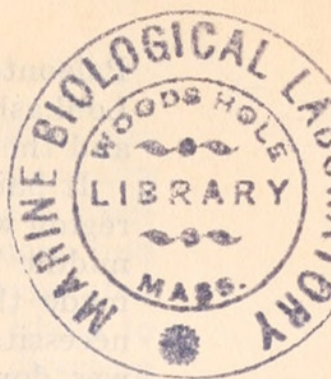


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MAMMALS OF THE CLEARWATER MOUNTAINS, IDAHO

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INTRODUCTION

The Rocky Mountains of northern United States are of great biological interest as a region in which a mixture of Pacific coastal and true Rocky Mountain plants and animals occurs. This condition is in all probability a result of several critical factors, among which may be suggested the proximity of the inland range to the Pacific Ocean at this point as compared with the same mountain mass farther to the south, the more northerly latitude, the absence of high coastal mountains in extreme southern British Columbia and also the absence of high mountain masses in eastern Washington. As a consequence the coastal influence with its relatively high humidity and high annual precipitation extends inland to northern Idaho and extreme northwestern Montana.

Relatively little of a general nature has been published regarding the mammals of this region and even less of a detailed nature concerning its mammalian fauna. This paucity of information was mentioned by Davis (1939) in his admirable work summarizing all the known data on the mammalian fauna of the state of Idaho. It was with the purpose of furthering our knowledge of the distribution of mammals in central Idaho that an expedition was sent by the California Academy of Sciences, in the fall of 1941, to the region of the Middle Fork of the Clearwater River in Idaho County. The personnel of the party comprised Dr. G. Dallas Hanna, Curator of

August 18, 1943.

Paleontology, Mr. Cecil Tose, Department of Exhibits, Mr. Anatole Loukashkin, Research Associate in Ornithology and Mammalogy, and the author.

It had originally been planned to collect in the Crag Mountains region which is situated between the Lochsa and Selway forks of the middle branch of the Clearwater River. Excessive rains, however made the roads in that region impassable for the most part and necessitated a change in plan. As a result, most of the field work was done in a portion of the Selway Fork drainage, principally in the canyon through which Meadow Creek flows and the ridges leading down to this north-flowing tributary of the Selway.

Two principal base camps were established. The first of these was situated along Meadow Creek, two miles south southeast of Selway Falls, at an elevation of 1,900 feet, between September 5 and 12. Activities here were confined principally to a study of riparian and lower canyon slope associations. The second camp, from September 12 to 30, was located on a ridge four miles southwest of Selway Falls, at 5,800 feet elevation, where opportunity was afforded to collect and observe mammals occurring on the tops and upper slopes of ridges. The second camp proved considerably more productive so far as mammal collecting was concerned. A one day trip was made to the Crag Mountains. The excessive rain and occasional snow, which occurred intermittently during all but five of the days the party was in Idaho, interfered to a considerable extent with collecting and especially with the drying of material secured.

While the primary purpose of the expedition was to secure mammals and land snails from this region, a number of birds, insects, and botanical specimens were also collected. Furthermore, considerable attention was paid to the natural history of the various species of mammals encountered, in so far as was possible. In all a total of 251 mammal specimens was secured. These represented 25 different species. The presence of 15 additional species, however, is here recorded, based either on personal observations made by members of the party or on the reports of other persons known to be reliable and accurate observers.

The writer wishes gratefully to acknowledge assistance received from Mr. John Thomas Howell of the Department of Botany of the California Academy of Sciences who kindly identified many of the plants collected, also Mr. Ralph L. Hand of the United States Forest Service, Missoula, Montana, who furnished the writer with information concerning previous forest fire records for the region studied as well as personal notes on the occurrence and distribution of certain species of mammals in the Clearwater Mountains. For the privilege of examining certain comparative material necessary to complete this report the writer is indebted to the University of California Museum of Vertebrate Zoology. The cooperation of the Idaho Department of Fish and Game was greatly appreciated.

Description of Area

The Clearwater River, which drains approximately 8,000 square miles of territory in east-central Idaho, has its headwaters principally along the western slopes of the Bitterroot Mountains, whose summit roughly constitutes the boundary between the states of Idaho and Montana in this section. The upper portion of the river is separated into three principal forks which converge in west-central Idaho to form the main Clearwater; the latter flows in a westerly direction and empties into the Snake River along the Idaho-Washington boundary in the vicinity of Lewiston, Idaho.

The so-called Clearwater Mountains area is, to quote Lindgren (1904, p. 59) "... an elevated plateau, of approximately uniform height, now so deeply dissected by such an intricate system of canyons that at first glance it has almost lost its once doubtless prominent plateau features." The average altitude of the ridges and peaks forming this mountain mass varies from 6,000 to 7,000 feet. Little evidence of glaciation is apparent except on the tops of some of the higher mountains. As a consequence of long periods of erosion the canyons are characteristically very deep, and broad valleys are absent. The average vertical distance between the summits of the ridges and the canyon bottoms is around 4,000 feet. This is in marked contrast to the Bitterroot Mountains, which adjoin the Clearwaters to the east, where we find evidence of the most extensive glaciation found in the entire Rocky Mountains of the United States.

According to Dr. G. Dallas Hanna, geologist and paleontologist with the expedition, in the immediate vicinity of Kooskia, which is about thirty-three miles west of Selway Falls on the lower, western slope of the Clearwater Mountains, the surface is covered by dark colored lavas of undetermined source and thickness. A few miles up the Clearwater River this type of rock is in contact with light colored gneiss which forms the mountain ranges to the eastward as far as the collecting party went. Much of the gneiss shows irregular banding and often has a granitoid texture.

Evidence of mountain glaciers was obvious on the upper slopes of the Crag Mountains. Morainal material and U-shaped valleys were common and in some places it seemed that the ice had recently disappeared. None of the usual evidences used for determining the previous presence of glaciers was observed on the lower slopes of these mountains or in those parts of the surrounding Clearwater Mountains where most of the collecting was done.

Dr. E. C. Van Dyke (1919, p. 1-12) many years ago came to the conclusion from a study of ground beetles, that much of the mountainous area of Idaho had long been undisturbed from a biological standpoint and, at his special request, careful search was made for evidence of glaciation. If, here, a large region continued through the Pleistocene without denudation, the presence of a relatively isolated insect fauna would be more easily explained. The observations made

on the routes followed by one party certainly bears out his deduction. Furthermore, there exists in this region a most striking land snail fauna, the affinities of which are now difficult to trace. Unusual distribution among other groups of animals and plants has been noted. Thus, this region has a definite insular character from a biological standpoint, which, with the absence of evidence of general glaciation, leads to the belief that some of the elements of the fauna and flora may have lived through the Pleistocene without major disturbance.

Climatically, the Clearwater Mountains are characterized by relatively high precipitation compared with other portions of the State. No data were available for the exact area where collecting and observations were made, but in the Climatic Summary of the United States, Section 5—Northern Idaho, published by the United States Department of Agriculture Weather Bureau, the average annual precipitation up to the close of the year 1930 for the Pete King Ranger Station was 33.80 inches. This locality is at an elevation of 1,550 feet on the Lochsa Fork of the Middle Clearwater, several miles above its junction with the Selway Fork and is approximately fifteen miles west northwest of Selway Falls. Undoubtedly the precipitation is considerably greater in the latter locality which is closer to the center of the mountain mass. Farther north in the Clearwater Mountains, at Oxford Ranger Station in Clearwater County, at an elevation of 3,735 feet, the average annual precipitation to the close of the year 1922 is given as 45.77 inches. This locality, however, is within the watershed of the North Fork of the Clearwater.

Precipitation is well distributed over the year, although it is somewhat less in July and August than during the remaining months. In winter this precipitation is in the form of snow which is present from November until March. During September, 1941, several light snow falls occurred, sufficient to cover the tops of the higher ridges. Subsequent rain storms, however, soon melted the snow.

Summer rains and relatively high humidity combined with moderately cold winters are probably the direct factors inducing the growth of a vegetation complex composed of the more hardy species of the Pacific coastal forests and the northern Mesophytic evergreen forests of the west. This is well expressed by Livingston and Shreve, (1921, pp. 537-538) in regard to western hemlock (*Tsuga heterophylla*): "This tree occupies an area in which conditions are similar to those of the northwestern Evergreen Hygrophytic Forest, with differences due to the extension of the limits of *Tsuga* into northern Idaho and Montana, well to the east of the Hygrophytic Forest. The number of cold days in the frostless season endured by the easternmost individuals of this species reaches a maximum of 120, whereas no cold days are experienced within the Hygrophytic Forest. The normal daily mean temperature also ranges to lower values for the tree than for the vegetation in which it is most character-

istically developed. The temperature conditions encountered by *Tsuga* in northern Idaho . . . are otherwise very similar to those in coastal Washington and Oregon. The precipitation conditions for the area occupied by *Tsuga* are very similar to those of the Hygrophytic Forest, at least with respect to the frostless season. Higher intensities of evaporation are encountered in Idaho"

The average temperature for the Pete King Ranger Station for the period from 1910 to 1930 inclusive, according to the United States Weather Bureau is 50.0° F. with the greatest extremes 112° F. and -30° F. The average maximum temperature throughout the year for this period is 62.1° F. and the average minimum temperature 37.8° F.

Habitats

Although a considerable portion of the drainage of the Middle Fork of the Clearwater River was burned in previous years the area in which the present studies were carried on was for the most part virgin timber. A number of different forest associations were found to occur. Some of these were quite distinct while others differed principally with regard to the dominance of certain species of trees and shrubs which were common to several associations. This was found in certain instances to affect directly or indirectly the local distribution of some mammalian forms. Since collecting was carried on in the fall of the year most of the annual plants had disappeared and even many of the perennials had shed their leaves.

The following plant associations were conspicuous in the limited area studied. With the exception of brushland, which here was largely a result of fire and consequently not governed to any considerable extent by altitude, four other principal associations occurred from the canyon bottoms to the summits of the highest ridges. These may be described as (1) riparian, (2) fir, cedar and yew forest, (3) fir and spruce forest, (4) lodgepole pine forest, and (5) brushland.

Riparian.—The river banks and streamsides were, generally speaking, lacking in dense vegetation such as is usually characteristic of mountain watercourses. In several instances it appeared that beavers were responsible for the depletion of certain riparian vegetation, such as willow. The following species of plants were noted most commonly along watercourses in the bottoms of canyons:

Equisetum arvense
Carex sp.
Salix sitchensis
Salix sp.

Alnus tenuifolia
Boykinia major
Philadelphus Lewisii
Symphoricarpos albus

Only two species of mammals observed seemed restricted to watercourses and the immediately adjacent territory. These were beaver and mink. Several species of bats of the genus *Myotis* regularly

foraged over waterways when available but they were by no means restricted to them. Where suitable grassland grew along stream banks such places proved attractive to meadow mice. White-tailed deer, while not strictly riparian inhabitants in this region, occurred principally in canyon bottoms where they undoubtedly foraged to a considerable extent on streamside growth.

Fir, cedar and yew forest.—In the deep canyon bottoms and lower slopes the dominant trees were western red cedar (*Thuja plicata*), grand fir (*Abies grandis*) and western yew (*Taxus brevifolia*). Farther up the slopes, locally, in more open and exposed situations, this forest was partly replaced by one composed principally of Douglas fir (*Pseudotsuga taxifolia*) and yellow pine (*Pinus ponderosa*) associated with such shrubs as snow berry (*Symphoricarpos albus*), service berry (*Amelanchier Cusickii*) and mountain ash (*Sorbus sitchensis*). This latter type of forest, however, failed to reach its maximum development here, whereas, on the lower, western slopes of the Clearwater Mountains it was found to be the dominant forest cover.

The fir, cedar and yew association was essentially one of shaded canyons or slopes and was characterized by a luxurious undergrowth of shrubs and herbs, numerous fungi and trees well covered with lichens. Locally, tongues of this forest extended upward almost to the tops of the ridges, often following the course of ravines. Here at 5,000 to 6,000 feet it gradually blended with the alpine fir and Englemann spruce forest characteristic of the higher regions. Some of the best stands of cedar were noted on the tops of the ridges which are sometimes relatively flat and plateau-like over limited areas. Where pure stands of cedar occurred, to the exclusion of all other forest trees, there was rarely any appreciable undergrowth. The forest was dense, dark and heavily hung with lichens and the forest floor was bare of vegetation except for numerous fungi, as well as masses of fallen branches and trees.

The following species of plants were noted most commonly in the fir, cedar and yew forest:

<i>Adiantum pedatum</i>	<i>Crataegus brevispina</i>
<i>Pteridium aquilinum</i>	<i>Acer glabrum</i>
<i>Abies grandis</i>	<i>Rhamnus purshiana</i>
<i>Thuja plicata</i>	<i>Sphaeralcea rivularis</i>
<i>Taxus brevifolia</i>	<i>Cornus canadensis</i>
<i>Clintonia uniflora</i>	<i>Campanula rotundiflora</i>
<i>Montia sibirica</i>	<i>Micromeria chamissonis</i>
<i>Berberis repens</i>	<i>Solanum Dulcamara</i>
<i>Boykinia major</i>	<i>Synthyris</i> sp.
<i>Heuchera</i> sp.	<i>Symphoricarpos albus</i>
<i>Ribes cognatum</i>	<i>Lonicera ciliosa</i>
<i>Holodiscus discolor</i>	<i>Hieracum columbianum</i>
<i>Rubus parviflorus</i>	<i>Aster Fremontii</i>
<i>Fragaria bractata</i>	

With but a single exception none of the mammals encountered in the Selway region appeared to be restricted solely to this type of

forest. One species of chipmunk (*Eutamias amoenas*) was rarely found much above this forest belt, the highest elevation at which it was observed being 4,500 feet. It was replaced in the higher spruce and fir forests by another species (*Eutamias ruficaudus*). Solid stands of pure cedar appeared to be singularly unproductive, due probably to the scarcity of undergrowth. Only shrews and flying squirrels seemed attracted to dense cedar forests.

Fir and spruce forest.—On the tops of the ridges and on the more protected upper slopes, somewhat lower zonally than the lodgepole and white pine association, a fir and spruce forest predominated. The principal conifers in this association were Englemann spruce (*Picea Englemannii*), alpine fir (*Abies amabilis*), grand fir (*Abies grandis*), western red cedar (*Thuja plicata*), occasionally Douglas fir (*Pseudotsuga taxifolia*) and, in more open situations, western larch (*Larix occidentalis*). The undergrowth in such a forest was generally very dense, conserving moisture on the floor of the forest and inducing the growth of many different types of fungi. The principal trees and shrubs composing this "substratum" were western yew, dwarf maple, thin-leaf alder, snowberry, thimble-berry, thin-leaf huckleberry, rustyleaf, service berry and spirea. The forest floor was likewise densely carpeted with numerous smaller plants. In more open situations, however, bracken and elk grass formed the main cover.

The following species of plants were those most conspicuous in general within this association:

Pteridium aquilinum

Larix occidentalis

Picea Englemannii

Pseudotsuga taxifolia

Abies grandis

Abies amabilis

Thuja plicata

Taxus brevifolia

Xerophyllum tenax

Clintonia uniflora

Salix sp.

Alnus sinuata

Aquilegia sp.

Tiarella unifoliata

Spirea corymbosa

Rubus pedatus

Amelanchier Cusickii

Pachystima myrsinites

Acer glabrum

Chimaphila umbellata

Menziesia ferruginea

Vaccinium macrophyllum

Symphoricarpos albus

Adenocaulon bicolor

In the more dense and typical portions of this forest the only coniferous trees, aside from western yew which actually formed a dense undergrowth, were Englemann spruce and alpine fir. The other species of conifers usually occurred where the forest was either of a more open type or along the margins.

Two species of mammals appeared in this region to be rather typically associated, although at least one of them was not restricted, to this fir-spruce association. These were *Eutamias ruficaudus* and *Clethrionomys gapperi*. The former species was also noted in lodgepole pine forests and in brushland at high elevations.

Lodgepole pine forest.—Lodgepole pine (*Pinus contorta* var. *murrayana*) occurred scatteringly in most of the forest associations where suitable conditions prevailed. Relatively pure stands, however, were found locally at higher elevations. A few western white pines (*Pinus monticola*) were generally present in any extensive lodgepole pine forest. On the upper parts of higher mountains, such as the Craggs, where most of the timber had been burned off in 1934, there was evidence that extensive areas of lodgepole pine previously occurred. Many young trees, some twenty feet in height, were observed among the brushy cover of willow, alder and tobacco brush. Natural reforestation appeared in evidence over widespread areas. This was in marked contrast to burned over spruce, fir and cedar areas where occasional trees had survived but where there was very little indication of reforestation.

The following species of plants were most typical of this forest:

Pinus monticola
Pinus contorta var. *murrayana*
Carex sp.
Xerophyllum tenax

Spirea corymbosa
Ceanothus velutinus
Phyllodoce empetrifomis
Vaccinium Myrtillus var.
microphyllum

This type of forest varied from dense stands of relatively small trees, in which underbrush was practically lacking, to open, loose stands, especially where previous burning had taken place. No mammals were observed to be restricted to this association.

Brushland.—Much of the territory north of the Selway Fork and east of Meadow Creek was extensively burned over by the great fire of 1910, and again by the "Pete King" fire in 1934 which destroyed hundreds of square miles of virgin forest in the upper watershed of the Middle Fork of the Clearwater River. As previously noted the higher portions, which were originally forested with lodgepole and white pine, showed considerable evidence of reforestation appearing amid the dense brush which presently covers most of the area. Lower down, however, there was little indication of fir, spruce and cedar reappearing and brush solidly covered the slopes. In the region west of Meadow Creek there appeared to have, likewise, been intensive fires many years ago, probably about 1889 (*vide* R. L. Hand in letter). These latter burned areas are still primarily brushland at present, although locally there are fair stands of pole-size timber. In many places the tops of the ridges have become grassland and support tall stands of grass with occasional old firs and spruces and standing snags scattered about.

The most common shrubs forming this brushland habitat resulting from fire were thin-leaved alder (*Alnus sinuata*), willow (*Salix* sp.), mountain ash (*Sorbus sitchensis*), dwarf maple (*Acer glabrum*) and snow berry (*Symphoricarpos albus*). Bracken (*Pteridium aquilinum*) and elk grass (*Xerophyllum tenax*) were widely distributed

throughout, especially in small clearings. Certain other herbs such as *Rudbeckia occidentalis*, *Polygonum Douglasii* and *Epilobium* sp. were numerous. Higher in the mountains, especially above 6,500 feet altitude in the Craggs, *Ceanothus velutinus*, *Spirea corymbosa*, *Phyllodoce empetrifomis* and *Vaccinium Myrtillus* var. *microphyllum* were of importance in the composition of the brushland.

These fires and the resulting brushland have greatly affected the distribution of certain mammals over this region and obviously have resulted in the relative isolation of populations of forest-dwelling mammals in the various small "islands" of unburned timber that survived these catastrophes and are scattered about locally on some of the ridges and deep canyons. Few of the smaller mammalian species seem to have successfully reinvaded these once devastated regions and it appears likely that certain species will not do so until a climax forest is once again established.

The white-footed mouse (*Peromyscus maniculatus*) was one of the few species that appeared to be abundant in the burned over areas. It is possible that this rodent, which exhibits a great range of adaptability, possesses a greater population over the entire area now than previous to these fires. This may be due in part to the nearly complete absence of competition from other forms of small mammals in the burned areas. White-footed mice were trapped in such localities in numbers. The chipmunk (*Eutamias ruficaudus*) was another of the small terrestrial mammals that showed some ability to invade or at least survive to a limited extent in areas that had been severely burned. Peripheral brushland, adjacent to forest cover, where numerous snags still stood or littered the ground, was extensively inhabited by members of this species. At high altitudes where rock slides offered protection and shelter the immediately adjoining brushland, especially where this contained some snags and fallen trees, was likewise inhabited. Such talus slopes had undoubtedly acted as focal points for the repopulation of surrounding devastated areas.

The distribution of pocket gophers (*Thomomys talpoides*) did not appear to have been affected seriously by fire. This species in fact seemed more abundant in brushland than in forested sections. Mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) may also have benefitted as a result of fire, due to the increase in browsing land.

Many other species of mammals, however, without question have suffered severely as a consequence of the depletion of forest cover. Shrews, red squirrels, flying squirrels, red-backed mice, meadow mice and certain other forest-requiring species will be restricted to the remaining timbered areas until such time as a sufficiently extensive forest growth once again develops in the areas now covered with brush.

SPECIES ACCOUNTS

***Sorex vagrans monticola* Merriam.** Wandering Shrew

Although most of the areas where trapping was carried on seemed to offer exceptionally favorable habitats for shrews these animals appeared scarce. Four wandering shrews, nos. 8312-8315, were secured between September 14 and 23, from three to four miles southwest of Selway Falls, at elevations varying from 5,500 to 5,800 feet. Two of these were trapped amid fallen bark and other litter in a dense cedar forest, while the other two were taken beneath dense undergrowth in mixed spruce, alpine fir and cedar forests.

Three specimens are in worn summer pelage; a fourth, taken on September 20 possesses new winter pelage on all but the head and shoulders. The weights of two males are 6.1 and 5.2 grams.

***Sorex obscurus obscurus* Merriam.** Dusky Shrew

A single adult male, no. 8316, of this species in fresh winter pelage was taken on September 24, 6 miles southwest of Selway Falls at an altitude of 5,800 feet. It was trapped in an area densely forested with spruce and alpine fir adjacent to an extensive lodgepole pine forest. The weight of this individual was 5.9 grams.

***Myotis evotis chrysonotus* (J. A. Allen).** Long-eared Bat

A single individual of this species, no. 8317, was taken on the evening of September 8, shortly before dusk. It was shot as it flew over a bridge on Meadow Creek, two miles south southeast of Selway Falls at 1,900 feet elevation.

***Myotis volans interior* Miller.** Long-legged Bat

Four individuals, nos. 8318-8321, of this species were secured, one on September 16 and three on September 23. All were shot just before dusk as they flew above a road leading through a moderately dense Englemann spruce and alpine fir forest, four miles southwest of Selway Falls at 5,800 feet elevation. *Myotis californicus* was associated with this species when foraging.

A remarkable range in color variation is to be noted among the specimens secured. One compares favorably in color with the race *interior* from the Great Basin region of western United States, whereas the other three are so dark in general appearance that they were at first thought to be representatives of the race *longicrus* which occurs not far to the north and west and which might indulge in local or seasonal population movements. It was later decided, however, that these three specimens were probably immature and

in a subadult pelage. The resemblance of immature specimens of *interior* to adults of *longicrus* has been noted by Miller and Allen (1928, p. 141).

Myotis californicus californicus (Audubon and Bachman).

Little California Bat

Eight specimens, nos. 8322-8329, of the little California bat were secured in the Selway Falls region, between 1,900 and 5,800 feet elevation. All were taken as they foraged over roads or watercourses in forested areas in the evening.

Ursus americanus cinnamomum Audubon and Bachman.

Black Bear

Black bears appeared to be moderately abundant in this region, judging from the numerous signs and tracks observed, especially along the banks of watercourses and trails in canyon bottoms. On September 8 a hole dug by a small black bear the previous night was found in a small sandy beach along Meadow Creek close to camp. Only one bear was seen, however. This was in the late afternoon of September 18 near an unoccupied Forest Service Look-out Station at Falls Point, on a ridge about one mile southwest of Selway Falls. One skull, no. 8330, of a half-grown individual was found in good condition two miles south southeast of Selway Falls on September 24.

Procyon lotor excelsus Nelson and Goldman

Raccoon

Although raccoons have never been recorded this far north in Idaho their presence is here reported in the Clearwater Mountains on the basis of information supplied by Mr. R. L. Hand of the U. S. Forest Service, Missoula, Montana, who was stationed for seven years in the region of the Middle Fork of the Clearwater River and its tributaries. Mr. Hand in a letter to the writer, dated February 17, 1942, states as follows: "Actually, though they [raccoons] are by no means common, almost every trapper who covered the lower Selway and Lochsa rivers got a 'coon or two each season. I have examined hides from O'Hara Bar, Ratcliff Creek and the upper Middlefork and lower Lochsa and seen tracks frequently."

No signs of raccoons were noted by members of the Academy's expedition in the vicinity of Selway Falls, but this region for the most part is rather high zonally for this species. Ratcliff [Rack-cliff] Creek, the nearest locality from which skins are reported as having been taken by trappers, is about ten miles west northwest of Selway Falls. While this is over three hundred miles north of the nearest locality in Idaho from which Davis (1939, p. 128) records

this species, it is only about seventy-five miles east of the Snake River Valley in southeastern Washington from which Nelson and Goldman (1930, p. 458) record *Procyon lotor excelsus*.

***Martes caurina caurina* (Merriam). Marten**

Martens are reportedly of widespread occurrence throughout the higher portions of the Clearwater Mountains. Shortly before sunset on September 16 a marten was seen in the crown of a dense spruce, four miles southwest of Selway Falls. This individual disappeared in the dense foliage as rapidly as it had appeared (Loukashkin, MS). The skull of an immature marten, no. 8331, was found close to a deserted trapper's cabin, six miles southwest of Selway Falls, on September 22.

***Mustela cicognanii cicognanii* Bonaparte.**

Short-tailed Weasel

Two short-tailed weasels, nos. 8332-8333, were secured in small steel traps. One of these, an adult male, was caught two miles south southeast of Selway Falls on September 11, in a rocky situation close to Meadow Creek. Grand fir, red cedar and western yew were the principal trees here. The second individual, a female, was taken along a trail in a dense spruce forest, four miles southwest of Selway Falls on September 15. Another female, no. 8334, was shot as it ran along a trail in a spruce forest close to the second camp in the late afternoon of September 16. On September 25 the desiccated remains of a fourth individual, thought to be a female judging from its small size, was found on this same trail. The skull of this animal was saved, no. 8339.

The skins of the specimens collected show no indication of winter pelage appearing. The weights of one male and two females are 102.9, 59.0 and 65.9 grams, respectively.

***Mustela frenata nevadensis* Hall. Long-tailed Weasel**

On September 22 a male long-tailed weasel, no. 8335, was caught in a small steel trap placed at the base of an uprooted stump in a dense fir and spruce forest close to our second camp. At noon on September 25, while the writer was approaching a chipmunk on a pile of logs not far from the above locality, a weasel of this species was seen a short distance away. It was moving about actively over and under fallen logs, branches and other forest debris and was apparently so engrossed that, although it approached within less than ten feet of the observer, it failed to notice him. When about twenty-five yards away a few moments later it was shot. This specimen, no. 8336, proved to be a female. Both of the above mentioned

specimens are in summer pelage. The weights of the male and female are 184.4 and 149.9 grams respectively.

The skull of a long-tailed weasel, no. 8340, was found close to a trapper's cabin, six miles southwest of Selway Falls, on September 28.

***Mustela vison energumenos* (Bangs). Mink**

A female mink was caught on the morning of September 12 in a steel trap placed near Meadow Creek, two miles southeast of Selway Falls. When the trap was approached another mink was seen close by, but it rapidly disappeared in the adjacent forest undercover. The trapped animal was exceedingly vicious and succeeded in lacerating the collector's hand before it was dispatched (Loukashkin, MS).

The single specimen collected, no. 8337, weighed 565.6 grams. It is exceptionally dark for this race, as was noted by Davis (1939, p. 138) for all of the specimens from Idaho at his disposal.

***Spilogale gracilis saxatilis* Merriam. Spotted Skunk**

On September 14, a spotted skunk was caught about four miles southwest of Selway Falls at an elevation of 5,800 feet. It was taken in a steel trap placed in a crotch at the base of a divided Englemann spruce. Although the situation was a most unusual one for a member of this species, being in a dense Canadian Life Zone forest, it was only about 100 yards from a grass and brush-covered ridge that contained but a scattering of timber.

None of the residents of this region contacted by members of the Academy party knew of the presence of spotted skunks in this part of the state, although all were familiar with the striped skunk. So far as known this locality is about 160 miles north of the northernmost record for *Spilogale gracilis* in Idaho. The heretofore known range of the species, however, approaches the Clearwater Mountains more closely in eastern Oregon and southeastern Washington (cf. Bailey, 1936, p. 312).

According to Whitlow and Hall (1933, p. 248) a single skin examined by them from the vicinity of American Falls in southern Idaho exhibits an extreme restriction of the white markings even for the race *saxatilis*. The specimen collected in the Clearwater Mountains, a subadult male, no. 8338, shows quite the reverse. The white markings are more extensive than in any specimens of *saxatilis* examined, resembling very much the pattern possessed by the race *phenax* of California. Cranially, however, this individual resembles comparable specimens of the former race.

***Mephitis mephitis* (Schreber). Striped Skunk**

The presence of striped skunks in the vicinity of Selway Falls was apparently known to a number of residents of the region but

members of the Academy party failed to secure any specimens. Until a series is available, however, it will remain conjectural as to whether representatives of the species from this region may be referred to *Mephitis mephitis hudsonica* or to the more southern form *M. m. major*.

***Canis latrans lestes* Merriam. Coyote**

No individuals of this species were collected or seen. Tracks, however, were observed regularly, especially on the tops of ridges. Although occasionally noted in dense forests of spruce, they were most frequently seen in more open situations, especially along trails through brush and grassland. Early on the morning of September 28 several coyotes were heard calling some distance away in a lodgepole pine forest six miles southwest of Selway Falls. That evening a single individual was again heard calling in the same vicinity.

***Felis concolor hippolestes* Merriam. Mountain Lion**

No mountain lions were seen in this region but their abundance in the Clearwater Mountains was attested to by local U. S. Forest Service officials and employees of the U. S. Fish and Wildlife Service. Large herbivores such as elk, mule deer and white-tailed deer, upon which this species normally preys, were numerous.

***Lynx rufus pallescens* Merriam. Bobcat**

Bobcats were reportedly abundant over most of this region. No specimens were secured but their tracks were noted not infrequently along trails both in forested and brushy country.

***Marmota caligata nivaria* Howell. Hoary Marmot**

***Marmota flaviventer avara* (Bangs). Yellow-bellied Marmot**

Marmots were reported by local residents to be widely distributed over the drainage of the Middle Fork of the Clearwater River, occurring generally where rocky situations were present. As these animals are all in hibernation by the middle of August none was seen or collected. Numerous droppings, however, were observed on the upper granitic slopes of Fog Mountain and in talus slopes bordering Canteen Meadows in the Crag Mountains. In the latter region, marmots were undoubtedly associated with bushy-tailed woodrats and conies.

From information derived from various sources it would appear that both the yellow-bellied and hoary marmot are present in the Clearwater Mountains, the former occurring generally at lower altitudes, the latter at higher altitudes. R. L. Hand in correspondence (February 17, 1942) states: "In the Lochsa district both

the hoary marmot (*Marmota caligata*) and a race of *Marmota flaviventer* occur quite commonly. While the latter is more of a low altitude species I am quite certain that the ranges of the two meet and overlap in the Lochsa Canyon. Actually I have seen the former only above the Lochsa Ranger Station, and the latter some 15 or 20 miles below and on down the Middle Fork. The hoary marmot seems most common at the higher altitudes and I distinctly remember running on to an individual or two near Stanley Butte which is just north of the Crags. I should certainly expect to find the smaller brown species [*flaviventer*] along the Selway River."

***Citellus columbianus columbianus* (Ord).**

Columbian Ground Squirrel

Columbian ground squirrels were all in hibernation in September, but numerous burrows, presumably occupied by members of this species, were noted from the deepest canyon bottoms to the tops of the higher ridges. Their widespread occurrence over this region was well known to all persons contacted who were familiar with the Selway River country.

***Citellus lateralis tescorum* (Hollister).**

Mantled Ground Squirrel

Members of this species had also entered hibernation by early September when the Academy's expedition arrived in the Clearwater Mountains. Their presence on Coolwater Ridge, separating the lower Selway and Lochsa rivers, and in the Crags Mountains, however, was reported by a number of reliable observers familiar with this region. Here, as is generally true of the species throughout its range, they were said to inhabit mainly rocky situations.

The subspecific name *tescorum* is herein used on the basis of A. H. Howell's revision of the ground squirrels (1938, p. 199), no specimens having been examined by the writer.

***Eutamias amoenas luteiventris* (Allen).**

Buff-bellied Chipmunk

This species was found to be very abundant throughout forested country and in marginal brushlands at elevations below 4,500 feet. It was not found, however, in the higher Englemann spruce forests where *Eutamias ruficaudus* occurred. As is true generally of this species throughout its range *Eutamias amoenas* was found to be primarily terrestrial, foraging over the ground and along fallen logs. Individuals were occasionally seen on the lower branches of trees, especially yews, the berries of which were eaten. When approached they would invariably attempt to get to the ground rather than escape by ascending higher into the trees. The cheek pouches of a

female taken on September 8 contained a number of seeds of grand fir. The wings of the seeds had been removed.

The following trapping data gives some evidence of the abundance of members of this species in the Selway Falls region in September 1941. At mid-morning on September 6, 40 mouse traps were placed out in a semi-circular area within a radius of 100 yards of the center of our first camp on the east bank of Meadow Creek. By 2 p.m. 22 chipmunks had been captured. Between 2 p.m. and sunset four more were taken and at 6 a.m. the next morning three more were in the traps. The traps, of course, were visited often and reset when found sprung. Even this did not seem to represent the total chipmunk population foraging over this very limited area as more individuals were seen here during the day of September 7 when the traps were removed and on succeeding days. Of this total of 29 individuals secured around camp in less than 24 hours, six contained one or more large bot fly (*Cuterebra*) larvae beneath the skin. The greatest number noted on any one chipmunk was three. These larvae were located on the neck, chest, back, flank and beneath the ear. Five additional individuals possessed capsules beneath the skin from which larvae had already emerged. The incidence of infection by these parasitic flies seemed especially high, therefore, as shown by 11 out of 29 specimens secured over a very limited area either being currently infected, or giving indication of having recently been infected.

The series of *Eutamias amoenas* obtained from the Selway region shows a very intense pigmentation on the ventral part of the body. It is more marked in these specimens than any comparable examples of the race *luteiventris* examined from Montana, southern British Columbia or extreme northern Idaho.

A total of 35 specimens, nos. 8380-8414, were secured two miles south southeast of Selway Falls. These represent 30 skins plus skulls, four skulls only and one complete skeleton. Of this number 15 are males and 20 are females. The average and extreme measurements in millimeters of 14 males are: Total length, 204 (193-214); tail length, 88.4 (80-98); hind foot, 31.9 (31-34); ear from notch, 17.1 (16-19). The average and extreme measurements in millimeters of 19 females are: Total length, 209.1 (191-222); tail length, 91.2 (77-98); hind foot, 31.8 (31-33.5); ear from notch, 16.9 (15-19). The average and extreme weights in grams of 14 males and 19 females are 50.6 (45.3-55.4) and 53.6 (44.4-62.7), respectively.

***Eutamias ruficaudus simulans* Howell.**

Rufous-tailed Chipmunk

In general this species of chipmunk was very abundant higher in the mountains, being a common resident of the Englemann spruce and alpine fir association. A single specimen was secured on September 6 in a lowland fir and cedar forest along Meadow Creek at

1,900 feet altitude. This was the only individual noted below 4,500 feet. On September 20, members of this species were seen at an altitude of 7,000 feet in the Crag Mountains.

These chipmunks were found to be much more arboreal in habits than *Eutamias amoenas*, which occurred at lower elevations. Much of their foraging was carried on in trees and in a large number of instances they were found to have nest holes in trees or standing snags. Although forest-dwelling for the most part, many marginal tracts of brushland in which snags were still standing were inhabited by these chipmunks. In one place a broken, dead fir, approximately 18 feet in height, was seen to house six individuals. These six chipmunks were observed daily in this tree for a period of a week, and each seemed to possess a separate hole in the main trunk in which it would take refuge.

On September 14, two chipmunks were observed picking up feathers about camp, four miles southwest of Selway Falls. These were placed in their cheek pouches and later carried to their burrows where undoubtedly they served for nest material. Many chipmunks were caught in small steel traps baited with meat for small carnivores such as weasels. Two chipmunks secured in brushland on September 23 had their cheek pouches filled with the seeds of *Polygonum Douglasii*. During the last week in September when the weather was quite cold there was a noticeable decrease in the number of chipmunks seen.

Thirty-nine specimens, nos. 8341-8379, representing 16 males and 23 females, of *Eutamias ruficaudus* were secured. The average and extreme measurements in millimeters of 16 males are: Total length, 219 (207-246); tail length, 95.5 (82-111); hind foot, 32.6 (31-35); ear from notch, 17.5 (16-21). The average and extreme measurements in millimeters of 19 females are: Total length, 219.4 (206-236); tail length, 95.6 (88-106); hind foot, 32.4 (31-34); ear from notch (18 averaged), 17.3 (16-19). The average and extreme weights in grams of 16 males and 19 females are 55.5 (46.5-66.3) and 57.5 (46.5-70.2), respectively.

***Tamiasciurus hudsonicus richardsoni* (Bachman).**

Red Squirrel

Red squirrels were abundant throughout the forested portions of this region, but most numerous where either grand or alpine fir occurred. During September red squirrels were seen to ascend regularly to the tops of firs in the early morning to cut off cones. Sometimes they would dismantle the cones in the tree tops and secure the seeds there, the presence of a squirrel being more often detected by the steady dropping of chips and seeds rather than by any sound it made. Generally, however, the cones were cut off and let drop to the ground. After several cones had been dropped the squirrel would descend and secure them. These cones were

often then taken apart on logs, the cone scales being left in a pile while the seeds that were secured were carried away.

A total of 29 specimens, nos. 8415-8443, was secured. Of this number 15 are males and 14 are females.

***Glaucomys sabrinus bangsi* (Rhoads). Flying Squirrel**

Flying squirrels appeared to be fairly common in the more heavily forested portions of the Selway River region, being more often detected at night by sound rather than by sight. Flying squirrels were seen or heard almost nightly in the vicinity of our first camp on Meadow Creek. Here, in a grand fir and red cedar forest, one or more individuals were regularly observed by lamp light gliding from tree to tree shortly after dark. High pitched notes emitted by these squirrels were commonly heard in the surrounding forest at night. One specimen was trapped close to this camp on September 11, and two additional specimens were secured four miles southwest of Selway Falls at 5,800 feet altitude. One of these was taken in a cedar forest on September 18 and the other in a dense spruce forest on September 29. All three individuals were caught in small steel traps baited with meat and placed on the ground.

These specimens were found on comparison to agree with a large series from Golden, Idaho County, which were reported on by Mayer (1941) and placed in the race *bangsi*. The two individuals taken on September 11 and 18, respectively, are in worn summer pelage with new winter pelage appearing beneath the surface of the old hairs on the shoulders, sides, flanks and posterior part of the back. The specimen taken on September 29 has new pelage on the entire dorsal surface, with the exception of the head. Worn pelage remains on the ventral parts of the body but new pelage is readily apparent beneath the surface. The weights of three males, nos. 8444-8446, collected are 94.1, 109.5 and 159.2 grams.

***Thomomys talpoides saturatus* Bailey. Pocket Gopher**

Pocket gophers were distributed locally over this region. Very few signs of this species were noted in the canyon bottoms which were quite rocky and lacking in grassy clearings. Over a period of eight days only two separate workings were noted along Meadow Creek canyon from its junction with the Selway River to a point three miles upstream. One specimen was secured in the vicinity of our first camp, two miles south southeast of Selway Falls. The scarcity of pocket gophers was also apparent on the steep, rocky slopes of the mountains. On the tops of the mountains, however, where considerable fine top-soil was present, pocket gophers were numerous. Their workings were found to be almost equally numerous in heavily forested country, where, of course, there was considerable low-growing vegetation, as on more or less open, grassy ridge tops. Burned over areas, grown up with brush and containing

many small clearings, appeared to present optimum conditions for members of this species in this region.

Twenty-eight specimens, nos. 8447-8474, were secured and of this number 13 were males and 15 were females. This series on comparison with *Thomomys t. fuscus* from central Idaho appears darker in coloration, agreeing in this respect with specimens from northern Idaho which were considered by Davis (1939, p. 256) to be best placed with the race *saturatus*.

Castor canadensis Kuhl. Beaver

Many signs of beavers were noted along the lower part of Meadow Creek, especially where the water was relatively deep and flowing quietly. So far as could be determined these animals inhabited holes in the banks of the creek, the entrances being below the surface of the water. No dams were observed, nor were they necessary due to the permanence of the water supply.

Many beaver cuttings were seen along the shores of the creek. Among the species of trees and shrubs cut were grand fir, western red cedar, western yew, service berry, snowberry and willow. Where the latter occurred in beaver territory it was usually trimmed to the ground, apparently being a preferred food. Some of the firs and cedars cut measured up to 10 inches in diameter. Occasionally partly cut larger trees were noted, the largest one seen being two feet in diameter, and at a distance of 25 feet from the edge of the water. On one occasion a living cedar, which had fallen, probably as a result of a storm, with part of its crown submersed in the creek, was found to have all the tips of the branches cut off by beavers. Frequently the smaller vegetation, such as sedge and horsetail growing along shore, was noticeably trampled down by these animals.

Shortly before dusk on the evening of September 7, about one-half mile up Meadow Creek from our first camp, a beaver was seen. It was heard to hit the water with its tail as it started to swim across the stream. The noise was a dull thump which, however, had considerable carrying power. A second beaver was believed to be present but visibility was too poor to be certain. The writer and Cecil Tose returned to a point about 150 yards below this same locality on the following night at 8:15 p.m., equipped with a strong spotlight. An approach was no sooner made than a beaver was heard to hit the water with its tail. Upon turning on the light it was seen swimming toward the center of the stream where it turned abruptly and swam down stream. After continuing down stream it made a sharp right angle turn and swam toward the observers. Each time, before turning, it dived momentarily, slapping the water with its tail as it did so. This behavior, consisting of sharp turns while swimming accompanied each time by a shallow dive and the slapping of the water with its tail, continued for some time. Finally, it became frightened, dived and was not seen again that evening.

***Peromyscus maniculatus artemisiae* (Rhoads).**

White-footed Mouse

White-footed mice were widely and abundantly distributed over all portions of the Selway River drainage in which trapping was carried on. The following data at our camp on Meadow Creek gives evidence of the abundance of this species. Forty traps placed out on the evening of September 6 in a semi-circular area possessing a radius no greater than 100 yards contained 15 mice by 10 p.m., and at 6 a.m. the following morning three additional individuals were found to have been caught during the night. This, of course, was in a camp that appeared to be regularly used, at least during the summer, and represented a somewhat higher population than was present over the entire area in general. Where information was definitely recorded in the field notes of members of the party as to the exact number of mouse traps placed out at night and the succeeding catches the next morning it was found that 670 known trap nights produced, among other small mammals, 91 white-footed mice. This represents the results of trapping in varied forest habitats, brushland and riparian growth. A number of those mice taken at lower altitudes were found to be infected with bot fly larvae.

One individual, captured on September 7, was found to have 11 seeds of cascara sagrada (*Rhamnus purshiana*) in its cheeks.

Although a large number of half-grown young were taken, only one female was found to be pregnant. This individual was captured on September 7, two miles south southeast of Selway Falls, and contained four embryos averaging 16 millimeters in length. Another taken on this same day showed signs of nursing young. On the morning of September 8 at 10:30 o'clock a small, shrill, bird-like call note was heard repeatedly in a thicket of brush about camp. On investigating it proved to come from a young white-footed mouse that had wandered from its nest and was not yet old enough to feed itself. The mother had probably been trapped on the night of September 6-7.

The series of 29 specimens, nos. 8476-8504, secured in this general area appears to be typical *artemisiae*, exhibiting none of the sub-specific characters of the race *serratus* recently described by Davis (1939, p. 290). The average and extreme weights in grams of 12 males and 10 females are, respectively, as follows: 21.1 (19.4-23.5) and 25.4 (19.6-34.4).

***Neotoma cinerea occidentalis* Baird.**

Bushy-tailed Wood Rat

Bushy-tailed wood rats occurred locally throughout this area wherever the terrain was rocky, and were also found about deserted human habitations. Talus slopes, such as were inhabited by conies

in the Crag Mountains, were found to contain numerous signs of wood rats.

Four specimens were secured, nos. 8505-8508. Three of these were taken about camp, two miles south southeast of Selway Falls, 1,900 feet altitude, and the fourth was trapped at a deserted cabin six miles southwest of Selway Falls at 5,800 feet altitude. These few specimens appear to be intermediate in character between *Neotoma cinerea occidentalis* and *N. c. alticola* approaching nearer, however, to the former (*cf.* Hooper, 1940, p. 418).

***Clethrionomys gapperi idahoensis* (Merriam).**

Red-backed Mouse

Red-backed mice were taken only in spruce and fir forested areas at higher elevations, intensive trapping in canyon bottoms in situations seemingly suitable for members of this species producing no results. At higher altitudes red-backed mice were moderately common in coniferous forests where there was an abundant undergrowth of dwarf maple, alder, yew, and snowberry as well as numerous fallen logs. One individual was trapped in a crotch in a spruce tree at a height of three feet above the ground.

The majority of red-backed mice captured were immature, many of them being less than half-grown. One adult female, taken on September 13, carried three embryos measuring 22 millimeters in length. A total of 40 specimens, nos. 8509-8548, was secured, 24 being males and 16 females.

This series agrees with those specimens from southern Idaho, in the collection of the Museum of Vertebrate Zoology, which were assigned to the race *idahoensis* by Davis (1939, p. 311). It may here be remarked, however, that the differences between *Clethrionomys g. idahoensis* and *C. g. saturatus* are very slight.

***Microtus longicaudus mordax* (Merriam).**

Long-tailed Meadow Mouse

Meadow mice were relatively scarce in those portions of the Selway drainage in which trapping was carried on. This was probably due to the scarcity of mountain meadows and grassy streamside banks, except locally at high elevations where glaciation had occurred. The greatest number secured at any one time was on September 9 when four individuals were taken from 30 traps placed over a very limited area along Meadow Creek. Three of these were caught in traps placed among horse-tail, sedge and grass, growing within 15 feet of the creek. The fourth was secured next to a fallen log in the forest, a few yards from the stream, where wild strawberries formed the principal ground cover. On the tops of ridges meadow mice were occasionally taken in dense spruce and fir forests in association with red-backed mice. They were nowhere near as

numerous, however, as was the latter species. A total of 10 individuals, nos. 8549-8558, in all was secured.

***Microtus richardsoni macropus* (Merriam).**

Richardson Meadow Mouse

A single immature individual, no. 8559, of this species was secured on September 17, 4 miles southwest of Selway Falls at 5,800 feet elevation. It was taken in a trap set on a mossy ledge in the center of a small rivulet having its origin at a spring several hundred yards above. When found the extremities of this animal were partly submerged and being eaten by leeches.

***Erethizon epixanthum epixanthum* Brandt.**

Yellow-haired Porcupine

Although no porcupines were seen, a skull and part of the skeleton, no. 8475, of one was found by Dr. Hanna one mile above Selway Falls on September 10. Undoubtedly these animals are common throughout the forested portions of this region.

***Ochotona princeps princeps* (Richardson). Pika**

On September 20 many pikas were heard in the talus slopes surrounding Canteen Meadows in the Crag Mountains. Although it was quite cold a few individuals were seen as well as heard at noon when there was intermittent sunshine. All disappeared by 2:30 p.m., at which time it began to snow lightly. Snow continued falling during the remainder of the afternoon and, although pikas were heard beneath the rock slides, only one individual was seen. Late in the afternoon a pika was seen on top of a rock, in the snow, by Tose who promptly collected it.

Due to the general plateau-like surfaces of the mountain tops and the sheer, eroded sides of the canyons there were few talus slopes for these animals except in the highest areas.

The one specimen secured, no. 8560, agrees in characters with the race *princeps*, as represented by a series in the University of California Museum of Vertebrate Zoology from the vicinity of the Glidden Lakes, Shoshone County, Idaho.

***Lepus bairdii bairdii* Hayden. Snowshoe Rabbit**

Snowshoe rabbits were peculiarly localized in their distribution over the Selway River region. They were in fact noted only in two limited localities about five miles apart. The intervening territory, as well as many portions of the surrounding country, appeared equally suitable for these animals but, while careful search was made for rabbits or signs of such, no evidence indicating their presence was found.

Shortly after dark on the evening of September 10, and again on the evening of September 15, a snowshoe rabbit was seen along the edge of the road about one mile southwest of Selway Falls at an altitude of approximately 4,500 feet. The forest cover here was rather open with, however, a dense undergrowth of brushy species present. On September 27, snowshoe rabbits were discovered inhabiting dense undergrowth in a spruce-fir forest six miles southwest of Selway Falls at 5,800 feet elevation. This undergrowth consisted principally of western yew, thin-leaf alder, dwarf maple, and snowberry. The following evening at dusk four rabbits were observed along the edge of a road in this vicinity over a distance of one-half a mile. One of these was secured. This specimen, no. 8561, is a male with new white winter pelage appearing on the ventral parts of the body.

***Cervus canadensis nelsoni* Bailey. American Elk**

Elk were very abundant in those portions of the Selway River drainage visited. Tracks and signs were of equally common occurrence from the canyon bottoms to the tops of the higher ridges. According to Parsell (1938, p. 23) elk were scarce here in the early days and it is only within the past 20 years that their numbers have greatly increased to the present estimated population of 11,000 in the Selway National Forest. This great increase has been attributed in large part to the extensive burning that has occurred over much of this area, resulting in large tracts of brushland which provide adequate winter food for elk.

Although fresh elk signs were noted daily and individuals could regularly be heard morning and evening higher on the ridges, the animals themselves, despite their abundance and size, were seen but rarely. Bulls were heard bugling principally in the early morning, late afternoon and evening, their cries resounding from every canyon. Judging from observations made, much of the day was spent well down in the canyons. In the late afternoon the bulls, at least judging from their calls, gradually ascended to the ridge tops. In many places on the tops of the ridges, especially where brush and grassland intermingled, there were areas 10 to 15 feet in diameter where the ground and vegetation had been torn up apparently as a result of fighting.

On the evening of September 27, on Burned Ridge, west of Meadow Creek, the writer heard several elk bugling in the canyons on either side of the summit shortly after sunset. One individual could be heard rubbing its antlers on a tree several hundred yards down a canyon to the south. To the north several hundred yards, in a canyon on the opposite side of the ridge, two other individuals were heard crashing about in the brush as they moved toward the summit. The one in advance was not bugling but the other, following some distance behind, was calling although not with the usual

series of ascending notes. Its cry somewhat resembled that of a steer. Finally, after a few minutes, the first animal, a large bull elk, came into sight, trotted up the ridge at a moderately rapid gait through brush and grassland and disappeared over the crest and down the south slope. About 10 minutes later the second animal appeared, following the same trail. The light was so poor, however, at this time that it was impossible to discern the antlers.

Numerous well worn elk trails were noted in equal abundance both in densely forested areas and in more or less open brushland.

***Odocoileus hemionus hemionus* (Rafinesque). Mule Deer**

Mule deer were reported to occur during the fall of the year in the higher parts of the mountains although it is highly probable that later in the year they would descend to lower elevations where the snow would not be so deep. Signs of mule deer were seen sparingly on the higher ridges. Elk signs were many times more numerous. It would appear, according to Case (1938, pp. 25-27), that the large number of elk present in this region is responsible for the present reduction in deer, due to scarcity of winter food.

No deer were seen although a single four-point antler and a portion of the skull of one, no. 8562, were found near Canteen Meadows, nine miles northeast of Selway Falls, on September 20. Incidentally it might be mentioned that more signs of deer were seen high in the Crag Mountains than elsewhere in this region. Signs of elk were very rare here. The abundance of granite rock and the scarcity of dense brush or forest cover likely was responsible for this difference in the relative abundance of these two species.

***Odocoileus virginianus ochrourus* Bailey.**

White-tailed Deer

White-tailed deer were reported by local representatives of the U. S. Forest Service and U. S. Fish and Wildlife Service to occur principally in the canyon bottoms. Signs of deer, presumably members of this species, were noted not uncommonly in Meadow Creek and the Selway River canyons. On September 15, at sunset, a doe and yearling white-tailed deer were seen running through the forest, adjacent to the river, several miles below Selway Falls. Their tails were held high in the air as they ran.

***Alces americanus shirasi* Nelson. Moose**

According to Adams (1926), in his summary of big game animals on the National Forests, it was estimated that there were 485 moose present in the Selway National Forest in Idaho in 1925.

No moose were observed during the month of September but residents of this region have seen these animals in the higher moun-



Orr, Robert Thomas. 1943. "Mammals of the Clearwater Mountains, Idaho." *Proceedings of the California Academy of Sciences, 4th series* 23, 511–536.

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