



MAMMALS
OF
MOUNT RAINIER
NATIONAL PARK

by

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MAMMALS
of
MOUNT RAINIER NATIONAL PARK

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FOREWORD

There are few places remaining in this country today where one may observe wild animals in a natural setting, free to move about, unrestricted by bars or enclosures, and exhibiting little of the instinctive fear of man instilled through many wildlife generations by the advance and expansion of settlement and civilization.

The national parks are among the greatest wildlife sanctuaries of the world. Most wild creatures are quick to recognize the protection afforded by such a refuge, and thus become less shy and elusive than they are elsewhere. As a result of protection, it is not difficult to attain an acquaintance with these wilderness folk.

To know Nature in her various forms is to increase appreciation of the natural scene. It is for this purpose that *Mammals of Mount Rainier National Park* has been written, the third of a series published by the Mount Rainier Natural History Association.

JOHN C. PRESTON

Superintendent

Mount Rainier National Park

United States Department of the Interior

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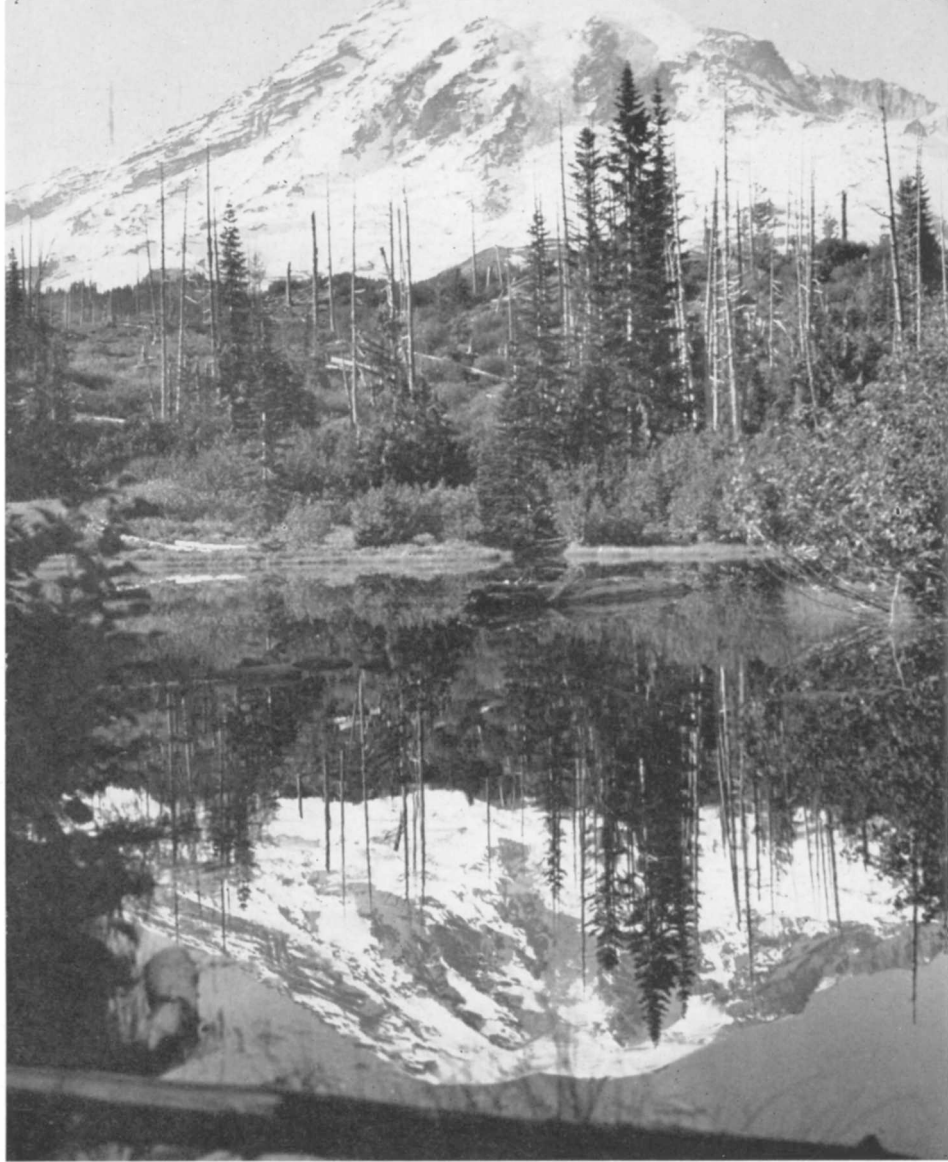
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Bench Lake, Hudsonian life zone lakeshore-fireburn habitat. This type of cover is extensively utilized in summer by the coyote and black-tailed deer, and on the southern exposures by the Hollister chipmunk and mantled ground squirrel. The lake shore is favored by the water-loving shrews.

THE MAMMALS OF MOUNT RAINIER NATIONAL PARK

INTRODUCTION

In looking back through the years during which mammal studies have been carried on at Mount Rainier, three periods stand out in which considerable field research was accomplished. The first of these was in July and August, 1897, when a party headed by Dr. C. Hart Merriam, Vernon Bailey, Dr. A. K. Fisher and Walter K. Fisher made the first field studies of the mammals of the park. Following this very important piece of work there was a lull in field activities until the summer of 1919 when a party working under the auspices of the National Park Service and the Bureau of Biological Survey conducted studies on the local bird and mammal populations. In this party were such well known scientists as Dr. Walter P. Taylor, in charge, George G. Cantwell, Stanley G. Jewett, Professor J. B. Flett, Professor William T. Shaw, Professor J. W. Hungate and Mr. and Mrs. William L. Finley. Upon the completion of this study there was again a long period in which little of a systematic nature was accomplished. The last period of note came during the years 1934-1936 when Mr. E. A. Kitchin, a member of the Wildlife Division of the National Park Service, supervised field studies in various portions of the park. Many of these studies were concerned with observational data rather than extensive collecting. For the next few years only brief observations from members of the park staff were added to the park records. Then, during the summer of 1947, special studies were begun by the Naturalist Staff on the status of the mountain goat and the problems arising from a foot disease that occurred in the deer population. It is planned that other special studies shall be carried on in future years, designed to clarify the status of other important mammalian species in the park.

Because of the extensive data that have slowly accumulated through the years since the 1919 survey, the need for a publication to bring all information up to date has become increasingly apparent. This booklet is designed to answer that need.

The sequence of species used brings many of the larger animals ahead of the smaller and more obscure kinds, and thus

does not in many cases follow in systematic order. However, it is felt that the order used best meets the needs in a publication of this type. Common names selected are those most generally accepted for the animals in question.

WILDLIFE TRENDS

When the first wildlife survey was made in 1897 it is likely that the conditions of that year came nearest to representing the original status of the various species — a status that has changed drastically in many instances in the years that have followed. At that time the park was little known and the faunal relationships were relatively undisturbed. In the years since 1900, however, the region has experienced radical changes. Trappers have reduced the fur bearers in large numbers, logging activities in the valleys and on the mountain slopes near the park have entirely changed the ecology of the region. Many important predators, such as the wolf and wolverine, either became extinct or virtually so, while the changing forest scene due to fires and logging brought new species into prominence, such as the porcupine and coyote. Recently elk, released in the nearby valleys, have entered the park and are now firmly established, promising still new changes in the mammal picture as time goes on. In many respects Mount Rainier has become a biotic island in a region where the original conditions no longer exist except in the park. The smallness of this biotic island makes it impossible for even an undeveloped area of this type to represent really primitive conditions. Thus the park today cannot be considered as representing the original wilderness as seen by the first white men to enter the region. It is merely as near the original wilderness as it has been possible to keep it in the midst of all the changes brought about by man.

However, by the preservation of the natural environment, the National Park Service does much to conserve the wildlife as well. In many instances the national parks are among the last remaining refuges for rare and vanishing species of wildlife. The wolverine, the grizzly bear, and the wolf, now extinct over much of their range in North America, may still be found in these sanctuaries, and, along with other species, these creatures of the remote wilderness are fighting their battle of survival in the only areas left to them.

Extirpated species, those native forms which are known to have existed in some areas, but which have since disappeared, are being restored where possible. The muskrat, formerly present in Mount Rainier National Park, now not known to occur, is an example of an extirpated species which should be restored.

WILDLIFE PROBLEMS

Since the establishment of the National Park Service in 1916, it has become increasingly obvious that the occupation of the national parks by man and wildlife must inevitably result in wildlife problems. The act creating the National Park Service is specific in its language; it says that the Service thus established shall promote and regulate the use of the areas by such means and measures necessary "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The apparent inconsistency presents itself immediately. Natural features must be conserved and protected, they must not be impaired, yet provision must be made for their enjoyment by the millions of visitors who come to the national parks each year. The course that must be followed, then, is one of permitting modification of the natural scene only to the degree required to provide for perpetual enjoyment of "the scenery, the natural and historic objects and the wildlife."

The relations between man and the wildlife of the national parks are complex. Both occupy the parks, with equal rights to that occupancy. It can scarcely be argued that man is not a part of the natural scene; certainly there is nothing essentially unnatural in the progress of our civilization from the dawn of history to the present. In the national parks, however, the *unimpaired* values to be preserved are those of the *primitive natural scene*. Man can strive to maintain these values, unimpaired, because he has the power of reason. Through that power he can recognize the effect of his conflict with nature, and so prevent the destruction of the primitive natural scene by a proper regulation of his acts.

Specifically, the wildlife problems now readily recognized in Mount Rainier National Park are those which have developed because of relations between man and mammals. The deer, bear, and raccoon are outstanding examples. In the developed areas of the park many of these animals have become so accustomed to the proximity of man that they no longer exhibit timidity in his presence. They are essentially "wild" animals, yet because of close association with man for several wildlife generations, they may be practically considered as "semi-domestic" animals.

This "semi-domesticity" is a problem in itself. First, it is not in keeping with the primitive natural scene. The true wildlife picture is not one of a deer eating from a visitor's hand; that is scarcely more natural than seeing the animal within the fenced enclosure of a zoo. The artificial feeding of any form of wildlife is objectionable for several other reasons. Such feeding encourages an unnatural concentration of the animals in restricted localities, thus increasing the danger of the spread of any contagious disease or infection. In the case of deer, feeding affects, often disastrously, the normal habit of migration to lower elevations in winter. Deer encouraged by feeding to remain at Longmire, for example, encounter difficult times during the winter months. Natural forage is buried beneath the snow, migratory routes to the lowlands are blocked, and starvation is not unusual.

In every instance, experience has shown that when animals are hand-fed, petted, and tamed, the results have been detrimental to both the animals and to man. The "tamed" animals are often dangerous, or may become so. Even the harmless appearing deer may, and do, inflict severe injuries by striking with the fore feet or hooking with the antlers, and bears often strike or bite, once they have lost their instinctive fear of man. When any animal becomes dangerous, the only solutions are to eliminate the danger by killing the animal, or to live-trap and remove it to a more isolated section of the park. The latter is often a temporary expedient because the animal is likely to return almost at once to its original home.

That many park visitors are entirely unaware of the concept of presenting wildlife in its natural setting is exemplified by the man who dashed excitedly into the Chief Ranger's office and



“Semi-domestic” bears may become unruly. Such animals must be live-trapped and removed to isolated sections of the park. A wary bruin is often suspicious of the trap.

breathlessly exclaimed, “Hey, one of your bears is loose!” Park animals are not “zoo animals.” They have simply adapted themselves to man’s presence, and although their habits have been materially changed in many instances, they retain the wild instinct to fight when cornered, to strike back against a real or fancied danger, to quarrel with anything which seeks to rob them of food. It seems hardly necessary to emphasize the futility of attempting to argue the right to possession of a choice morsel with a three-hundred-pound bear.

Bears are often condemned as nuisances because they rob the camper’s food cache, even to the extent of forcing open locked cupboards or entering automobiles. Raccoons may make a shambles of food stores, if the larder is left unprotected. That these things are nuisances is true, but had the animals not been encouraged to expect food, it is unlikely that they would go to such lengths to obtain it. The original approach was undoubtedly made by man, not by the animal, and man has little reason

to condemn, under the circumstances. The sad sequence, however, is that it is all too often the unsuspecting innocent who suffers. One party entices a bear into camp today, feeds the animal, and moves on. Tomorrow another camper receives a rude shock when bruin moves in and appropriates his food supply.

It appears then, that these wildlife problems, which have developed through man's influence upon the animals, have been brought about by man's failure to employ his power of reason, his failure to recognize the effect he may have upon the natural scene. Indeed, it would seem, in many instances, that man is the problem, not the animals. They have adapted themselves to a condition at variance with their nature; man has failed to do so.

These problems, and others which are similar, are not impossible of solution. Of the many phases of wildlife management that are a part of the adjustments to be made in our relations with the animals of the parks, these of living together must be approached by our recognition of the need for such adjustment. The late George M. Wright has well expressed the goal to be attained:

"These problems are of such magnitude that some observers have concluded that only the childish idealist, pathetically blind to the practical obstacles, would attempt to accomplish the thing. There are others who believe the effort is warranted. Much of man's genuine progress is dependent upon the degree to which he is capable of this sort of control. If we destroy nature blindly, it is a boomerang which will be our undoing.

"Consecration to the task of adjusting ourselves to natural environment so that we secure the best values from nature without destroying it is not useless idealism; it is good hygiene for civilization.

"In this lies the true portent of this national parks effort. Fifty years from now we shall still be wrestling with the problems of joint occupation of national parks by men and mammals, but it is reasonable to predict that we shall have mastered some of the simplest maladjustments. It is far better to pursue such a course though success be but partial than to relax in despair and allow the destructive forces to operate unchecked."

LIFE ZONES OF MOUNT RAINIER

Life zones, as defined in relation to plant and animal life, are areas inhabited by more or less definite groups of plants and animals. The classification of these zones which is accepted by many biologists was devised by Dr. C. Hart Merriam, who named six zones; the Arctic-alpine, Hudsonian, Canadian, Transition, Upper Sonoran and Lower Sonoran. If one travels from the Southwestern United States into the high country of the Rockies or the Pacific Northwest, he will pass through all six of these zones, beginning with the Lower Sonoran, or low desert zone, through the Upper Sonoran, or high desert, and so on through the others until the highest, or Arctic-alpine Zone is reached. The area immediately adjacent to Puget Sound, for example, falls within the Transition Zone. Moving inland toward Mount Rainier, one passes from the Transition into the Canadian Zone, usually a short distance inside the park boundaries, and the major portion of Mount Rainier National Park is within the upper three zones.

Temperature is the basis for the separation of these zones, and temperature, as we know, is affected by both altitude and latitude. In general a difference of 1,000 feet in altitude is equivalent to a difference of 300 miles in latitude. Variation in latitude explains the high elevation of tree line in the southern Sierra Nevada of California in relation to the comparatively low limit of tree growth in northern British Columbia or Alaska. Variation in temperature explains the tremendous difference in size and variety of tree species at 2,000 feet and at forest line, 6,500 feet, on Mount Rainier. On a very high mountain we might find all six of the life zones represented. The mountain presenting such a condition, however, would necessarily be located in a more southern latitude than Mount Rainier.

Four life zones are represented in Mount Rainier National Park: the Transition Zone, which occupies the lower elevations of the park up to 3,000 feet; the Canadian Zone, which, with the exception of the Transition area, extends from park boundaries to about 5,000 feet; the Hudsonian Zone, with an altitudinal range of from approximately 5,000 to 6,500 feet; and the Arctic-alpine Zone, from 6,500 feet to the summit of the Mountain.

As stated previously, the zones are inhabited by more or less definite groups of plants and animals, but there is no distinct line of demarcation between the various zones, and there is often considerable variation in the altitudinal distribution of plants. If temperature and moisture were uniform at a given altitude, the zones would probably be quite distinct. However, these conditions are obviously not uniform. On northern exposures, for example, there is less evaporation, consequently soil moisture is increased, and lack of sunshine results in lower temperatures. Plants which normally occur at 5,000 feet on a sunny southern exposure may be found at a lower elevation on northern slopes, and the reverse is true, of course, with a reversal of exposures.

Such variation is even more marked in the distribution of mammals and birds. Many species are characteristic of one or more life zones, depending upon the season of the year, the scarcity or abundance of food, and other factors.

For example, deer occupy the Transition or the extreme lower limits of the Canadian Zone in winter, but in summer range up to and occasionally beyond the limits of the Hudsonian Zone. Goats normally range within the upper limits of the Hudsonian and upward into the Arctic-alpine Zone in summer, but are most commonly found in the lower Hudsonian Zone in winter.

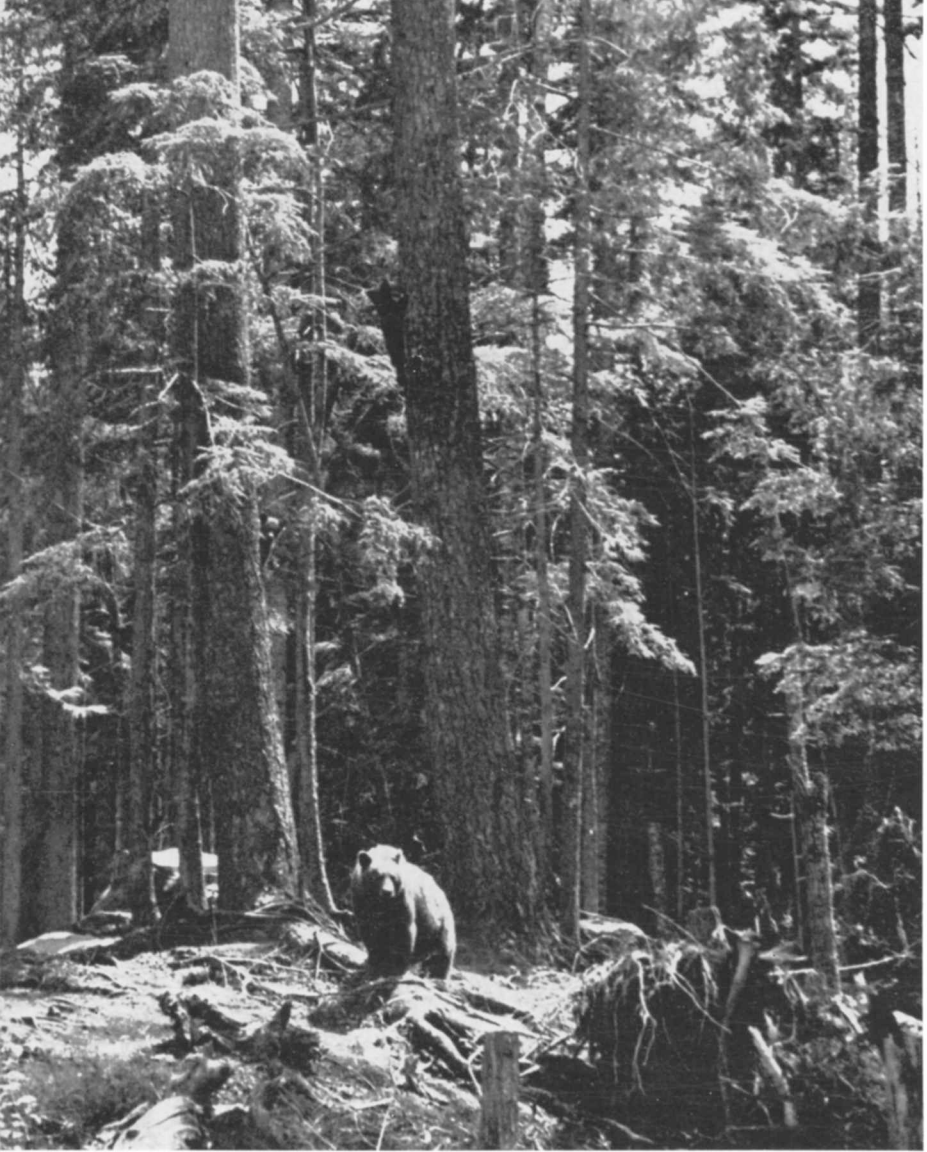
The general characteristics of the zones are as follows:

Transition Zone: This zone occupies that portion of the park which lies below 3,000 feet. For the most part it may be more adequately designated the Humid Transition Zone, although a limited area (roughly 4 to 6 square miles) on Stevens Creek and the Muddy Fork of Cowlitz River is characterized by a modified plant and animal population due to repeated fires in old Indian days. This burning favored the upward advance of low zone elements, the destruction of the original forest cover by fire opened the forest stand, accomplished a marked change in conditions of temperature and moisture, thus creating a drier, warmer site.

The Humid Transition Zone proper is one of dense, sombre forest; magnificent trees rising from a mass of shade-loving plants with a great number of fallen trees of huge size. Even on



*The Humid Transition life zone is one of
magnificent trees.*



*The forests of the Canadian life zone afford excellent
cover for many mammals throughout the year.
In summer such retreats are favored
habitats for bear families.*

bright, mid-summer days the evergreen canopy of interlaced branches permits only a little sunlight to penetrate to the forest floor, and semi-twilight conditions exist in the peaceful solitude of this cathedral-like serenity.

Characteristic plants of this zone, though not confined to such association, include the Douglas fir, western red cedar, western hemlock, salal, Oregon grape, black cottonwood, bigleaf maple, and swordfern.

Here are found the raccoon, little spotted skunk, Oregon and Olympic meadow mice, and the mink. In this zone are seen in late spring the new-born fawns of the black-tailed deer.

Canadian Zone: This zone does not become well defined until above the 3,000-foot level. There is a considerable mixture of both Transition and Canadian elements at the approximate area of separation. While still heavily forested, the trees of the Canadian Zone are noticeably smaller than those at lower elevations and the forest is more open in character. Although common tree species include the Douglas fir and western hemlock of the Transition Zone, the most typical trees are the silver fir, Alaska yellow cedar, noble fir, and western white pine. Other typical plants are the Canadian dogwood, pipsissewa, and Cascades azalea.

There are no mammals which may be considered as characteristic exclusively of the Canadian Zone, since those occupying this zone also range into the Hudsonian.

Hudsonian Zone: At an elevation of from 4,500 to 5,000 feet the character of the forest cover begins to change. The trees are smaller, and the alpine fir and mountain hemlock become dominant tree species. Ascending to higher levels the forest becomes broken, with the number and extent of grassy parks and sub-alpine meadows increasing until finally all tree growth vanishes at an elevation of about 6,500 feet. This is the zone of beautiful summer wildflower gardens, a region of extensive panoramas and rugged mountain scenes. The avalanche lily, glacier lily, the heathers, paintbrushes, and the mountain phlox are common, as well as the white-barked pine.

Snow blankets these highlands throughout most of the year, and the larger mammals are usually at the lower elevations dur-



Snow blankets the Hudsonian life zone throughout most of the year. Paradise Valley lies within this zone, the towering bulk of the Mountain above 6,500 feet is in the Arctic-alpine zone.

ing the winter months. Many of the permanent wildlife inhabitants are those which hibernate or are active beneath the snow, as the Hollister chipmunk, marmot, pika, Rainier meadow mouse, and Rainier pocket gopher.

Arctic-alpine Zone: Above the forest line all plant life diminishes rapidly in extent. This is a region of barren, rocky soils; perpetual snow fields; and glacial ice; a bleak and forbidding expanse of awe-inspiring grandeur where the storm king yields supremacy for only a few brief weeks in mid-summer.

Characteristic plants, found in the lower portions of this zone, include the Lyall's lupine, Tolmie's saxifrage, mountain buckwheat, and golden aster.

Only one mammal, the mountain goat, may be considered as characteristic of this zone.

COLUMBIAN BLACK-TAILED DEER, BLACK-TAILED DEER

Odocoileus hemionus columbianus (Richardson)

The Columbian black-tailed deer is a typical member of the deer family, about the size of its eastern relative, the white-tailed deer. The antlers of the males are forked, rather than having the tines rise from a single main beam as do those of the white-tail. The upper surface of the tail is conspicuously dark brown or black over its entire length. The color of the pelage varies with the season, but is the same in both sexes. In summer the back and flanks are reddish to reddish yellow; in winter gray, intermixed with black, with a dark line along the back, black on the top of the head, and conspicuous white on the chin and upper throat. The underparts are sooty, with white on the inner sides of the legs. The young, at birth, are a dark, rich brown, profusely spotted with creamy yellow. The dark coloration very shortly fades to a lighter brown, or reddish, similar to the summer coat of the adult, and the spots disappear in the early fall when the change to winter pelage begins.

Specimens in park collection: RNP-14 and RNP-113; Longmire Museum, Park Headquarters.

The range of the Columbian black-tailed deer is the Pacific Northwest from northern California to British Columbia and from the Sierra Nevada and Cascade Mountains to the Pacific Coast.



*The bleak and awe-inspiring grandeur of the
Arctic-alpine life zone is the summer
habitat of the mountain goat.*

It is the most common large animal in the park, distributed in summer throughout the forested areas and occasionally wandering above tree line, the males generally ranging higher than the females and young, preferring the sub-alpine parks and meadows. Deer in general exhibit a preference for burned-over brush lands and other less densely forested areas.

In winter they are found at lower elevations, usually below snow line, generally outside park boundaries, although common along the Nisqually River from Longmire Meadows downstream, along lower Tahoma Creek, and in the vicinity of the Ohanapecosh Hot Springs and lower Carbon River.

Nearly all visitors to Mount Rainier National Park soon become familiar with this graceful animal so commonly seen along the trails and roadsides. Indeed, it is a rare occasion when one or more deer are not seen in a short drive or hike in any section of the park. It is only with the arrival of the snows that they are less frequently observed, and even during the winter months they are quite abundant at the lower elevations.



Columbian black-tailed deer and fawns. The young were less than an hour old when this photograph was made.

The seasonal migration is a noteworthy characteristic. With the coming of spring, deer move upward from the lowlands, closely following the retreating snow. The young are born in late May or June, usually after the does have reached their summer range, although they may move higher to find relief from flies. There is practically no banding together of the deer at this time. Each mother and her offspring, usually twins, sometimes one and rarely three, comprise a family group, and tend to keep to themselves. The fawns are hidden at birth, and remain in some secluded spot until they are several days old. The mother visits them at intervals during the day so that they may be fed, and stays near their place of concealment. Almost every season "abandoned" fawns are discovered and brought in to one or another of the park's ranger stations by well-meaning but ill-informed park visitors. In exceptionally rare instances the mother may have been killed by some predator or a passing automobile, but under no known circumstances has a fawn ever been deliberately abandoned. *Fawns, if found, should be left unmolested.*

At the time of the spring migration to the uplands, the older bucks habitually move to higher levels than do the young bucks



New-born fawns, if found, should be left unmolested.

and does. They prefer the subalpine parks and meadows, and often range in pairs or in groups of from three to five or six individuals.

The first heavy snow starts the deer on their annual trek to the lowlands, and the journey is ordinarily a consistent one, once begun it is completed over a period of from several hours to a day or two, depending upon the distance to be covered. Study has revealed that deer follow regularly established routes during migration, returning year after year to the same general winter and summer ranges. Well-worn game trails along prominent ridges and watercourses are testimony to this concentrated movement, the intersecting minor paths are but tributaries to the major current of travel.

It is prior to the fall migration that the deer herds assemble, the does, fawns, and yearling bucks banding together, the older bucks breaking away from their summer associations and joining the does for the mating season, which occurs in November and December.

Vicious battles are frequent at this season. Determined to assert supremacy, the bucks are merciless antagonists, and at times the struggle is fatal to the loser. In rare instances both may

perish, with antlers so tightly locked that escape for either is impossible, exhaustion and starvation the inevitable result. At the conclusion of the mating season the two sexes go their separate ways again, the bucks often assuming again the easy companionship of the summer months.

The abundance or lack of forage is an important factor, perhaps the most important, in determining local abundance of deer. Densely forested sections are not capable of supporting large deer populations because of the lack of sufficient brush, shrubbery, and succulent plants which make up the bulk of the deer's diet. Primarily a browser, only in spring does this animal show a preference for grass, and then only for a short period.

Deer have many natural enemies. It is fortunate that nature has provided for an abundant reproduction in this species. Snow is perhaps most serious of all, since a heavy snowfall may cover the food supply, and certainly hampers the movement of the animals when they must escape predatory coyotes or cougars. Late spring snows, in particular, come at a critical time. At best forage diminishes steadily during the winter months, and when this period is followed by even a short space when food is unavailable, starvation and death strikes the weaker and aged animals.

Of the predatory animals, the coyote and cougar are most effective. The fox, wildcat, and bear undoubtedly take an occasional fawn, but cannot be considered dangerous to an adult deer. In view of the powers of rapid reproduction shown by deer, it is well that they have numerous natural enemies; otherwise wholesale destruction of brush lands and forest reproduction would occur as the animals reached a peak of overpopulation, followed by mass starvation. This frequently happens in many parts of the West where the natural enemies of the deer have been exterminated. Predators follow, in most instances, the line of least resistance. As a consequence, it is the weaker, the diseased, or the otherwise unfit animals that tend to be struck down first, and so the fittest survive.

A reasonable balance seems to have been attained in the numbers of deer in the park. For the past several years there has been no apparent change, an estimated 600 range within park boundaries during the summer months.

ROCKY MOUNTAIN MULE DEER, MULE DEER

Odocoileus hemionus hemionus (Rafinesque)

The mule deer is similar to the preceding subspecies in general character. Perhaps the most noticeable field difference is the tail, which in the mule deer is narrow and black-tipped, above *and below*, rather than wider and dark brown or black over the entire upper surface and entirely white below as in the black-tailed. The large ears, from which this species derives its common name, are distinctive, the black-tailed deer is the smaller and darker of the two subspecies.

Specimens in park collection: None.

The mule deer ranges over most of the Rocky Mountain region and the western United States, from the Dakotas, Nebraska, Kansas and Oklahoma westward to eastern British Columbia, Washington, Oregon and California.

The range of this species in the park is at present restricted to the extreme northeastern section, where it is observed on rare occasions during the summer months.

The mule deer is very similar to the black-tailed deer in habits as well as in appearance. Seasonal migrations, food preferences, natural enemies, and other characteristics are much alike in both species, although the mule deer habitually favors a more sparsely timbered, less rugged terrain.

The typical habitat is an open forest, with many parks, meadows, and brush-covered hillsides. As a general rule the mule deer prefers the Ponderosa pine and sagebrush region, and avoids densely wooded areas. The occasional records of this species in the park are of those rare stragglers which drift in from east of the Cascade crest.

Taylor and Shaw (*Mammals and Birds of Mount Rainier National Park*, 1927) state that mule deer "May occur in small numbers in the White River region, on the east side of the park." Although their parties did not observe mule deer while in the field in 1919, they believed that observations made by others familiar with the region were reliable.

A report submitted by the chief ranger of the park in 1932 states: "While mule deer are rarely seen they do range along the east side." It was not until 1941, however, that this species was included in the park's annual wildlife census, when it was listed as, "Uncommon, only a few have been seen. Tipsoo Lake, Deadwood Lake, and Yakima Park."

The 1948 wildlife census estimates 10 to 20 mule deer observed occasionally on the east side during the summer months in previous years. While no reports were recorded in 1948, it is believed that the status of the species is unchanged.

AMERICAN ELK, WAPITI

Cervus canadensis nelsoni Bailey

The elk is the largest animal found in the park, and the largest member of the deer family found in North America, except the moose. The adult males have tremendous, wide-branching antlers, which are shed annually. The sexes are slightly different in coloration, with females lighter than the males. The head and neck are dark brown, flanks and back a tawny to brownish gray, large yellowish rump patch, legs dark brown. The young are light brown, spotted with white. An adult male in good condition will weigh from 800 to 1,000 pounds; females are somewhat smaller.

Specimens in park collection: None.

Elk are found in western North America, mostly in the Rocky Mountain area and the far west. They formerly ranged over most of the United States and southern Canada.

During summer elk occur in the park along the eastern boundary, north and west to the Deadwood Lakes and Goat Island Mountain, up the Cowlitz River and Stevens drainages to The Bench on the north side of the Tatoosh Range. They are reported very rarely from the northern and western slopes of the Mountain. In winter a few elk range along the Ohanapecosh drainage in the southeastern part of the park.

The early settlers of this country gave the name "elk" to this magnificent member of the deer family. This is an unfortunate designation, since the animal in no way resembles the Old

World elk, which is actually a moose. However, elk it has been since early American history, and elk it is likely to remain, although the Indian name "wapiti" seems preferable and more appropriate.

The history of the elk in Mount Rainier National Park is an interesting study. There can be little doubt that the Roosevelt or Olympic elk, *Cervus canadensis roosevelti*, formerly ranged over much of the Cascade Range in the State of Washington, and so must be considered the native species of Mount Rainier, although no longer found in this region.

An attempt was made to reestablish the Roosevelt elk in the park in June, 1934, when two young animals, obtained from the Washington State Department of Game, were liberated at Longmire Springs. Two more were released in October, 1934; all had been captured on the Olympic Peninsula, and the four were to form a nucleus for the park herd.

However, to the keen disappointment of park officials, the transplanted elk were unfavorably affected by their proximity to civilization, as is often the case with wild creatures. So unafraid did they become that soon they were regarded as a nuisance, a dangerous nuisance because of their size, pugnacity, and their total lack of timidity, and recapture and deportation to a nearby zoo was the final step in this attempted repatriation.

The elk now ranging into the park have been introduced on lands outside park boundaries by the Washington State Department of Game and the Pierce County Game Commission. These animals belong to the species called American elk, *Cervus canadensis nelsoni*, and were imported from the Yellowstone region. They do not differ greatly from the native species, though somewhat smaller and lighter in general coloration.

The seasonal migration of elk is well defined. Early in spring, with the retreat of the snow from the uplands, they move to higher pastures, where they remain until driven down by the approach of winter. During recent years a gradual increase in numbers and an extension of range within the park has been observed. The wildlife census for 1948 estimated the summer herd to number some 40 to 50 individuals, with several animals win-

tering along the Ohanapecosh drainage in the southeastern section of the park.

Bull elk are the most polygamous of all deer. During the mating season, which occurs late in the fall, a single bull will gather together a "harem" of from three or four to as many as two dozen cows with the current year's calves, and defiantly assert his mastery over the group, driving away younger bulls of lesser strength. Should another bull challenge his dominance, the ensuing battle is rarely fatal, although it may result in a new master. It is not unusual to see the loser, reduced to the status of a "bachelor bull," ranging alone.

The "bugling" of the bulls, a shrill, high-pitched invitation to combat, is a thrilling call, an unusual record of the music of nature.

The young are born in late May or June, usually one to a mother, sometimes two, and rarely three. Like all deer, they are spotted, somewhat lighter in color than the fawns of the black-tailed deer. The spots are retained until replaced by the winter coat.

CASCADE MOUNTAIN GOAT, WHITE GOAT, MOUNTAIN GOAT

Oreamnos americanus americanus (Blainville)

The goat is completely unlike any other park animal, and is easily identified by its resemblance to a large white or yellowish-white domestic goat. Both sexes have short, black, sharp-pointed horns, and are otherwise alike, except that the males are generally somewhat larger, and have a distinct beard.

Specimens in park collection: None.

The Cascade mountain goat is found in the Cascade Mountains of Washington. Records indicate that it probably ranged into the Oregon Cascades some decades ago, but there are no recent authentic reports from that area. Sub-species similar to the Cascades goat are found in the northern Rocky Mountains, northward through Canada and into Alaska, as well as on the Olympic Peninsula.



The mountain goat is an indomitable mountaineer.

In the park in summer this denizen of the rocky crags is rather frequently seen in the high country on all slopes of the Mountain. The principal bands may be found in the region of Van Trump Park, Cowlitz Rocks, Cowlitz Chimneys, Steamboat Prow, Burroughs Mountain, the Colonnade, the Puyallup Cleaver, and Emerald Ridge, where they normally range at elevations of from 6,000 to 10,000 feet.

In winter it is not uncommon to observe small bands on Cougar Rock, the southern slopes of Tum-Tum Peak, Mount Wow, lower Emerald Ridge, Mother Mountain, and the western slope of Chenuis Mountain.

Here we have another example of an animal that has been misnamed. Although it is called a mountain goat it is not a true goat, but is more of a rock antelope. Its nearest living relatives are the Alpine chamois of south central Europe and the Himalayan serow of Asia. At one time near relatives of our present goats were spread over much of the western part of North America and fossils have been found in caves in lower Grand Canyon and as far south as Nuevo Leon, Mexico. While it is not known what happened to cause their extinction over much of their orig-

inal range, it appears likely that early man had an important part in it. It is known that the Indians of the Mount Rainier country hunted the goats extensively at one time, and undoubtedly this awkward appearing dweller of the remote and inaccessible sections is an animal most park visitors hope to encounter.

Chief feeding grounds during the summer are on the heavily vegetated slopes near forest line. In the early morning hours the goats move out of their nighttime resting places and begin feeding as they climb to higher elevations. They travel in a very leisurely fashion, seldom running, and they select their course with considerable care. An old billy usually takes the lead, the other following along behind in single file. Young goats are "sandwiched" between the adults. In moving across any slope area where the footing is treacherous or where rocks might roll, it is customary for only one goat to cross at a time, the others staying back until it is safe to cross.

Without doubt the characteristic of the mountain goats that excites the most interest and admiration is their ability to travel across steep cliffs and narrow ledges with no apparent difficulty or hesitation. Nor does this trail lead only over perilous rock ridges. The goats may venture out upon the ice fields of some of the glaciers. Even glare ice does not present an impasse, it only serves to slow the progress of these indomitable mountaineers.

The female usually has one or two kids born in late spring. By September they are about half grown, and quite capable of keeping up with their parents in even the most difficult going. They remain with their mother through the first winter. Like most young animals, kids are quite playful.

Apparently the goat population of this area is fairly stable, perhaps increasing slightly under the complete sanctuary afforded by the park. As long ago as 1894, John Muir reckoned that there were over 200 goats on Mount Rainier. Ernest Thompson Seton, in his *Lives of Game Animals* states that "There are certainly 300 now (1929)." The wildlife census for the park lists from 250-300 goats in 1931, and census reports in recent years indicate from 350-400.



Bears are a feature attraction of the park.

OLYMPIC BLACK BEAR

Ursus americanus altifrontalis Elliot

There are two color forms of the black bear in the park—the black and the brown. The all black or mostly black is the phase most commonly observed, but brown individuals may often be seen. The black phase sometimes has a brown patch covering the muzzle and a white spot on the chest. The color ratio is usually about five black to one brown.

Specimens in park collection: None.

The black bear was formerly found over most of wooded North America, but has now become extinct over much of the original range. The Olympic black bear occurs in western Washington, western Oregon, and northwestern California.

In the park it is likely to be encountered anywhere in the timbered regions, with an occasional record coming from above forest line. One record of an unusual nature was obtained several years ago by Mr. Harry Meyers of the Mountaineers Club and

Major E. S. Ingraham of Seattle. They reported that while blizzard bound in the crater on the summit of Mount Rainier they saw a black bear walk up to the rocks on the rim of the crater and then disappear in the storm. They suggested that the bear possibly was lost in the storm while on a glacier and instinctively climbed higher and higher until it reached the top of the peak. In October, 1948, a record was obtained of a bear well up on the Paradise Glacier, 6,500 feet. This animal was climbing steadily higher, and disappeared over the crest west of Cowlitz Rocks.

There can be no doubt that the bear is one of the feature attractions of the park. The appearance of one of these animals is a signal for visitors of all ages to come running to get a look. Unfortunately the attention paid to the bear doesn't always stop at this point, and someone is almost sure to pull out a piece of candy or some other tidbit to see if bruin will eat it. Thus a bear problem is soon in the making. Loving sweets, bacon and grease as he does, the bear cannot be blamed too much if he eats quantities of these items offered him and then makes a shambles of tents and food stores looking for more.

Contrary to popular belief the black bear is not a vicious animal, and in the normal wild state is timid and takes to his heels whenever anything of an unusual nature happens. Sudden loud noises will send him off in a wild stampede. This can certainly be attested to by one visitor whose car was invaded by a bear. Unwittingly the bear sat heavily upon the car's horn—and simply took out glass, door and all in his mad scramble to get out!

The bear is an expert climber and handles himself with great skill. When frightened the cub will almost always shinny up the nearest tree before looking to see what caused the alarm. The mother bear will often send her youngsters up a tree when she is afraid they may be in danger or when she wants them to "stay put" for a time. Bear cubs in a tree are a fair warning to stay away because the mother is bound to be somewhere close by.

The baby bears are usually two in number and are born in January or February while the mother is in her winter quarters. They are small and helpless at birth, weighing only a few ounces. By the middle of June, when most folks see them, they are about

the size of raccoons, and by the time fall comes around they are large enough to take pretty good care of themselves, although they still remain with their mother. There is nothing more humorous and clown-like in the forests than a young bear cub. Filled with an endless desire to learn something new, he is forever getting into difficulties. The cub loves to wrestle and box, and a play session with a husky brother or sister is usually somewhat of a rough and tumble affair.

Falltime is the time of year to see bears, because the abundance of huckleberries on the many slopes and ridges above 5,000 feet brings them out in large numbers. It is nothing uncommon to see as many as six of these animals at one time in a berry patch, industriously stripping the bushes of the luscious fruit. The bear is also in his best physical condition at this time, as he prepares to go into hibernation and his coat is rich-toned and glossy. The hibernation period varies with the individual, some animals going into their winter sleep rather early while others may prow around for some time after the first snows have fallen. Bears have been observed out of hibernation as early as February 26, near Longmire.

The kind of food available is really no great problem for a bear; his main worry is getting enough of it. He seems to like almost anything, with the list including such varied items as bumblebees, clover, skunk-cabbage roots and many other succulent plants, frogs, toads, field mice, ants, berries of all types and a wide assortment of meats.

PACIFIC RACCOON

Procyon lotor psora Gray

The raccoon has a stocky body about the size of a small dog, with relatively short legs and a sharp-pointed muzzle. The coloration is grizzled gray-brown with black-tipped hairs sometimes giving a dark appearance. The top of the head is blackish, and a broad, "mask-like" black band extends across the face and eyes, bordered above and below with white. The tail is brownish, encircled by six or seven blackish rings. The underparts are light brown, silvered here and there with whitish hairs. The soles of the feet are black.

Specimens in park collection: Mounted specimen, Longmire Museum, Park Headquarters.

Raccoons are widely distributed through the forested regions of North America. The Pacific raccoon is found from southern British Columbia south to northern California, in and west of the Cascade Mountains. In the park it normally ranges up to around 3,000 feet, although some individuals have taken up residence in the buildings around Paradise Valley, 5,500 feet.

Cunning, clever, and inquisitive, with a truly remarkable ability for adaptation to human influences, the raccoon has firmly established residence in a few locations of the park during recent years. Formerly uncommon, these animals are now abundant at Longmire, and are frequently seen in other developed areas as well.

A comparison of the habits of the 'coons thus subjected to close contact with man, and the traits of the true wilderness animals is amazing. The semi-domestic raccoons are no longer strictly nocturnal in their wanderings, but are often abroad at all times of the day. A whole family may parade leisurely across the lawn or parking plaza at mid-day, pausing to peer curiously through slitted eyes at an assemblage of camera-laden visitors. Competition for food is keen, and so avid in their pursuit of forage do the animals become that no time is wasted in "washing" any morsel, it is bolted immediately.

Quarrels, squabbles, and vicious battles are waged vociferously. The raccoon is a surly, short-tempered creature at best, and when two or more get together, especially members of different families, a "gang fight" may be expected to develop, with half a dozen clawing, biting, snarling 'coons entangled in one furry mass. For some reason the ringed tail appears to be a particularly vulnerable point of attack, as several "bob-tailed" animals at Longmire attest.

In some regions this animal is reported as hibernating during the winter months, but the local raccoons do not do so. They remain as active with three feet of snow on the ground as during the summer, although not seen in their normal abundance during periods of extremely inclement weather.



*The marmot is abundant in rock slides above
5,000 feet.*

The raccoon seems to eat practically anything, with meat of any type freely accepted. Under normal conditions the diet is largely made up of frogs, fish, small animals, birds, eggs, insects, and fruits.

CASCADE HOARY MARMOT, WHISTLING MARMOT, WHISTLER

Marmota caligata cascadenensis Howell

The Cascade hoary marmot is one of the largest North American rodents, a close relative of the woodchuck of the East, with the head and body about twenty inches in length, tail about nine inches. The body is stout and clumsy in appearance; the legs are short and stout; the head is short and broad with a blunt nose, small, broad, rounded ears, and small eyes. Adults have a black face; the nape, shoulders, and upper back gray; the remaining portion of the back and rump is black grizzled with gray; the tail is brown. The young are darker in color than the adults. In midsummer the pelage is in poor condition, with the

darker portions more brown than black. The large size, gray shoulders, and shrill, whistling call are distinguishing characters which permit easy identification of this animal.

Specimens in park collection: RNP-40, RNP-41, RNP-112; Longmire Museum, Park Headquarters.

The woodchucks (genus *Marmota*) are found over most of the United States, well into Canada, and in the west north into Alaska. The Cascade hoary marmot occurs in the northern Cascade Mountains from Mount Rainier northward into southern British Columbia.

On Mount Rainier the whistler is abundant in the rock slides from about 5,000 feet to forest line and above. Occasionally the alpine parks and meadows are chosen habitats; the animals are common in the Paradise Valley and on the open slopes above Alta Vista.

A piercing, far-carrying whistle is often the park visitor's introduction to the marmot or rockchuck of Mount Rainier. A careful scrutiny of the nearby terrain will often be rewarded by the sight of one or several of these animals, old and young, perched on a rock above the entrance to the burrow, or galloping clumsily but swiftly toward home and safety.

It is usually possible to continue the acquaintance at closer range, particularly if the observer approaches slowly and the animals are in areas where they have become accustomed to having human visitors in their neighborhood.

The whistler is almost strictly vegetarian in his food habits, feeding upon green succulent vegetation in the near vicinity of the burrow. It is common to find well-beaten paths from the animal's "front door" to the forage areas. Moving about on a grassy slope the fat, lazy rodent seems anything but alert, as he crawls from one spot to another. But the observer soon becomes aware that the chuck's pauses to survey the landscape are frequent; his head is raised, if no danger threatens his tail flips and feeding is resumed. If frightened, swift retreat is generally preceded by the shrill whistle, and the sluggish, crawling fat one becomes a scurrying bundle of fur following a well-worn and familiar route to the sanctuary of his den.

The marmot is a sun-worshiper. After an early morning feeding period, it is his custom to sprawl, rug-like, on a favorite rock slab, sometimes for hours, resting and obviously enjoying his sun-bath. Chucks are rarely abroad for any extended length of time on cloudy, drizzly days. They may appear if driven out by hunger, but seem to prefer the warmth and comfort of the den during inclement weather.

The hibernating period of the marmot begins in September and lasts well into spring, the time of emergence is usually late in April. There is no evidence that any food is stored, and for some time after coming out of hibernation the animals may travel a considerable distance over the snowfields in search of open ground and green vegetation.

The famous naturalist, Ernest Thompson Seton, has well expressed the marmot's way of life:

"Convincing evidence there is that, during lethargy—the little death of the winter sleep—the vital functions are suspended—the sleeper neither grows, suffers, wastes, nor ages. He did not lay up stores of food; yet, in the spring, he comes out just as fat as he went in the fall before.

"If then, the Powers-that-Be have allotted to the Marmot five full years of life, and he elects to live that life in ten bright summer times, then must he spend the six dark months each year in deathlike sleep. And this he does, in calm, deliberate choice.

"Oh, happy Whistler of the Peaks! How many of us would do the very same, were we but given choice."

Not many natural enemies threaten the marmot. Perhaps the most to be feared is the golden eagle, which may drop from the blue to seize him in the midst of his luxurious sun-bath. Because of his size the smaller predators are harmless to him, but the coyotes and foxes are relentless hunters and ever-present dangers.

THE CHIPMUNKS

Two kinds of chipmunks, the Cooper and Hollister, are known to occur within the park. Although their altitudinal ranges overlap, the two species may be quite readily distinguished by their variation in size and other characteristics. A brief discussion of each follows:



The Hollister chipmunk is a lively and audacious little animal.

The Cooper chipmunk, *Tamias townsendii cooperi* Baird, is the larger of the two species mentioned above. It is predominantly dark brown in color; the light colored stripes above and below the eye are indistinct; the black head stripes are not conspicuous; the nine alternating black and grayish white lengthwise stripes on the back are somewhat obscured by the dark color; the tail is black above, grizzled with white, silvery margined, reddish brown below. The total length of a typical specimen is ten inches; head and body five and one-half inches, tail four and one-half inches.

This chipmunk is found in the higher eastern Cascade Mountains and Olympic Mountains of Washington. In Mount Rainier National Park it occurs from park boundaries to 6,000 feet, almost to forest line.

The Hollister chipmunk, *Tamias amoenus ludibundus* (Hollister), also called the little chipmunk or Alpine chipmunk, is about a third smaller in size than the Cooper chipmunk. It is predominantly gray brown in color. The light colored stripes above and below the eye are distinct; the black head stripes are more conspicuous than those of the Cooper, the back stripes are

sharply defined; the tail is brown mixed with black above, margined with yellowish brown, yellowish brown below. The total length is about eight and three-fourths inches; head and body four and three-fourths inches, tail four inches.

The Hollister chipmunk is found in the higher Cascade Mountains of Washington. In Mount Rainier National Park it occurs generally in the Hudsonian Zone between 4,500 and 6,500 feet, rarely lower or above forest line, but it is one of the few park animals recorded on the summit of Mount Rainier.

Specimens in park collection: Cooper chipmunk, RNP-7, RNP-8, RNP-9, RNP-16, RNP-18, RNP-74, RNP-110; Hollister chipmunk, RNP-28, RNP-29, RNP-30, RNP-95; Longmire Museum, Park Headquarters.

The lively, audacious, and beautifully marked chipmunks are the most popular of all the animals of the park. Locally abundant as they are in the neighborhood of the campgrounds and lodges, easily observed because of their diurnal habits and lack of fear, they are a source of entertainment and amusement to many park visitors.

Like the mantled ground squirrels, the chipmunks adapt themselves rapidly to man's presence, forage about camps and lodges in search of various delicacies, invade camp stores without hesitation, but are such engaging company that it is difficult to regard them as anything other than friendly guests.

Many varieties of seeds and berries furnish the food supply of this animal, and quantities are stored in their burrows for use during the spring and early summer. Although the chipmunks hibernate during most of the winter, they sometimes venture out on warm, spring-like days, returning to their winter nests when the weather again becomes inclement.

Predaceous birds and mammals active during the daylight hours are all enemies of the chipmunks. These natural enemies work to keep the chipmunk populations free of contagious diseases such as relapsing fever, which is transmissible to human beings, by removing sick and sluggish chipmunks before they can infect their companions.



*Mantled ground squirrels are popular with
park visitors.*

CASCADE MANTLED GROUND SQUIRREL, BIG CHIPMUNK
Citellus saturatus (Rhoads)

As the name implies, the mantled ground squirrels are ground dwellers. In general external appearance they resemble the eastern chipmunks, but are considerably larger, and much bigger than their environmental associates, the western chipmunks. They may be further distinguished from the latter species by the more robust body, the conspicuous white eye-ring, and the absence of stripes on the head. The Cascade species of mantled ground squirrel is about twelve inches in length overall, with a flattened, somewhat bushy, narrow tail some four inches long. The sexes are colored alike, the mantle over the head, sides of the neck, shoulders, and forearms is reddish-brown, mixed with black, which is in distinct contrast to the rest of the upper parts. The back is grizzled black, merging into grizzled red-brown over the rump, with a narrow yellowish-white stripe, edged with black, on each flank from shoulder to thigh. The underparts and the upper surfaces of the feet are yellowish-white. The tail is well-clothed with dark, yellow-tipped hair above, yellowish-brown below.

Specimens in park collection: RNP-33, RNP-34, RNP-36; Longmire Museum, Park Headquarters.

The mantled ground squirrels are found only in western North America, on the forested mountain slopes from California, Arizona, and New Mexico north into British Columbia.

The species common to Mount Rainier National Park is found in the Cascade Mountains of Washington, and on the Mountain it is confined principally to the Hudsonian zone, between 4,500 and 6,500 feet. It is most abundant on the east side, but is very common locally in the Paradise Valley vicinity.

This animal inhabits by preference the rather open, rocky hillsides, and is seldom seen in the heavily forested sections. Burned over brush lands are favored localities, particularly on those slopes exposed to the sun.

The big chipmunks are less graceful than their livelier, smaller cousins; they are unsuspicious and easily observed, and are very popular with park visitors because of their obvious lack of timidity. They are quick to adapt themselves to the proximity of humans, and sometimes become nuisances about campsites and dwellings because of their audacious thefts of various food-stuffs.

The capacious cheek pouches are used in collecting seeds, nuts, roots, berries, and the bulbs of various plants, which are stored in underground caches. Although these ground squirrels hibernate from early fall until late spring, forage is meager during the first few weeks after emergence from their long winter nap, and without provision for these lean times, the animals would surely starve. They often appear when the snow is still deep over their burrows, digging several feet upward through this white blanket to emerge on the surface.

The most dreaded enemy is the weasel, but the ground squirrels are preyed upon by coyotes, foxes, and hawks as well, since they are a staple item in the diet of most predators.

DOUGLAS PINE SQUIRREL, CHICKAREE

Tamiasciurus douglasii douglasii (Bachman)

A dark grayish brown squirrel about twelve inches in length overall; with prominent ears; moderately slender in form; tail



Common throughout forested sections, the Douglas pine squirrel is a vociferous bundle of energy.

almost as long as the body, somewhat flattened, well clothed with hair but not bushy, more gray than the body. The underparts vary from a pale yellow brown to reddish brown. The sexes are colored alike; the pelage is fairly long, soft, but not silky. The characteristic appearance is one of extreme alertness.

Specimens in park collection: RNP-10, RNP-11, RNP-15, RNP-47, RNP-100, RNP-107; Longmire Museum, Park Headquarters.

The Douglas squirrel is classified as one of the red squirrels, or chickarees, which are distributed over most of forested North America.

In Mount Rainier National Park these squirrels are common, and are found throughout the area from the park boundaries to forest line, and occasionally even higher.

This vociferous, restless bundle of energy is seen and heard by almost every park visitor, bounding across the highway or trail, or scampering madly up a nearby tree, to peer around the trunk or perch upon limb just out of reach where it scolds and chatters vehemently at all intruders.

Unlike the flying squirrel, the chickaree is abroad throughout the daylight hours, busy, inquisitive, obviously and usually noisily resentful of interference with what it considers its own affairs. Only in the spring is this squirrel somewhat subdued, probably because of the youngsters tucked away in a nearby nest in some tree hollow. The young do not venture into the world until more than half grown, when they take their places in the regular routine of family activities.

Because the Douglas squirrel does not hibernate, it gathers the cones of most of the coniferous trees, as well as the winged seeds of the vine maple and even mushrooms to furnish food over the lean winter months. The late summer and early fall is a busy time for this industrious fellow. The swish and thump of falling cones is a common sound through the woods when the harvest is in progress. A number of cones are neatly clipped from the tree tops, then the worker descends the tree to gather and store them in a hollow stump, beneath a log or the roots of a tree, or even in a hastily excavated hole in the forest floor. Interrupt this activity by secreting a few of the fallen cones, and the imprecations called down upon your head would scorch the printed page if they could be translated into human speech.

Although preyed upon by winged and four-footed predators alike, the chickaree holds its own very well, probably because this fellow is seldom caught napping, certainly not because of shy and retiring habits, since the "chatterer" is one of the most conspicuous and interesting of our woodland creatures.

CASCADE FLYING SQUIRREL

Glaucomys sabrinus fuliginosus (Rhoads)

A medium-sized, arboreal squirrel; dark-brown above, light brown on the under parts, light gray or sometimes light brown on the sides of the face, the sexes colored alike, the young darker than the adults. The eyes are large and dark, the pelage is soft and silky. The flat, furry tail and the fold of loose skin between the fore and hind legs on either side distinguish this animal from any other.

Specimens in park collection: None.

Flying squirrels inhabit a large part of forested North America. The Cascade sub-species is found from southern British Co-



Park visitors rarely see the beautiful little flying squirrel.

lumbia southward along the Cascade Range to the Siskiyou Mountains of Northern California.

Although seldom seen because of its nocturnal habits, the flying squirrel is locally abundant in some sections of the park, particularly at Ohanapecosh Hot Springs.

The most interesting characteristic of this little tree-dweller is its unique habit of gliding from tree to tree through the air. In launching its "flight" the squirrel leaps into space from its perch on a dead snag or tree, extends the fore and hind legs, spreading the loose fold of skin along its sides, and with the flat tail fluttering behind, sails obliquely downward, alighting on the ground or the lower trunk of another tree. This aerial maneuver cannot truly be called flight, but has resulted in the name "flying squirrel."

Little is known of the life history of this beautiful little animal, because of the difficulty of observation. Old woodpecker holes or natural cavities in trees are favorite nesting places, and the flying squirrel is almost never found away from the nest

except at night or when disturbed. It is a shy and retiring creature, preyed upon by owls, martens, weasels, and other small carnivorous animals on the rare occasions when it comes to the ground. Flying squirrels are omnivorous, nuts and other vegetable foods are apparently preferred, although meat is sometimes taken when available.

CASCADE PIKA, CONY

Ochotona princeps brunnescens Howell

This small, rodent-like animal is robust, short-legged, with a tail so short that it is not noticeable in field observation. The sexes are colored alike; gray-brown above, whitish below, ears darker, feet light. The pelage is soft and quite dense. In general appearance the pikas closely resemble the rabbits, except for their small size, short legs, and short, rounded ears. The peculiar "bleating" call is unmistakable.

Specimens in park collection: RNP-12, RNP-13, and one mounted specimen; Headquarters Museum, Longmire.

The many sub-species of the pika are widely distributed at the higher elevations throughout the Rocky Mountains and the Coast Ranges. The typical habitat is the rock-slides and talus slopes near forest line.

In the park one may expect to find the pika on any rocky slope from 3,000 (rarely lower) to 8,000 feet. They are infrequently seen in winter, due to the depth of snow over most sites which they inhabit, but during clear, sunny days they occasionally venture out in exposed locations.

The common name "hay-maker" has often been applied to the pika, because it is one of those provident creatures which literally "makes hay" during the summer months, curing and drying a wide variety of grasses and other plants which are stored for winter food. The hay-barn of the pika is in a sheltered crevice or beneath an overhanging boulder in the masses of rock where it makes its home. These hay-piles are much in evidence where pikas are abundant.

The protective coloring of the animal makes it difficult to distinguish among the rocks, and it is commonly heard before it is seen. The sharp, short bleat, almost a chirp or squeak, often



The busy beaver is an industrious engineer.

repeated at rapid intervals when the pika is alarmed, is distinctive. If the observer remains motionless, and carefully searches nearby with his eyes, he is almost certain to see a tiny "rock-rabbit" scamper quickly and with silent, sure feet across the rocks, to disappear in a crevice or to perch on an exposed boulder. Should the watcher remain quiet, the pika will resume its interrupted activities until again disturbed.

The well-chosen shelter of the pika, deep down beneath the rocks, affords adequate protection from most predators. Only the weasels, and their relatives, the martens, are capable of following these elusive creatures through the talus. Undoubtedly the hawks and eagles may strike suddenly from the air and be successful in capturing a pika less alert than his fellows, but such occasions must be rare.

PACIFIC BEAVER

Castor canadensis leucodonta Gray

The beaver is the largest North American rodent, and the species found in Mount Rainier National Park is the largest of any of the recognized geographical races. An adult will weigh

thirty pounds* or more, up to a maximum of sixty pounds. The form is robust; the tail is broad, flat, and scaly; the ears are short; the hind feet webbed. The pelage is composed of short, soft underfur, with long guard hairs. The sexes are alike in size and color, a dark, glossy, reddish brown above, lighter brown below. The beaver is aquatic in habit.

Specimens in park collection: Mounted specimen, Longmire Museum, Park Headquarters.

The geographical range of the beaver extends over most of North America from the Rio Grande northward.

Beaver are not now abundant in the park, and it is doubtful that they were ever numerous. Observations have been made in many sections, notably Fish Creek, Tahoma Creek, along the Nisqually River from the park entrance to the mouth of the Paradise River, Longmire Meadows, the Ohanapecosh River, and Reflection and Tipsoo Lakes. Records indicate that Fish Creek and Tahoma Creek are the sites most extensively used by beavers during recent years, although intermittent activities have been noted in the vicinity of Longmire Meadows. A colony on Kautz Creek was undoubtedly destroyed by the flood of October, 1947.

No other animal played as important a role in the early history and exploration of this country as did the beaver. This is particularly true of the Rocky Mountain west, and to a lesser extent of the Northwest. The fur trade made the beaver pelt a standard of exchange, and to get beaver the trappers moved westward, seeking out this valuable animal in the most inaccessible and remote regions. These early explorations, which had as their incentive fur rather than the expansion of territory, paved the way for later settlement by those seeking new lands and a better livelihood in the West. So great was the demand for fur that the beavers, in the beginning abundant, were reduced in numbers to a point where returns did not compensate trappers for the risk and hardship involved.

The first mention of beaver in the park is found in *Mammals and Birds of Mount Rainier*, Taylor and Shaw, which states:

"Dr. A. K. Fisher records that several beavers lived at Longmire Springs until 1896, when a trapper killed them all."

By 1905, according to the *Annual Report of the Secretary of the Interior*, beaver had been exterminated within the boundaries of the park.

However, by 1919, beaver were again active on Fish Creek, along the eastern base of Mount Wow, and in December, Mr. Roger W. Toll, park superintendent, reported two dams, each 100 to 200 feet in length. Mr. Toll's observations were set forth thus in a letter:

"The beavers are now living in these lakes, and fresh signs are abundant. There are numerous tracks in the snow leading from the lakes to the thickets of alder, elder, and willow which they are eating. There is no typical beaver house in the lakes, but the under-water entrance to their house can be seen leading under the roots of a fir tree about four feet in diameter that stands on the edge of the upper lake."

It is in this immediate vicinity that fairly extensive beaver workings were observed in November, 1947, including newly repaired small dams and fresh cuttings.

The house or burrow in the stream bank studied by Mr. Toll appears typical of the beaver in this area. In other sections, notably Rocky Mountain National Park, Colorado, where beavers are abundant, an extensive system of dams and canals is frequently developed on the smaller streams, with a large house completely surrounded by the impounded water a central feature of the colony. No such elaborate workings have been found here. Since the beavers habitually reside in burrows along the margins of streams they are referred to as "bank-beavers." A plausible explanation for this habit is the constant and ample flow of water, which eliminates the necessity for large dams, and is adequate to cover at all times the underwater entrances to the burrows.

A small stream, bordered by cottonwood, alder, and willow, tracing its course through swampy places or meadow lands at intervals, is the preferred habitat of the beaver. The bulk of its food is made up of the bark of the tree species mentioned above, although coniferous trees are sometimes used, perhaps as an appetizer. The roots of aquatic plants are eaten also, as well as the smaller roots of tree species. In an active beaver colony, freshly peeled twigs and branches will be found lodged against

the upstream side of the dam, as well as along the stream and pond margins.

Much has been written concerning the sagacity, engineering ability, and industry of the beaver. Certainly "busy as a beaver" is an apt comparison for the industrious. The amount of tree-felling, food harvesting, and construction and repair which a colony of beavers will accomplish overnight is remarkable.

Other characteristics, while impressive, are not the unerring instincts that were often attributed to the animal by early writers. While the dams are in most instances sturdily constructed of brush, small stones, mud, and, at times, sizeable short lengths of trees, a sudden spring freshet may completely destroy a poorly located structure. That the beaver exhibits what might be considered good judgment in taking advantage of natural stream barriers in dam construction is commonly demonstrated, however. It is not unusual to find trees that have fallen across water courses, or boulders in or on the margins of streams, used to provide a portion of a dam, apparently by design rather than by accident.

The felling of trees is approached in a haphazard fashion, without regard to the direction of fall. It appears that the beaver, or beavers, set to work to gnaw the trunk through at a comfortable working height above the ground, a point they can reach from a sitting position. Where the tree falls is left entirely to chance. There may be a half circle of open space in one direction, yet it is quite possible that the tree will topple in the opposite direction and so lodge before it reaches the ground. Under such circumstances the beavers may cut another section or several sections from the butt of the tree, without eventually accomplishing their purpose.

Nevertheless, to give credit where credit is due, it must be admitted that the beaver is unique in the animal kingdom by virtue of its feats, even though these are largely the result of instinct.

Among the natural enemies of the beaver clan are listed most of the predators; fox, coyote, cougar, bear, wildcat, and where their habitats coincide, the otter. It seems that all of these exhibit a liking for the flesh of this largest of rodents, al-

though a painstaking stalk, consummated by a swift rush or leap is necessary for success, lest the beaver escape to his natural refuge, the water. The otter, of course, may enter the burrow or house and kill the young, but it is not likely that it has the strength required to deal with a full grown animal.

MOUNT RAINIER APLDONTIA, MOUNT RAINIER
MOUNTAIN BEAVER

Aplodontia rufa rainieri Merriam

A stout-bodied rodent, about the size of a muskrat, with a tail so short that it is concealed in the fur. Sexes are alike in size and color; upper parts light brown with a darker overcast, under parts a dull brown, sometimes showing white patches. Eyes and ears small.

Specimens in park collection: RNP-80, RNP-104, and a mounted specimen, Longmire Museum, Park Headquarters.

The various subspecies of aplodontia are found only along the western coast of North America, from the mountain ranges westward to the Pacific. It is not known to occur elsewhere in the world.

The Mount Rainier mountain beaver is found only on and in the immediate vicinity of Mount Rainier, where it is abundant in some localities from park boundaries to 6,000 feet. It has been reported from the Paradise River (5,200 feet), Longmire, Reflection Lake, Ohanapecosh, Comet Falls, the Rampart Ridge Trail, the Nisqually Entrance, in the Nickel Creek burn, and on the Wonderland Trail on the north side of Stevens Canyon (3,000 feet).

The common name of this animal is not particularly appropriate, since it resembles the muskrat and pocket gophers in appearance and habits more closely than it does the beaver to which it is not closely related. It prefers a wet habitat, but is not aquatic. It occasionally gnaws through the small stems of willow, alder, and other shrubs, felling them to the ground, but it makes no attempt to construct dams or canals. Tiny rivulets are often diverted to flow through the mountain beaver's burrows, perhaps by accident, possibly because the animal intended such diversion.

The food of the aplodontia includes almost every succulent plant found in the park, as well as many shrubs and the bark of

some trees. Bracken appears to be on the preferred list. During the summer months the presence of the animal in a locality is often indicated by bundles of plants cut and piled in exposed places to cure. The mountain beaver is more particular in this respect than the pika, the bundles are often rather neatly arranged on a log or stump, the base of the stems at one end of the pile, nicely evened up, and the entire bundle intact. After curing, the bundles are stored in the burrows, to serve as food and nesting material.

A rather extensive system of burrows from a few inches to a foot or two beneath the surface, and piles of freshly excavated earth are also evidence of the workings of this animal. The typical site chosen for development is ordinarily moist, probably not because the aplodontia is a lover of water, but because it is in such locations that suitable food plants abound. The burrows are constructed as exploratory routes in foraging, with what appears to be a main gallery intersected by a number of branches. These burrows emerge in thick cover or under logs, with the openings often connected by well-beaten runways where the overhanging plants and shrubs afford concealment.

Such extensive workings were found along the Wonderland Trail in Stevens Canyon in 1947 and 1948. The first indication of the activity of mountain beavers was the undermined condition of the trail in several places, where burrows crossed under the path and caved beneath the feet. Upon investigation many freshly cut stems of bracken were discovered, and several piles of recently excavated earth, in some instances sufficient to fill a bushel basket. This site was typical: excellent cover; several small streams; and deep, very moist soil with few rocks and an abundance of food plants.

Natural enemies of aplodontia undoubtedly include nearly all of the predatory animals, particularly the skunks and weasels, which can invade the dens without difficulty.

YELLOW-HAIRED PORCUPINE

Erethizon dorsatum epixanthum Brandt

The porcupine is a large, short-legged rodent (total length about 30 inches), clumsy and awkward appearing, slow-moving, bearing long, sharp quills or spines over most of the body and



The almost impregnable armor of the porcupine is adequate protection against most predators.

on the short, club-like tail. The pelage is composed of soft, brownish-black or black hair. Intermixed with the pelage, and extending beyond it are the quills and long, stiff, shiny, yellowish-tipped hairs, which give a yellow tinge to the underlying dark color. It is impossible to confuse this unique animal with any other found in the park.

Specimens in park collection: RNP-42, RNP-47, and a mounted specimen, Longmire Museum, Park Headquarters.

The several species of porcupine are widely distributed, ranging in the timbered regions of the northeastern states, the Rocky Mountains from near the Mexican boundary northward, and from northern California into Canada and Alaska.

Formerly rare, the first actual record was of a single individual in Paradise Valley in 1933, porcupines are increasing throughout the forested areas of the park, although the animal is still considered uncommon.

An apparent lack of interest or concern in events is probably the outstanding characteristic of the porcupine. Protected as it is with an almost impregnable defense of quills, it has no need

for speed and shows little fear of any other creature, even man. If pursued when encountered, it will waddle away at top speed, which is about equal to a man's brisk walk. If crowded closely, the animal will take to the nearest tree if given the opportunity, or may thrust its head beneath a convenient root, log, or rock, then thrash the muscular tail about vigorously in an effort to discourage attack. The tail is indeed a formidable weapon. The quills are loosely attached to the skin, and are readily detached when they strike any object. They may even be loosened by the swinging of the tail, and fly through the air for a short distance. It is conceivable that quills thus detached might actually penetrate the skin at short range, but a porcupine can not "shoot" its quills.

During the winter months "Porky" feeds upon the bark of various trees, with an apparent preference for the conifers and coniferous foliage. At times a single tree may furnish food for several days. The porcupine is not a traveler, and rarely moves far, since food is ordinarily readily available. In summer bark is eaten at times, but the diet is predominantly the leaves and new twigs of shrubs, grasses, and succulent plants.

The inordinate liking for salt exhibited by the porcupine is well known. Tool handles which bear a trace of dried perspiration are eagerly devoured; it is common to find table-tops and other articles of furniture in abandoned camps almost destroyed if they retain any evidence of bacon, salt pork, or other salty foods. This habit has created a hearty dislike among campers and woodsmen for the "quill-pigs," and they are notorious as camp nuisances.

Because of its nocturnal habits, the porcupine is not often seen. It prefers to remain concealed in the uppermost branches of a thick-foliaged tree, or perhaps in a hollow stump or log during the day, venturing out at dusk to forage.

Natural enemies of this animal include many of the predators, although the protection afforded by the quills is sufficient to discourage attack in most instances. Perhaps extremities of hunger result in desperate attempts upon occasion, but it is difficult to imagine any flesh-eater coming out better than second-best in an encounter, with one exception. Observations and records

of naturalists, trappers, and other competent observers throughout the north woods country indicate that the fisher is an implacable and deadly enemy of the porcupine, which is the fisher's favorite prey and which it kills by tearing open the unprotected belly. Observers have found trapped fishers to contain porcupine quills in the intestines and in other parts of the body, with no apparent harmful effects. Since the fisher has been almost exterminated over most of its range within the United States, however, it cannot be regarded as an effective check upon the increase in the porcupine population. In rare instances, coyotes and cougars have been recorded as preying upon the porcupine, and forest fires have been important in reducing their numbers in the past.

THE VARYING HARES

Two kinds of varying hares, or snowshoe rabbits, are known to occur within the park. A brief discussion of each follows:

The Washington varying hare, *Lepus americanus washingtonii* Baird, is a medium-sized hare, larger than the common cottontail rabbit. Mammalogists differ in their discussions of the coloration of this species. The variations of opinion are of interest. H. E. Anthony, in his *Field Book of North American Mammals*, thus describes the Washington Varying Hare:

"Summer and winter pelages both dull, dark reddish brown (no white winter pelage); tops of feet more intense reddish; soles of hind feet sooty."

Taylor and Shaw, in *Mammals and Birds of Mount Rainier National Park*, are in general agreement with Anthony's description of summer pelage, but describe the winter coat as follows:

"In winter in the lowlands the pelage merely puts on a slightly paler or more vinaceous cinnamon tinge; but in Mount Rainier National Park a white coat is assumed."

Still another observation was made by Mr. Walter W. Dalquest of the Department of Zoology, University of Washington. After examining study skins of the varying hares collected in the park, Mr. Dalquest made the following comments in a letter addressed to the park naturalist (April, 1939).

"The snowshoe hares of the entire Western Cascade region are a very interesting but mixed up group. I should

refer all three of your specimens to *Lepus americanus washingtonii* plus *cascadensis*.

"The summer specimen from Longmire seems to be typical *washingtonii* in color and skull. The white winter specimen seems to be typical *cascadensis* while the very dark specimen (still in winter coat) represents an interesting condition found only in the Western Cascades, in which the specimens are darker than any other forms of *Lepus americanus* I have ever seen. This character is well represented in a large series from Skykomish, Washington, in which the winter coat varies from pure white to almost black."

From these observations it would appear that there is a marked variation in the winter coloration of *Lepus americanus washingtonii*, and further that another subspecies of varying hare, *Lepus americanus cascadensis*, is found in the park.

The Washington varying hare is not abundant in the park, having been recorded only from the southwestern section, from the park boundary to an elevation of about 3,000 feet, rarely higher.

It occurs on the western slope of the Cascades to the coast in Washington, and northward into British Columbia.

The Cascade varying hare, *Lepus americanus cascadensis* Nelson, is about the same size as the Washington varying hare. In summer it is a dark, rusty brown, reddish along the back, darker on the rump; white in winter.

This hare apparently occurs most frequently in the southwestern part of the park also, although tracks observed in winter at Yakima Park may have been those of this species. Its range undoubtedly overlaps that of the Washington varying hare, but it seems probable that in general it is found at the higher elevations, 3,000 to 5,000 feet.

The distribution of this species, within its altitudinal range, is about the same as that of the Washington varying hare.

Specimens in park collection: Washington varying hare, RNP-57, RNP-99, and a mounted specimen; Cascade varying hare, RNP-98; Longmire Museum, Park Headquarters.

From the foregoing data, it is apparent that positive field identification of either species is impossible in most instances.

If a brown hare is observed in winter (mid-October to mid-April) it may be identified with reasonable accuracy as the Washington varying hare. However, if the hare is white, it may be either species, particularly if its habitat is near the elevation of overlapping distribution, 3,000 feet. Since the summer pelage of both species is similar, it is not possible to differentiate during that season. In general the observer may expect to find the Washington varying hare at 3,000 feet or lower, the Cascade varying hare at 3,000 feet or higher. That such identification can not be considered infallible, however, is demonstrated by a brown specimen collected near Reflection Lake, elevation 4,800 feet, in February, and identified as the Washington varying hare.

The aptness of the common name, varying hare, is easily understood, since it applies to the seasonal change of color, brought about by the shedding of the coat during the moult. The term "snowshoe rabbit" is derived from the long, broad hind feet of the animal, Nature's wise provision which permits rapid and efficient progress over deep, soft snow.

The food preferences and habitats of the snowshoe rabbits are similar. Both species prefer the dense cover of swamps and thickets, which provide excellent protection from hawks and owls above as well as avenues of escape from coyotes, foxes, and other predators on the ground. Every large predator is the enemy of the snowshoe.

Green plants, grasses, and clover make up the bulk of the food in summer. The winter diet consists chiefly of the bark, buds and twigs of various trees and shrubs. Coniferous foliage is often eaten.

WESTERN BUSHY-TAILED WOOD RAT

Neotoma cinerea occidentalis Baird

This large, gray-brown rat (head and body nine inches, tail eight inches), can not be mistaken for any other park animal. It closely resembles a several times magnified white-footed mouse, except that the tail is so well-haired as to be almost like that of a squirrel. The ears are conspicuous, the eyes large and lustrous, the feet, underparts, and underside of the tail are dull white.

Specimens in park collection: RNP-19 and RNP-20, Longmire Museum, Park Headquarters.

The wood rats are found over the western United States, northward into western Canada, and in some of the southeastern and mid-western states.

The Mount Rainier species inhabits southern British Columbia, all of Washington and Oregon, northern California and Nevada, and most of Idaho. In the park it is found from park boundaries to forest line, rarely higher, and is not common, although Taylor and Shaw (1919) found it "unusually abundant in the timber along Tahoma Creek," and recorded one individual at Camp Muir (10,000 feet).

Every woodsman has a fund of "pack rat" stories, nearly all of them emphasizing the thieving propensities of the animal, and every story has a basis, at least, in fact, because the wood rat will usually pick up and carry away anything about the camp that strikes his fancy, if such articles are not beyond his physical powers. At times these treasures may be found cached away in a bulky pile of dead twigs, leaves and other debris in some rock crevice, but the wood rats seem to place little dependence upon these "nests" as a place of refuge, preferring to retreat into a more adequately protected spot in the rock mass itself.

These animals are ordinarily nocturnal in habit, but may occasionally be seen by day. They are not excessively shy, and oftentimes create quite a disturbance with their nightly prowlings when they are found about campsites or dwellings. Their presence is frequently made known by a soft "thump-thump-thump" made at regular intervals of about one second by tapping a hind foot on the ground, rock, or some object.

The wood rat has a distinct musky odor, and a cave, crevice, or cabin in which they have established residence can be recognized at once, even by man's inferior sense of smell, by the atmosphere.

It is readily apparent from the preceding discussion that the reputation the wood rat has made among woodsmen and campers as a nuisance is not ill-founded. They are interesting and active creatures, however, not nearly so unsavory as the name "rat" implies, and in many instances the entertainment they provide outweighs their less engaging habits.



The inquisitive and abundant white-footed mice are immaculately clean animals.

WASHINGTON WHITE-FOOTED MOUSE, DEER MOUSE

Peromyscus maniculatus oreas Bangs

The white-footed mouse is about the size of a house mouse, with the head and body about three and one-half inches in length, the tail about four and one-half inches. The ears and eyes are large; the tail is comparatively long, blackish-brown above, white below. The general coloration over the head and back is a rather dark tawny-brown, intermixed with black hairs, with a preponderance of black toward the base of the tail. The underparts are white, with the lead-gray hair bases showing through; the feet are white. In examining this mouse, the impression is one of an immaculately clean little animal, definitely at variance with the usual conception of mice.

Specimens in park collection: RNP-3, RNP-4, RNP-22, RNP-23, RNP-35, RNP-36, RNP-37, RNP-38, RNP-39, RNP-77, RNP-84, and RNP-91, together with a mounted specimen; Longmire Museum, Park Headquarters.

The white-footed mice are distributed over nearly all of North America south of the Arctic Circle.

The Washington species is found in the western part of the state and northward into southern British Columbia. On Mount Rainier it occurs throughout the park to elevations well above forest line, and has been recorded on the summit of the Mountain.

The inquisitive, active, and abundant white-footed mice are attractive and familiar inhabitants of the woods about the Mountain. They are readily adaptable to a variety of conditions, and are quick to invade camps and dwellings in search of shelter and food. They are particularly fond of cereal grains, and will often damage clothing left within their reach, since these materials are evidently highly prized for the nest. Campers will do well to protect food-stuffs and garments from their foraging instincts.

These animals are nocturnal in habit, it is rare to see them abroad by day. They feed upon a wide variety of plant seeds and vegetable material, and are preyed upon by all of the four-footed carnivores, as well as the owls.

RAINIER POCKET GOPHER

Thomomys talpoides shawi Taylor

The sturdily built pocket gopher, with its long, sharp, fore claws, tiny eyes and ears, external cheek pouches, robust body, and short legs, can hardly be confused with any of the other rodents. The head and body are about six inches in length, the thinly haired, whitish tail about two and one-half inches. The color is light brown above, with the lead-colored hair bases showing through in places; paler brown on the sides; gray-white below, with white on the throat and a small, irregular white patch on the nose.

Specimens in park collection: RNP-101, Longmire Museum, Park Headquarters.

The pocket gophers are widely distributed over western North America, and are abundant in many regions.

In Mount Rainier National Park the local species is found on the east side of the park in the Hudsonian Zone above 4,500 feet, usually on the grassy hillsides and in the open meadows.

These animals are burrowers in the true sense of the word, rarely venturing above ground, but constructing elaborate systems of connecting tunnels a few inches beneath the surface. Because of this subterranean habit they are seldom seen, although the evidences of their presence may be conspicuous. Mounds of freshly turned earth scattered about over a meadow indicate that active excavations by pocket gophers are in progress.

The fore claws are well adapted for the purpose of digging, and as the burrow progresses, the earth is disposed of by thrusting it out through a surface opening. Careful observation may be rewarded by a glimpse of the head, shoulders and forelegs as the gopher accomplishes this disposal, thus forming the mound of earth, which eventually closes the emergence hole. When not in use, these openings are closed by earthen plugs.

Pocket gophers feed almost exclusively upon the roots and bulbs exposed by their burrowing activities, although at rare intervals they may move a short distance from the burrow to gather surface food.

Earth excavated during the winter months is firmly packed in tunnels which the gopher makes on the surface of the ground beneath the snow. These winding ridges of earth are revealed by the melting snow as further evidences of pocket gopher activity.

THE MEADOW MICE

Three species of meadow mice are known to inhabit the park, and of these, two are so similar that the positive field identification of each is difficult in most instances. Only the Cascade meadow mouse, or water vole, shows sufficiently distinctive characteristics to permit easy recognition. Of the two similar species, the Oregon meadow mouse is probably most likely to be encountered.

The Oregon meadow mouse, *Microtus oregoni oregoni* (Bachman), is similar in general coloration to the Olympic meadow mouse, but has conspicuous ears, is distinctly smaller, and has been found from park boundaries to 5,000 feet and higher.

The Olympic meadow mouse, *Microtus longicaudus macrurus* Merriam, is dark brown above, with slightly paler sides, and with under parts a dull buff or whitish. The tail is distinctly bicolor, black or brown above, white below. The ears are inconspicuous. The head and body measure about five and one-quarter inches, the tail about three and one-half inches. This mouse is rarely found above the 3,000 foot elevation.

The Cascade meadow mouse, *Microtus richardsonii arviculoides* (Rhoads), is much larger than any of the other species found in the park. The head and body measure about six inches, the tail a little over three inches in a typical specimen. In general this species prefers a moister habitat than the other meadow mice, and is usually found from 4,000 feet to forest line (6,500 feet). It is the most abundant of the park mammals found at high elevations, and has been recorded at Camp Muir, 10,000 feet.

Specimens in park collection: Oregon meadow mouse, RNP-27, RNP-32, RNP-51, RNP-71; Olympic meadow mouse, RNP-31; Cascade meadow mouse, RNP-5, RNP-26, RNP-48, RNP-49, RNP-50, RNP-59, RNP-60, RNP-75, RNP-81, RNP-109; Longmire Museum, Park Headquarters.

As the name implies, the general habitats of these rodents are the open parks and meadows, from park boundaries to above the forest line. They are locally abundant in many places, and are active throughout the year, feeding upon the various green and succulent plants, burrowing along the surface of the ground beneath the snow to find food in winter. Only the Cascade meadow mouse shows any marked deviation in its habits, being semi-aquatic, at least in summer, with a marked preference for marshy or boggy meadows, taking to the water readily to escape danger, and burrowing along the banks of small streams. In winter this mouse often seeks the hillsides and normally dryer sites, probably in search of a more abundant food supply, the change in habitat being encouraged by abundant winter moisture. These hillside habitats often reveal earthen tunnels on the ground surface as the snow melts, similar to those made by the pocket gopher. Mounds of earth thrown up around the burrows of the Cascade meadow mouse are also similar to the gopher mounds, but may be distinguished from the latter by the open burrows, often left so, rather than being closed by earthen plugs.

It is well that the meadow mice are so abundant and prolific, since they constitute a large portion of the food supply of coyotes, foxes, and other predators.

MOUNTAIN LEMMING MOUSE, OLYMPIC PHENACOMYS, HEATHER VOLE

Phenacomys intermedius oramontis Rhoads

The lemming mouse is similar in appearance and habits to the meadow mice; the head and body are four and one-half inches to five inches long; the tail from one to one and one-half inches. The back is a grizzled gray-brown, showing a yellowish tinge; the belly is gray-white; the fur is sprinkled with black hairs. The dull color and short tail distinguish this mouse from all others except the Oregon meadow mouse. The latter is slightly smaller, the hair is less woolly, but field distinction is difficult or impossible.

Specimens in park collection: None.

The genus *Phenacomys* is found in the western United States and most of Canada, inhabiting the mountain summits and colder zones.

The Olympic phenacomys of Mount Rainier occurs only at the higher elevations, 4,500 to 8,500 feet in the park, and its range extends into the Olympic Mountains, as well as southward along the Cascade crest into central Oregon.

The alpine parks and windswept slopes well above forest line are the home of the hardy little lemming mice. One of the common names for the animal, heather vole, is suggestive of the locality where they may be found, finding shelter in the protection afforded by the low-growing masses of the heather. Their range is not entirely confined to the alpine country, however, since records have been established in the upper forested areas, down to a low elevation of 4,000 feet.

The only conspicuous evidences of the presence of the heather vole are the tidy, compact winter nests of dried grass, lichen, and other plant fibers. These nests, constructed on the ground under the snow, are apparently abandoned when the snow

melts, and it is difficult to discover other signs of the animal's activities.

Like the meadow mice, the mountain lemming mouse is a staple item in the diet of the predators.

CASCADE RED-BACKED MOUSE

Clethrionomys gapperi cascadiensis Booth

The red-backed mouse is slightly larger than a house mouse; in a typical specimen the head and body are about four inches long, the tail slightly less than two inches. The distinguishing characters which separate this animal from the other mice are the broad, reddish-brown stripe over the back from the forehead to the base of the tail (this stripe distinguishes it from the field mice), and the inconspicuous ears and short tail which are so different from the large ears and long tail of the white-footed mouse.

Specimens in park collection: RNP-17, RNP-62, RNP-63, RNP-65, RNP-66, RNP-67, RNP-68, RNP-69; Longmire Museum, Park Headquarters.

The many species of red-backed mice occur generally over the wooded sections of North America.

The Cascade red-backed mouse is found in the Cascade Mountains from British Columbia southward into Washington, east into northern Idaho and northeastern Oregon. In Mount Rainier National Park it occurs generally from park boundaries to forest line.

The heavily wooded areas of the park are the preferred habitats of the red-backs. They are usually common in such localities, but are not locally abundant in colonies, as are the field mice.

The activities of these mice are not confined to nocturnal excursions. They may be seen at any time of day, and the quiet observer in the deep woods is almost certain to glimpse them if he is patient enough to watch for a few moments.

NORTHWESTERN JUMPING MOUSE

Zapus princeps trinotatus Rhoads

The Northwestern jumping mouse is a little larger than a

house mouse, head and body about four inches, tail about six inches. The back is dark, sprinkled with buff; a broad band of buff, sprinkled with blackish hairs, extends along the sides; the underparts are pure white. The long tail is dull gray above, white below, and almost naked except for a tiny tuft of dark hair at the tip. This mouse may be easily distinguished from any other park animal by the long hind legs and tail.

Specimens in park collection: RNP-6, RNP-24, RNP-25, RNP-52, RNP-53, RNP-54, RNP-58, RNP-73, RNP-76, RNP-92; Longmire Museum, Park Headquarters.

The jumping mice are found throughout most of the United States from northern California and North Carolina, northward into Canada to the Arctic Circle. The Northwestern jumping mouse occurs from northern California through the Cascades to the coastal region of southern British Columbia.

In Mount Rainier National Park this animal is found irregularly from park boundaries to 6,000 feet. It is not common and is rarely seen.

The usual habitats of the jumping mice are the subalpine parks and meadows, where they may sometimes be abundant in a restricted locality. They hibernate from early fall until late spring, and during their period of summer activity they rarely leave the nest during daylight hours. The nests are on the ground, small and dome-shaped, made of dried grasses.

THE MOLES

Within the park are found three different kinds of moles, two of which are very closely related and similar in general appearance. The third is distinct in size and coloration.

The Townsend mole, *Scapanus townsendii* (Bachman), is considered to be the largest of its kind on the continent, with a total length of about eight inches. The body is stout, with tiny eyes, short legs and tail. The fur is dense and velvety, blackish-brown in color, usually with a purplish tone.

It is found in "extreme northwestern California, Oregon and Washington west of the Cascade Mountains" (Jackson). Little is known about its status within the park. Workings were ob-

served and a specimen collected at Spray Park (5,500 feet) in 1919.

The coast mole, *Scapanus orarius orarius* True, is smaller than the Townsend mole, attaining a length of about six and one-half inches. Its coloration is black or blackish-brown above, with the underparts more grayish in tone.

This species is found in the humid coast region of northern California, Oregon and Washington. It is apparently not common in any part of the park, but has been collected at Longmire and the Owyhigh Lakes.

The Gibbs shrew-mole, *Neurotrichus gibbsii gibbsii* (Baird), is a very small mole, about the size of a house mouse, around four inches in total length. The entire coloration is dark grey, with the longer hairs frequently tipped with whitish.

This mole is found in extreme southwestern British Columbia, western Washington and Oregon west of the Cascade Mountains, and south into California in the coast region and interior west of the Sierra Nevada Mountains. It occurs rather commonly throughout the park below 4,000 feet, although an occasional record has been obtained at elevations in excess of 5,000 feet. Its habitat is around grassy swamps and near streams.

Specimens in park collection: Townsend mole, none; coast mole, RNP-105; Gibbs shrew-mole, RNP-21, RNP-106, RNP-112, RNP-114; Longmire Museum, Park Headquarters.

The mole is often confused with other small mammals, especially the rodents. However, it does not belong with the rodent group and can readily be distinguished by its short, very stout front legs which end in broad, handlike feet with the palms turned outward; and by its pointed nose; short tail; elongated body with fine, plush-like fur; and the apparent absence of external eyes and ears.

The mole is one of Nature's strangest creations. From birth it is destined to live underground, working diligently in total darkness to obtain the food necessary for its existence. Its appetite seems never to be satisfied and captive specimens have been known to eat more than their own weight in a single day. Earthworms and grubs make up the major portion of the food eaten,

although beetles, spiders, various insects and occasionally plants are of importance. The mole has the dubious distinction of being of great value to the farmer because of the worm pests he destroys, yet is regarded in return as one of the farmer's worst pests. A large part of this bad reputation arises from the damage done growing plants by rodents that use the mole burrow to reach the tender flower bulbs and growing roots found underground.

While hawks, owls and small mammal predators take a limited number of moles as food, high water in areas containing their homes constitutes an important factor in controlling their abundance. The heavy rains and snow runoff in the park probably has much to do with the local mole population.

THE SHREWS

The smallest of our North American mammals, the shrew, is represented in the park by six different forms, all closely related and similar in general appearance.

The wandering shrew, *Sorex vagrans vagrans* Baird, is a small shrew with dark brown upperparts and ashy gray underparts. The tail tends to be bicolor with a dusky color above and paler below.

This species is found from southern British Columbia through western Washington and Oregon into northern California. Only two records have been obtained from the park. These came from a specimen trapped at Bear Prairie (2,000 feet) about three miles south of Longmire and from one taken in Stevens Canyon (no elevation given). The wandering shrew lives in areas where there is considerable moisture and a damp, heavy forest cover.

The Olympic dusky shrew, *Sorex obscurus setosus* Elliot, is a fairly large shrew with upperparts brown with a few light-tipped hairs, the lower parts ashy washed with buff. The tail is brown above and yellowish-white below.

This shrew is found from the Cascades westward and south as far as the Columbia River. In the park it has been recorded in a number of localities ranging from 2,000 to 6,800 feet in elevation. It is normally found in moist situations where the undergrowth is heavy and is one of our common shrews.

The cinereous shrew, *Sorex cinereus cinereus* Kerr, is of medium size and difficult to separate from the dusky and wandering shrews. It is distinguished by its small size and pale color.

This species "ranges over most of Alaska, Canada and the northern half of the United States" (Dalquest). Within the park it has been recorded only along the Paradise River, and data are lacking regarding its range.

The Trowbridge shrew, *Sorex trowbridgii trowbridgii* Baird, is a large shrew, about three-fourths the size of a common house mouse. In coloration it is black or grayish above, lighter below. The tail is sharply contrasting blackish above and whitish below.

This shrew is found west of the crest of the Cascade Range in Washington and Oregon, and has been collected in the park at Ohanapecosh (2,000 feet), Tahoma Creek (2,500 feet), and Longmire (2,700 feet). It prefers dark woods and moist situations.

The navigator water shrew, *Sorex palustris navigator* (Baird), is a large shrew about the size of a house mouse, with small fore feet and broad hind feet. Its coloration above is dark brown or blackish with some of the hairs whitish tipped, the underparts are whitish-gray. The tail is brown above and pale gray below.

This species is found from the Rocky Mountains and the outlying ranges of British Columbia to southern Colorado, and in California as far south as Sequoia-Kings Canyon National Park. It is commonly encountered from the lowest elevations in the park up to around 8,000 feet, and is usually found along stream banks and at lake outlets.

The Bendire water shrew, *Sorex bendirii bendirii* (Merriam) is about the size of a house mouse, a sooty-gray color above and slightly paler below.

It is found in the Klamath section of Oregon, a narrow strip along the coast of California, and in the Cascades from Washington to British Columbia. It has been recorded at elevations ranging from 2,000 to 4,000 feet on the west and south sides of the park. Like all water shrews it prefers moist areas and is

usually found around wet meadows or in the forest cover near lowland creeks.

Specimens in park collection: Wandering shrew, RNP-89; Olympic dusky shrew, RNP-55, RNP-88; cinereous shrew, none; Trowbridge shrew, RNP-61; navigator water shrew, RNP-64, RNP-83, RNP-90; Bendire water shrew, RNP-1, RNP-56, RNP-72; Longmire Museum, Park Headquarters.

Because of their secretiveness and tiny size the shrews are seldom observed, although they are relatively abundant in the park. By stationing oneself in an elevated spot near a grassy stream bank or in a damp, shady, forested area it is sometimes possible to observe the actions of these small creatures. While their diet is largely composed of insects, they do eat such things as worms, as well as small birds and mammals that they can kill. They are very nervous animals and extremely courageous hunters, and will attack and kill other mammals much larger in size. They require an abundance of food to live and will die if deprived of food for even a few hours. This might lead one to suppose that they are somewhat weak, but such is not the case. They are active throughout the year, being seen abroad under even the most rigorous climatic conditions.

THE BATS

Of the four types of bats known to occur in the park, only two are closely related. These two are very small as compared to their larger cousins.

The Miller bat, *Myotis yumanensis saturatus* Miller, is a small bat with the upperparts dark glossy yellowish brown and the underparts golden. The sides, chin and throat are somewhat darker than the underparts. The fur over the entire body is slaty black at the base. The membranes of the wings are blackish.

This bat is found in the transition zone of British Columbia, Washington, Oregon and northern California, along the coast.

It has been taken at Longmire, Paradise Valley and Sunset Park. It stays in the forests of the park, only occasionally being seen above the open meadows.

The coloration of the Northwestern long-legged bat, *Myotis volans longicrus* (True), above is dark brownish, sometimes

blackish; the underparts are dusky brown. The ears and wings are blackish. This bat cannot be distinguished in flight from the Miller bat.

It is found in the humid coast and mountain region from Admiralty Island, Alaska, to Monterey County, California.

While it is apparently fairly common at the lower elevations, very few collections have been made. It has been taken at St. Andrews Park (5,500 feet) and at Longmire.

The silver-haired bat, *Lasconycteris noctivagans* (Le Conte), is a medium sized bat with dark brown or blackish coloration above and below. Many hairs on the back and underparts are tipped with white, with the white tips most numerous on the middle of the back. The wings are dark brown.

This bat occurs on the North American Continent north of Mexico, ranging from the Pacific to the Atlantic.

There is as yet no evidence that this bat actually stays within the park for any length of time. It is believed that it only moves through during migration. Records thus far obtained are during September, at elevations around 5,000 feet.

The Townsend lump-nosed bat, *Corynorhinus rafinesque townsendii* (Cooper), is of medium size, with long thin ears and two prominent lumps on either side of the nose. The coloration is dark brown above, somewhat lighter below, the base of the fur is dark slaty. The ears, feet and wings are dark brown.

The Townsend lump-nosed bat occurs from southern British Columbia southward through most of Washington and Oregon, and along the coast into California as far south as San Francisco.

Only one record has been obtained from the park, a specimen collected at Longmire in September, 1937.

Specimens in park collection: Miller bat, RNP-85; Northwestern long-legged bat, none; silver-haired bat, none; Townsend lump-nosed bat, RNP-93; Longmire Museum, Park Headquarters.

The bats are among the most feared and least known of any of our mammals. Many people are afraid to have anything to do with them, and everyone is familiar with the old belief that,

given the opportunity, a bat will fly into one's hair. Yet the bats that are so common in North America are weak and entirely harmless. Far from being harmful to man, they serve a most useful function in destroying various insects. The worst problem the bat presents is the habit some species have of using buildings as a place to sleep.

Although possessing a wing-like structure, the bat does not have a wing in the sense that a bird has. The "wing" consists of a much modified hand with very long fingers. This is covered with a thin, but very tough membrane, that enables the animal to fly. The bat's flight is seemingly aimless, but is actually purposeful. It is during these "drunken flights" that it catches the insects upon which it lives.

By far the most astonishing and marvelous feature about the bat's anatomy is the delicate mechanism that guides it in flight. This animal has operated on the principle used by radar thousands of years before man discovered the device. The hearing is extremely acute and bats are able to receive sound impulses at a vibration frequency too high for the human ear. During flight it sends out shrill cries of high vibration frequency. As these sounds travel out through space they are reflected back by any object, large or small, that they strike. Through sensitive ears the bat receives these rebounding sounds and thus is aware at all times of the nearness of any object. This explains the bat's uncanny ability to fly through a room in total darkness without striking even such small objects as wire or lamp cords. This ingenious device fails around water, however. Experiments have shown that a small wire stretched just above the surface of a pond is not "seen" by the bat when it swoops down to get a drink.

Some bats rest in leafy treetops where they cling to small branches. Most species stay in hollow trees or caves during the daytime, and "bat caves" are common in many parts of the country, the most famous one is at Carlsbad Caverns National Park. While resting or sleeping the bat hangs head downward, always in a position to drop and fly at any moment. It is helpless on the ground, and must obtain sufficient elevation to allow for a few inches of drop before it can fly.



*One of the most elusive animals in the park is
the coyote.*

MOUNTAIN COYOTE

Canis latrans lestes Merriam

The mountain coyote resembles a small collie dog in size, with a slender body, erect, pointed ears, and bushy tail. The upper parts of its body are light brownish gray, with numerous long, coarse, black hairs. The under parts are whitish, with the long hairs of the throat tipped with black. The tail is heavily tipped with black above and light beneath. The muzzle and crown of the head is a bright yellowish brown.

Specimens in park collection: RNP-98, Longmire Museum, Park Headquarters.

The geographical distribution of the coyote includes all of western North America. The mountain coyote is found from British Columbia southward through Washington, Oregon, and the highlands of the Great Basin, Sierra Nevada and Rocky Mountains to the plateau region of northern Arizona and down the Continental Divide in New Mexico to the Mexican border.

It is found locally throughout the park, at all elevations from the extreme lower portions to forest line, although usually more abundant in the vicinity of the old fire burns near the south and west boundaries.

The shrill, wild, evening song of the coyote rising from an open slope or brushy burn never fails to bring the listener to a rapt and keen attention. There is a spine-tingling, eerie quality in the call that seems symbolic of a wilderness land. It is descriptive also, in that it may sound like one animal or a pack. Usually it is heard at sunset or on moonlight nights in the fall or winter, as the pack gathers for the night's foraging.

The park is not especially well suited to the coyote, as it lacks the open sagebrush flats and rolling hills that are such important parts of the animal's natural environment. Coyotes are highly adaptable animals, however, and seem to fit themselves into almost any habitat. Having respect but little fear of man, they are often found even in the farming districts and near the smaller towns. Wherever there is sufficient food there seem to be coyotes, even though they are mercilessly hunted in many such localities.

Food consists mainly of small animals, such as ground squirrels, mice, chipmunks and marmots, although an occasional deer falls prey to this wily hunter. Fruits and berries are eaten in large quantities when available. During the late summer it has been observed catching grasshoppers in the open meadows, such insects are staple articles of diet. The wild antics of a coyote as it dives and twists trying to capture an agile grasshopper, sometimes apparently as a game rather than in a serious quest for food, afford an amusing picture. As a mouser the coyote is hard to equal, and it may frequently be seen in the early evening catching meadow mice. Destruction of deer is not overly extensive, with the old animals and an occasional unwary fawn being the principal victims. Once in a while a deer is found that refuses to become an easy prey and a merry chase often follows—this time with the coyote beating a hasty retreat with the enraged, wouldbe victim close behind. There are numerous instances of such chases on record, and authentic observations of coyotes being knocked down and trampled by deer.

Coyote pups, normally about five to seven in a litter, are usually born in April or May and have all the playful characteristics of a puppy dog. Just as soon as they are able to walk, they may be seen around the entrance to the den where they tug and pull at each other in mock ferocity. As they grow older their interest in the outside world keeps pace with their growth, and by fall they are out learning the serious business of obtaining food under the direction of the father or mother, or both. It is during this time that they range in family groups of five or six animals.

TIMBER WOLF

Canis lupus fuscus Richardson

The wolf is a large, dog-like animal, with dull yellowish-brown fur, heavily clouded over the back and tail with black-tipped hairs. Occasionally it is almost entirely black or grayish. The young are black at birth, changing later to the adult coloration.

Specimens in park collection: None.

These animals were formerly found over most of the United States, Canada, and Alaska, but they have been exterminated over much of the original range. A few wolves are still found in the timbered regions west of the Cascades from Oregon northward through Washington, British Columbia and into Alaska.

At one time they were reported from several localities in the park, but gradually they were killed off throughout central Washington until they were apparently exterminated in the park prior to 1930. Since that time single animals have been reported in 1933, 1937, 1941, 1943 and 1947. These records appear to be those of stragglers that wander into and out of the park. The wolf can thus be considered as rare in the area today.

The heavily forested ridges and slopes near old fire burns appear to be the type of habitat preferred, and most of the local records are from such areas. The wolf seems to prefer the heavy timber for its home, but uses the more open areas for hunting, as it is in these old burns that deer, elk, rabbits and other important food sources are found. Being extremely shy and silent, the animal is seldom seen even when known to be present.



The "silver" color phase of the red fox transforms an alert and attractive animal into a creature of rare beauty.

Little is known regarding the family life of the wolf, although the adults are devoted parents. Apparently the pups number from five to ten, and are born in March or April. They usually stay pretty close to the den, which is a large hole in a bank, or a protected nook in a log jam, rock slide, or similar situation. Here they spend their puppyhood, an always hungry family even though their parents may bring in large quantities of food. In the late summer and early fall they are taken out in a group or pack and taught the essentials of successful hunting.

Powerful and intelligent, the wolf stands out as one of Nature's finest predator creations. It is unfortunate that man's economic interests and the food habits of the wolf clash, and the continuous campaign of extermination being waged can have but one inevitable result unless public appreciation of this now rare wilderness animal increases. Like other magnificent predators before him, the wolf appears doomed over most, if not eventually all, of the United States.

CASCADE RED FOX

Vulpes fulva cascadensis Merriam

The Cascade red fox is about the size of a small dog, with a very slender body, bushy tail, erect ears and pointed muzzle. It may have several color "phases" of which the red is the one most often seen. In the "red" phase the head and upper parts are a straw yellow; ears blackish and underparts white. The tail is yellowish mixed with black, with a prominent white tip. The "cross" phase is of the same general coloration as the red, but has a dark band running across the shoulders and a dark band down the back, another dark band runs from the chin down the throat onto the belly. The "black" or "silver" fox is all black with silver-tipped hairs, excepting the white tip of the tail. A litter of pups may contain all of the various color phases.

Specimens in park collection: None.

The red foxes occur over most of the United States and Canada. The Cascade red fox ranges from the northern Sierra Nevadas through the Cascades of Oregon and Washington.

It is found in the park at all elevations up to forest line.

Shy and cunning, this beautiful animal is seldom seen, yet is relatively common, especially around the alpine meadows, where its short, sharp bark is sometimes heard in the late evening. One pair of foxes has raised families for several seasons within a short distance of the busy highway to Paradise Valley near Marmot Point, while residents of Longmire have had the thrill of seeing more than one of the shimmering "silver" foxes around their yards.

Few animals are so graceful and agile, and to watch a fox stalking a mouse is to see a gifted expert in the art of hunting. Soundless, alert, poised, it is a wary mouse that successfully escapes the lightning-like pounce. Food is largely made up of such things as mice, ground squirrels, chipmunks, rabbits, wood rats, and other small game such as birds and insects. Berries and fruit are eaten in season.



A resident of the dense forest, the marten is a member of the weasel family.

NORTHWESTERN PINE MARTEN

Martes caurina caurina (Merriam)

This animal is slightly smaller than a house cat, with soft, heavy fur and a bushy tail. The coloration above is rich, dark brown, darker along the back and tail; face grayish; a large patch of buff or orange on the throat and breast.

Specimens in park collection: RNP-44, RNP-108; Longmire Museum, Park Headquarters.

Martens inhabit the forested regions of northern North America. The Northwestern pine marten is found from southern British Columbia south to northern California, in and west of the Cascade Mountains.

It is fairly common from the park boundaries to forest line, especially around the Paradise and White River valleys.

This beautiful and graceful member of the weasel family is chiefly seen after nightfall, but is also occasionally encountered along the trails during the day. At Paradise Valley a pair lived in the old Community House for several years, and were the source of a keen thrill to the visitors who saw them playing around the building. For the most part the marten is a resident of the dense forest. It is an expert climber, travels through the trees almost as well as a squirrel, and is equally at home among the talus slopes where it searches for conies.

The marten eats a wide variety of foods, with small game such as mice most commonly taken. Chipmunks, wood rats, squirrels, rabbits, pikas, birds and occasionally insects and berries are other important food items. Young martens are usually born from April to June and normally number around four to six in a family. The home is located in hollow trees or logs, or among the rocks.

FISHER

Martes pennanti (Erxleben)

The fisher is considerably larger than the marten, although resembling this near relative in general characteristics. The coloration above ranges from buffy gray to brownish black, with the under parts black or blackish. The hair over the head, neck

and shoulders has a grayish appearance. Spots of white may occur on the throat and breast.

Specimens in park collection: None.

The fishers are now confined almost entirely to the north-eastern United States and Canada, west to British Columbia, although rather common in the Sequoia-Kings Canyon National Park.

Its occurrence within the park is open to question as no records have been obtained for several years. Investigation in the more remote sectors may disclose its presence. It was once known to range from the park boundaries to forest line.

The name "fisher" is somewhat of a misnomer, as the animal is not known to catch fish or even to live close to streams. It will eat fish if the opportunity arises, however. It has a wide variety of common names, including that of pennant marten, pekan, and black cat.

Like the marten, the fisher is a lover of the deep woods and is reportedly very agile in the trees. It feeds principally upon rabbits, squirrels, mice, small birds, and frogs. It is not adverse to killing and eating the marten. One of its most interesting sources of food is the porcupine, which the fisher manages to kill without serious injury from the sharp quills. A litter of from two to four young, which are born in a nest in a hollow log or tree, are raised annually.

MINK

Mustela vison energumenos (Bangs)

The body of the mink is somewhat like that of a weasel, but heavier and considerably larger. The legs and ears are short; the tail is bushy. The coloration is brown, darkening along the back and becoming almost black on the tail. Sometimes irregular white streaks or spots occur on the throat, chest or belly.

Specimens in park collection: None.

The mink occurs over nearly all of North America, from the Gulf of Mexico north to the Arctic Circle.

Records from the park are few in number and show that it ranges mostly at the lower elevations, although it has been seen



The weasel is a tireless and efficient hunter.

at lakes around 5,000 feet. Most records have been obtained along the Nisqually and Ohanapecosh Rivers and around Lake Louise.

The mink seems to be equally at home in the forests or in the open meadows — all it requires is a watercourse or lake that will supply food of some type. Minks are great travelers, often following a stream for a considerable distance as they hunt. The hunting pattern is erratic and every little thing that attracts attention apparently bears investigating. This animal is an expert swimmer and can go long distances under the water in pursuit of fish. Other foods include almost any type of small mammal, birds, eggs, frogs and crustaceans.

There seems to be no sense of fear in a mink and in a fight it is an extremely dangerous adversary. Woe be unto the dog that attempts to corner it, as even the largest dogs usually are sent home with badly slashed faces. Like several other members of the weasel family, a mink gives off a strong odor if disturbed.

WASHINGTON WEASEL, LONG-TAILED WEASEL

Mustela frenata washingtoni (Merriam)

The Washington weasel is the largest weasel known to occur

in the park, measuring around fifteen inches in total length. During the summer it is dark brown above, darker on the head, with the under parts a dull yellow, lighter on the chin and throat. About two inches of the tip of the tail is black. In the winter its coloration may range from a dull brown, with white underparts, to almost pure white except for a yellowish tinge on the belly, rump and tail. The black tip of the tail remains unchanged.

Specimens in park collection: RNP-45, RNP-79, RNP-82, and RNP-94; Longmire Museum, Park Headquarters.

Weasels inhabit practically all of North America. The Washington weasel is found in the Cascade Mountains of Washington and Oregon, at least as far south as Fort Klamath, Oregon. One specimen is reported from the Chicago Field Museum as having been taken from Happy Lake in the Olympic Mountains.

In the park it is found from the lower elevations to forest line and above, being especially common around the open valleys between 4,000 and 5,000 feet.

Around Paradise Valley this weasel has found excellent hunting near the Lodge and Inn. Here visitors spend considerable time feeding chipmunks and ground squirrels, and attract large numbers with the quantities of food offered. With the slopes literally swarming with choice tid-bits, weasels have taken over each summer and created havoc among the chipmunks and ground squirrels, not to mention arousing the ire of all visitors concerned. Yet some check is necessary on these rodents, which might otherwise multiply beyond the ability of the habitat to support them. In spite of the efforts of the angry onlookers, mother weasel will dodge her way out among the fleeing animals and capture one to take home for her young. Records show that families of weasels have lived beneath the Lodge and Guide House for several years, reaping a rich harvest of food each summer from the rodent population.

LEAST WEASEL, ERMINE

Mustela ermina gulosa Hall

The least weasel is small, with a total length of around ten inches. In the summer it is dark brown above, darkest on the head, with the underparts whitish, usually tinged with pale yel-

low. The tip of the tail is black. In the winter the coat may range in color from a light brown among animals at lower elevations to a pure white at higher altitudes. The tip of the tail remains black, however.

Specimens in park collection: RNP-70, RNP-87, and RNP-111; Longmire Museum Park Headquarters.

This weasel ranges through the Cascade Mountains from southwestern British Columbia to Southern Oregon.

It is found in the park throughout the forested regions, and up as high as forest line, but is most abundant in the lower elevations.

The weasel never fails to impress one with its utter fearlessness and bewildering agility. It is very inquisitive and will probe around buildings as readily as the rocky slopes in its seemingly never-ending search for food. Its victims are limited only by their size, as the weasel shows no hesitation in attacking anything that it can possibly kill. For the most part its food consists of small rodents, such as chipmunks, ground squirrels and mice. Its lust for killing, and the occasional damage it does around poultry, combine to give it an exceedingly bad reputation which completely overshadows the economic good it does. As a natural control of rodent pests in agricultural and grazing regions it has no equal.

WOLVERINE

Gulo luscus luteus Elliot

The wolverine has a stocky body, with a powerful head, neck and legs. The legs and tail are short, the coloration is blackish or dark brown, a broad, yellowish band beginning at the shoulders runs along either side and reunites on the animal's rump. The lower parts are generally blackish, except for the throat and chest, which are usually mottled with white or salmon color. Large males may measure as much as three feet in length, including the tail, which is about ten inches long, and weigh up to fifty pounds.

Specimens in park collection: None.

The wolverine formerly ranged from the Atlantic to the Pacific Ocean, through the extreme northeastern states, Wiscon-

sin, Michigan, Minnesota, North Dakota, Colorado, Utah, and Oregon northward to the Arctic Ocean. It is believed to be extinct or nearly so over much of its original range in the United States, although it is reported to occur in fair numbers in Sequoia-Kings Canyon National Park.

From 1897 to 1918 wolverines were occasionally reported from the park area, but there have been none recorded since 1933, when one was observed near the White River Ranger Station.

Known by a variety of common names ranging from glutton, carcajou, mountain devil, skunk bear, to maneater, the wolverine lives up to any or all of them. A member of the weasel family, it has somewhat the general build and habits of a small bear. Fierce and ready to fight anything that walks, it is a terrifying animal to face. Even such a huge animal as an elk is attacked without hesitation. Its cunning and boldness is greatly respected by the Indians, who believe it to be inhabited by an evil spirit. For the most part it hunts by night and wanders great distances in search of food.

It will eat any kind of game it can kill, a list which is extensive. Not being able to entirely satisfy an enormous appetite by killing, the wolverine also consumes all the dead carcasses that can be located. It is famous for destruction along trap lines, methodically following the line and eating anything that has been caught. Suspicious and canny, it is difficult to lure into a trap, and often if caught will gain its freedom by smashing even a heavy trap to pieces.

PACIFIC OTTER

Lutra canadensis pacifica Rhoads

The otter is one of the largest members of the weasel family, somewhat minklike in general appearance, with a small head and rather short legs. The feet are webbed and the tail is thick and tapering toward the tip. The general coloration above is dark chestnut-brown, becoming somewhat paler on the underparts, throat and cheeks.

Specimens in park collection: Mounted specimen, Longmire Museum, Park Headquarters.

Otters are geographically distributed over most of North America. The Pacific Otter is found from Oregon, Washington and British Columbia northward as far as the coast of Alaska.

Recent years have failed to produce any records from the park, and there is some doubt that the otter still exists in the area. However, it was reported by Dr. C. Hart Merriam as fairly common along the Nisqually Valley in 1897, while there were reports from the park in later years. Thus it may be that this animal is still present in some more remote sectors.

Although adapted for living either on land or in the water, the otter seems to prefer the water. It is a graceful, powerful swimmer, and delights in frolicking in pools deep enough to allow lots of freedom of action. Playful by nature, it often amuses itself by sliding down banks into the water, repeating the performance time and again until a well defined slide is made. Its food is made up of a wide variety of animal life, ranging from fish, crayfish, frogs, snakes and birds to small mammals.

In one way it is unfortunate that the otter has such a valuable pelt, because it has been relentlessly trapped wherever found; so much so, in fact, that only in areas protected against trapping is it likely to continue to hold its own or multiply.

LITTLE SPOTTED SKUNK

Spilogale gracilis latifrons Merriam

This animal has a slender body about a foot in length, with short legs and a plumelike tail. The general coloration is black with a prominent white spot on the forehead, four white stripes running from the head onto the back, white patches and stripes along the sides, the rump spotted white, and the tail broadly white-tipped.

Specimens in park collection: None.

The spotted skunks, often erroneously called "civet cats," are found over most of the United States.

The little spotted skunk occurs on the west side of the Cascade Mountains of Washington, and through the Olympic Peninsula to the westward. The northern limits of range are not clearly defined.

In Mount Rainier National Park it has been reported from near Longmire, Tahoma Creek and Carbon River. In 1897 records show that it was fairly common in the Nisqually River Valley, but in recent years observations have become extremely limited. Its present status must be considered as uncommon to rare.

This is without doubt the most interesting as well as the handsomest skunk in the Northwest. Unlike its larger cousin, the Puget Sound striped skunk, this little animal is graceful and rather agile. Seldom is it seen during the day time, preferring to roam about in search of food during the night. Its travels take it over a wide area, and it shows a fondness for man-made buildings. It has been known to occupy attics in dwellings, and one disconcerted wife of a National Park Service employee found one casually strolling through the hallway of her house one night! It is rather playful and even tempered, and seldom resorts to the strong perfume it carries.

Its food is varied, and may include almost anything from insects and reptiles to small rodents. As a mouser it rivals a cat in effectiveness. Sometimes referred to as the "hydrophobia skunk" or "phoby-cat" it has had a bad reputation in the past as a carrier of hydrophobia. However, the belief so prevalent among many people that its bite will always produce this dread malady has no foundation in fact. Many animals may carry hydrophobia, and there are few authentic records of the skunks as carriers.

PUGET SOUND STRIPED SKUNK

Mephitis mephitis spissigrada Bangs

Larger and stockier than the little spotted skunk, the Puget Sound striped skunk is black, with a narrow white stripe through the forehead, a broad white stripe starting on the head and dividing at the shoulders into two broad stripes that run back along the sides of the body. There are long white hairs on the tail; the tip of the tail is black.

Specimens in park collection: RNP-43, Longmire Museum, Park Headquarters.

The Puget Sound striped skunk is found from northwestern Oregon through the lowlands of western Washington and into the Puget Sound section of southern British Columbia.

In the park it has been recorded only once. This lone record was from near the Nisqually Entrance where one was killed on the highway by an automobile.

This type of skunk is well known throughout the United States. Its cousins through the Middle West, East and South are familiar to every farm boy. Its struggle for existence has been seriously threatened in many localities because of the value of its fur. Because it prefers open country to dense forests and mountains, it occupies the same regions as man.

The skunk is by nature a timid and gentle animal, and by moving slowly it is possible to approach one with no fear of disastrous results. However, practically anyone will agree that it is a safer course to simply let the skunk go its way unmolested. The powers of persuasion it possesses are not to be taken lightly!

NORTHWESTERN COUGAR

Felis concolor oregonensis Rafinesque

The cougar is the largest of the cats found in the region, measuring up to more than eight feet in total length and weighing 150 pounds or more. The body is slender, with a small head and long tail. Its coloration above may range from reddish brown to gray brown, darkest along the back. The underparts are whitish with the light areas extending forward as far as the chin. The tail is brown with a prominent black tip. Young cougars are somewhat lighter in color, with large dark spots along the back and sides.

Specimens in park collection: Mounted specimen at the Forest House at Ohanapecosh.

Cougars, or mountain lions, were formerly found over practically all of the United States, but are now extinct over most of their original range.

The Northwestern cougar ranges from northern California through Oregon and Washington into British Columbia. It is fairly common in some parts of its range.

In the park it may be found from the lower elevations up to forest line. Most records have come from around the Nisqually

River drainage and from the west side of the park. However, it is apparently well distributed throughout the region.

Probably no animal found within the park affects the visitor as does the cougar. To many people it is regarded as a highly dangerous, blood-thirsty creature awaiting only a chance to pounce upon some unsuspecting hiker. On the contrary, there are few animals in the woods that are as shy or that run faster from humans than does the cougar. The chances of actually observing one in the wilds are very remote, as the lion usually sees without being seen, and beats a hasty retreat.

Much has been said pro and con about the ability of the cougar to emit a "scream." Much depends upon the person's conception of what makes up a "scream." For the most part the cougar is silent, but contrary to what is often claimed, it does have the ability to express itself vocally. At times it may utter a loud cry that reminds one somewhat of the caterwaul of a domesticated tomcat. One female lion in a zoo gave a long series of such squalls when her kitten was taken from her. The so-called "woman in agony" scream, so often attributed to the cougar, is more likely that of the grown young of the great horned owl.

The cougar is also well known because of its great liking for venison, and without doubt it accounts for several deer a year. To say that a lion kills large numbers of deer each year (some persons claim as high as 100 per year) is something that needs clarification. There is little doubt that when deer are abundant a lion will get a considerable number; conversely when deer are not common the number taken will be low. Under natural conditions the lion serves as an important "control" upon the numbers of deer in any given region, for the most part killing old animals that have passed their prime or young deer that aren't sufficiently alert, so offering no real threat to the deer population as a whole, but definitely helping to preserve forest reproduction from destruction by preventing an excessive multiplication of deer.

BOBCAT, NORTHWESTERN WILDCAT

Lynx rufus fasciatus Rafinesque

The bobcat is a typical member of the cat tribe, and resembles the common domestic cat in many respects. It differs in

size, being perhaps twice as large, has longer legs, a very short tail, and big feet. The Northwestern Wildcat is a rich rufous brown over the back, grizzled with black; paler on the sides; with white underparts splotted with black. The legs are barred with dark brown and black. The tail is dark brown above with black bars, the extreme tip and underside is white. The ears are slightly tufted, the side whiskers or throat ruff are conspicuous.

Specimens in park collection: Mounted specimen, Longmire Museum, Park Headquarters.

Bobcats are found in all of the United States, and northward into western Canada.

The Northwestern wildcat occurs in northwestern California, Oregon, Washington, and southwestern British Columbia. The cats are uncommon in Mount Rainier National Park, where their range is apparently confined mostly to the lower elevations near the southern and western boundaries.

Of all the wild creatures of the woods, the bobcat is perhaps the shyest. Many woodsmen of several years experience can count upon the fingers of one hand the cats they have seen, with the exception of those caught in traps or treed by dogs. Often it is only by observation of their tracks or sign that their presence is revealed. This is all the more remarkable when it is understood that like domestic cats, they hunt by day as well as by night.

Their habits are typically cat-like. They prey upon rodents and birds, and may occasionally kill deer, particularly fawns.

CANADA LYNX

Lynx canadensis canadensis Kerr

The lynx is like the bobcat in size and build, but is lighter in color, and may further be distinguished by the black tipped tail, longer ear tufts, more conspicuous side whiskers, and broad spreading feet.

Specimens in park collection: None.

The range of the lynx is principally in Canada, although it extends into northern Oregon in the Northwest, southward in the Rocky Mountains into Colorado, and as far south as Pennsylvania in the northeast.

Taylor and Shaw, in *Mammals and Birds of Mount Rainier National Park*, 1927, observe that, "The shy and secretive habits of the members of the cat tribe make their study unusually difficult. At the outset one finds himself practically restricted to an examination of tracks and sign. These indicate the abundance of cats of the genus *Lynx* (either lynx or bobcat) in suitable locations throughout the park. The Canada lynx is confined to higher portions of the park, the bobcat to lower altitudes. J. B. Flett reports the capture of a Canada lynx some years ago by C. A. Stoner in the Sawtooth Range just south of the park.

"Tracks and sign . . . were most in evidence on the backbone ridges at or just above timberline."

For the past several years there have been no authentic records of the Canada lynx in the park, and it is extremely doubtful that the animal now occurs within park boundaries.

HYPOTHETICAL LIST

Although not known to occur in Mount Rainier National Park prior to the date of this publication, the following mammals may be recorded:

Alaska Brown Bat, *Myotis lucifugus alascensis* Miller
Longeared Bat, *Myotis evotis pacificus* Dalquest
Northwest Coast Bat, *Myotis californicus caurinus* Miller
Big Brown Bat, *Eptesicus fuscus bernardinus* Rhoads
Puget Sound Weasel, *Mustela ermina streator* (Merriam)
Townsend Chipmunk, *Tamias townsendii townsendii* Bachman

Yellow Pine Chipmunk, *Tamias amoenus affinis* Allen
Oregon Flying Squirrel, *Glaucomys sabrinus oregonensis* (Bachman)

The occurrence of the following mammals was listed by Taylor and Shaw, *Mammals and Birds of Mount Rainier National Park*, 1927, as follows:

Muskrat, *Ondatra zibethicus osoyoosensis* (Lord). "In lower portions of the park; apparently now trapped out within its boundaries."

Norway Rat, *Rattus norvegicus norvegicus* (Erxleben).

"Here included on the authority of J. B. Flett, who has observed it at Longmire."

House Mouse, *Mus musculus* Linnaeus subsp? "At Longmire; at present scarce, perhaps extirpated."

It is believed that the three species above are not now found within the park.

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