistan.	Fruits, seeds, bulbs, and vegetation of desert plants. Also eats invertebrates.	Not listed by IUCN
Barbary ground squirrel *Atlantoxerus getulus* French: Écureuil foisseur de Barbarie, écureuil terrestre nord-Africain; German: Barbarie-Erdhornchen, Atlashörnchen Spanish: Ardilla mora	Body: 8.7 to 17.7 in (22 to 45 cm); tail: 7.9 to 9.8 in (20 to 25 cm), 10.6 to 38.8 oz (300 to 1,100 g). Short, coarse-textured hair; little hair on underside; white stripe down either side of body; whitish eye ring; black and white banded bushy tail.	Colonial in rocky areas with scattered trees and shrubs; lives up to 12,800 ft (4,000 m). Uncertain, but may hibernate at high elevations.	Atlas Mountains in Morocco and western Algeria in northern Africa.	Nuts and seeds.	Not threatened
Gunnison's prairie dog *Cynomys gunnisoni* German: Gunnison's-Präriehund, Weißschwanz-Präriehund	12.2 to 14.7 in (30.9 to 37.3 cm); 8.8 to 38.9 oz (250 to 1,100 g). Yellow buff intermixed with black hairs; white-tipped tail.	Live in clans that average about five individuals (range 1–19) with one or two breeding males, and several breeding females, and one or more non-breeding yearling males. Open habitats or with scattered shrubs and conifers. Active March to October.	The region where Utah, Colorado, New Mexico, and Arizona, United States, meet at elevations of 6,000 to 12,000 ft (1,840 to 3,660 m).	Grasses, forbs, sedges, and shrubs. Also eats invertebrates.	Not threatened

[continued]

Common name / Scientific name/ Other common names	Physical characteristics	Habitat and behavior	Distribution	Diet	Conservation status
Nelson's antelope squirrel *Ammospermophilus nelsoni* English: San Joaquin antelope squirrel; German: Nelson-Antilopen Zeisel	9.1 to 10.5 in (23.0 to 26.7 cm); 5.4 oz (154 g). Tawny-yellow with a white stripe down either side.	Live in scattered colonies of six to eight individuals. Found on open, rolling hills with gentle slopes, on fine textured soils that allow digging. Prefers to use burrows under shrubs dug by other animals. Adults may estivate during summer.	San Joaquin Valley of California, United States.	Feeds on insects (>90% of diet) from March to December during dry season. Eats grasses, forbs, and seeds at other times.	Endangered
Uinta ground squirrel *Spermophilus armatus*	11.0 to 11.9 in (28.0 to 30.3 cm), 7.4 to 15.2 oz (211 to 430 g). Buff-brown with paler undersides, cinnamon face.	Group together in large open areas such as meadows, pastures, or fields in high valleys to tree line, or shrub-steppe habitats. Individuals intolerant of one another except during breeding. Hibernation from August to April; may estivate in hot and dry areas in summer.	Western Montana to central Idaho, western Wyoming to southeast Idaho, United States.	Grasses, forbs, grass seeds, sagebrush leaves, and earthworms.	Not threatened
Belding's ground squirrel *Spermophilus beldingi* German: Belding Zeisel	9.1 to 11.8 in (23.0 to 30.0 cm), 4.4 to 19.4 oz (126 to 550 g). Gray with cinnamon on underside and reddish-brown on back; black-tipped tail.	Alpine, subalpine meadows, sage-brush flats, mixed brush and grass habitats, fields and pastures. Active from April to May through September. Lives in groups of related females and daughters; all males disperse.	Northeast Oregon south to California, southwest Idaho to central Nevada; and extreme northwest Utah, United States.	Grasses, forbs, and seeds. Also will eat invertebrates, other vertebrates, carrion, and will kill and eat young Belding's ground squirrels.	Not threatened
Allen's chipmunk *Tamias senex* English: Shadow chipmunk	9.0 to 10.3 in (22.9 to 26.1 cm), males: 2.4 to 3.5 oz (67to 99 g); females: 2.6 to 3.8 oz (73 to 108 g). Color varies regionally; grayish to brownish-orange with indistinct stripes except for middle dorsal stripe which is more conspicuous.	Dense coniferous forests. After accumulating 20% of its body mass in fat it hibernates from November through March.	Central Oregon south to east-central California; west to northwest California and east to California-Nevada border, United States.	Fungi, seeds, flowers, and insects.	Not threatened

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