

MOUNT RAINIER NATIONAL PARK WASHINGTON



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 INTERPRETIVE PROSPECTUS
 PARADISE
 Mount Rainier National Park

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UNITED STATES
 DEPARTMENT OF THE INTERIOR
 NATIONAL PARK SERVICE
 Mount Rainier National Park
 Longmire, Washington 98397

A COMPARATIVE LIST OF SOME OF THE PRINCIPAL MOUNTAINS
 OF THE WORLD

Everest	29,028	Nepal-Tibet
K-2	28,250	Kashmir
Makalu I	27,824	Nepal-Tibet
Annapurna	26,504	Nepal
Aconcagua	22,834	Argentina
McKinley	20,320	Alaska
Logan	19,850	Canada
Kilimanjaro (Kibo)	19,340	Africa
Citlaltepec (Orizaba)	18,700	Mexico
Elbrus	18,481	USSR, Caucasus Mts.
St. Elias	18,008	Alaska-Canada
Popocatepetl	17,887	Mexico
Iztaccihuatl	17,343	Mexico
Ruwenzori	16,763	Africa (Uganda-Republic of the Congo)
Mont Blanc	15,771	France-Italy
Monte Rosa	15,203	Switzerland-Italy
Matterhorn	14,690	Switzerland-Italy
Whitney	14,495	California
Elbert	14,431	Colorado
Harvard	14,420	Colorado
Rainier	14,410	Washington
Massive	14,404	Colorado
Longs	14,255	Colorado
Shasta	14,162	California
Pikes Peak	14,110	Colorado
Mauna Kea	13,796	Hawaii
Gannett Peak	13,785	Wyoming
Mauna Loa	13,680	Hawaii
Jungfrau	13,642	Alps
Fujiyama	12,388	Japan
Mount Adams	12,307	Washington
Mount Hood	11,245	Oregon
Mount Baker	10,778	Washington
Mount Etna	10,705	Sicily
Mount St. Helens	9,677	Washington
Mount Olympus	9,550	Greece
Mount Shuksan	9,127	Washington
Glacier Peak	8,976	Washington
Mount Olympus	7,965	Washington

Source: National Geographic Society

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Washington, D. C. 20242

NAMED SUMMITS OF THE UNITED STATES
OVER 14,000 FEET ABOVE SEA LEVEL

Summit	State	Altitude	Quadrangle	Scale	Date *
1. Mt. McKinley	Alaska	a) 20,320	Mt. McKinley A-3	1:63,360	1961
2. North Peak	Alaska	a) 19,470	Mt. McKinley A-3	1:63,360	1961
3. Mt. St. Elias	Alaska	18,008	Mt. St. Elias	1:250,000	1948
4. Mt. Foraker	Alaska	a) 17,400	Talkeetna D-3	1:63,360	1961
5. Mt. Blackburn	Alaska	16,523	McCarthy	1:250,000	1949
6. Mt. Bona	Alaska	16,421	McCarthy	1:250,000	1949
7. Mt. Sanford	Alaska	16,208	Gulkana	1:250,000	1949
8. Mt. Vancouver	Alaska	15,700	Mt. St. Elias	1:250,000	1948
9. Mt. Fairweather	Alaska	15,300	Mt. Fairweather	1:250,000	1952
10. Mt. Hubbard	Alaska	14,950	Mt. St. Elias	1:250,000	1948
11. Mt. Bear	Alaska	14,850	McCarthy	1:250,000	1949
12. Mt. Hunter	Alaska	a) 14,573	Talkeetna D-3	1:63,360	1961
13. Browne Tower	Alaska	14,530	Mt. McKinley	1:250,000	1950
14. Mt. Alverstone	Alaska	14,500	Mt. St. Elias	1:250,000	1948
15. Mt. Whitney	California	14,495	Mt. Whitney	1:62,500	1956
16. Mt. Elbert	Colorado	c) 14,431	Mt. Elbert	1:62,500	1935
17. Mt. Harvard	Colorado	b) 14,420	Mt. Harvard	1:62,500	1955
18. Mt. Rainier	Washington	b) 14,410	Mt. Rainier	1:62,500	1924
19. Mt. Massive	Colorado	c) 14,404	Mt. Elbert	1:62,500	1935
20. Mt. Williamson	California	14,375	Mt. Whitney	1:62,500	1956
21. La Plata Peak	Colorado	14,340	Mt. Elbert	1:62,500	1935
22. Blanca Peak	Colorado	c) 14,317	Huerfano Park	1:125,000	1889
23. Uncompahgre Peak	Colorado	c) 14,314	Lake City	1:62,500	1903
24. Crestone Peak	Colorado	c) 14,291	Trinidad	1:250,000	1954
25. Mt. Lincoln	Colorado	14,284	Mt. Lincoln	1:62,500	1938
26. Grays Peak	Colorado	14,270	Grays Peak	1:24,000	1958
27. Mt. Antero	Colorado	14,269	Poncha Springs	1:62,500	1956
28. Torreys Peak	Colorado	14,267	Grays Peak	1:24,000	1958
29. Castle Peak	Colorado	a) 14,265	Aspen SE	1:24,000	1960
30. Mt. Evans	Colorado	14,264	Mt. Evans	1:24,000	1957
31. Longs Peak	Colorado	14,255	Longs Peak	1:24,000	1961
32. Quandry Peak	Colorado	14,252	Mt. Lincoln	1:62,500	1938
33. Mount Wilson	Colorado	14,246	Mt. Wilson	1:24,000	1953
34. White Mountain	California	c) 14,246	White Mountain	1:62,500	1914
35. North Palisade	California	14,242	Mt. Goddard	1:62,500	1948
36. Mt. Cameron	Colorado	14,238	Mt. Lincoln	1:62,500	1938
37. Shavano Peak	Colorado	b) 14,229	Poncha Springs	1:62,500	1956
38. Mt. Belford	Colorado	b) 14,197	Mt. Harvard	1:62,500	1955
39. Mt. Princeton	Colorado	14,197	Poncha Springs	1:62,500	1956
40. Mt. Yale	Colorado	b) 14,196	Mt. Harvard	1:62,500	1955
41. Crestone Needles	Colorado	d) 14,191	Trinidad	1:250,000	1954
42. Mt. Bross	Colorado	14,169	Mt. Lincoln	1:62,500	1938
43. Mt. Shasta	California	14,162	Shasta	1:62,500	1954
44. Mt. Sill	California	14,162	Mt. Goddard	1:62,500	1948

Summit	State	Altitude	Quadrangle	Scale	Date*
45. El Diente Peak	Colorado	14,159	Dolores	1:24,000	1953
46. Maroon Peak	Colorado	a) 14,156	Aspen SW	1:24,000	1960
47. Tabeguache Mtn.	Colorado	b) 14,155	f) Montrose	1:250,000	1956
48. Mt. Oxford	Colorado	14,153	Mt. Harvard	1:62,500	1955
49. Mt. Sneffels	Colorado	d) 14,150	g) Montrose	1:125,000	1909
50. Point Success	Washington	14,150	Mt. Rainier	1:62,500	1924
51. Mt. Democrat	Colorado	14,142	Mt. Lincoln	1:62,500	1938
52. Liberty Cap	Washington	b) 14,133	Mt. Rainier	1:62,500	1924
53. Capital Peak	Colorado	a) 14,130	Snowmass Mtn. NE	1:24,000	1960
54. Mt. Lindsey	Colorado	14,125	Huerfano Park	1:125,000	1889
55. Pikes Peak	Colorado	14,110	Pikes Peak	1:24,000	1951
56. Kit Carson Mtn.	Colorado	i) 14,100	Trinidad	1:250,000	1954
57. Snowmass Mtn.	Colorado	a) 14,092	Snowmass Mtn. SE	1:24,000	1960
58. Windom Mtn.	Colorado	14,091	Needle Mtns.	1:62,500	1902
59. Mt. Eolus	Colorado	14,086	Needle Mtns.	1:62,500	1902
60. Mt. Russell	California	14,086	Mt. Whitney	1:62,500	1956
61. Humboldt Pk.	Colorado	14,075	e) Trinidad	1:250,000	1954
62. Columbia Pk.	Colorado	b) 14,073	Mt. Harvard	1:62,500	1955
63. Mt. Augusta	Alaska	14,070	Mt. St. Elias	1:250,000	1948
64. Culebra Pk.	Colorado	i) 14,069	e) Trinidad	1:250,000	1954
65. Missouri Mtn.	Colorado	14,067	Mt. Harvard	1:62,500	1955
66. Mt. Bierstad	Colorado	14,060	Mt. Evans	1:24,000	1957
67. Stewart Pk.	Colorado	14,060	Montrose	1:250,000	1957
68. Sunlight Pk.	Colorado	14,060	Needle Mtns.	1:62,500	1902
69. Split Mtn.	California	14,058	Big Pine	1:62,500	1950
70. Redcloud Pk.	Colorado	14,050	San Cristobal	1:125,000	1907
71. Handies Pk.	Colorado	14,048	Handies Pk.	1:24,000	1955
72. Little Bear Pk.	Colorado	d) 14,040	Huerfano Park	1:125,000	1889
73. Middle Palisade	California	14,040	Big Pine	1:62,500	1950
74. Mount Langley	California	b) 14,028	Lone Pine	1:62,500	1950
75. Mt. Tyndall	California	14,018	Mt. Whitney	1:62,500	1956
76. Pyramid Pk.	Colorado	a) 14,018	Aspen SW	1:24,000	1960
77. Wetterhorn Pk.	Colorado	14,017	Montrose	1:125,000	1909
78. Wilson Pk.	Colorado	14,017	Mt. Wilson	1:24,000	1953
79. Sunshine Pk.	Colorado	14,016	Durango	1:250,000	1951
80. Mt. Muir	California	14,015	Mt. Whitney	1:62,500	1956
81. North Maroon Peak	Colorado	a) 14,014	Aspen SW	1:24,000	1960
82. San Luis Pk.	Colorado	14,014	Creede	1:62,500	1959
83. Mt. Sherman	Colorado	a) 14,007	Leadville 4 NW	1:24,000	1962
84. Mt. Wrangell	Alaska	14,006	Gulkana	1:250,000	1949
85. Huron Pk.	Colorado	b) 14,005	Mt. Harvard	1:62,500	1955

NOTES: * = Date of Survey

a) Advance map

b) USGS geodetic control notes (elev. on map is for triangulation station)

c) USC&GS

d) Colorado Mountain Club

e) Peak named on 1:250,000 scale quadrangle

f) Not named on Garfield 15-minute quadrangle

g) Elevation 14,100 feet given on Montrose 1:250,000 scale quadrangle

h) Not named on Huerfano Park 30-minute quadrangle

i) Hayden Survey 1873

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EVOLUTION OF MOUNT RAINIER'S LANDSCAPE

1. During the Eocene Epoch, which began about 60 million years ago, the Cascade Range and Mount Rainier did not exist. In their place was a broad lowland partly occupied by rivers, lakes, and embayments of the ocean. By then, dinosaurs had become extinct but land mammals were abundant. Eruptions of volcanoes in this lowland, some on land and some under water, spread debris across vast areas, forming layers of sandstone and breccia that now make up the Ohanapecosh Formation. Volcanic eruptions continued into Oligocene and Miocene time, forming thick and widespread layers of volcanic ash and lava flows, which are called the Stevens Ridge and Fifes Peak Formations.
2. After these volcanic rocks were formed, they were crumpled into folds, broken along faults, and uplifted into northwest-trending mountains. At the same time, a mass of molten rock moved up into the lower part of the older rocks; as the molten rock slowly cooled and solidified, it formed granodiorite, a light-gray rock similar to granite.
3. After the northwest-trending mountains, which may never have been very high, were worn down to low hills, the north-trending Cascade Range began to rise across them. As the great new range rose, rivers cut deep valleys into its flanks, so that before Mount Rainier was born, the Cascades had been carved into a rugged range whose crest was about 6,000 feet high.
4. Between half a million and a million years ago, Mount Rainier developed at a weak spot in the earth's crust, where molten rock from the interior could reach the surface. The first lava flows moved down the deep valleys of the Cascades as much as 15 miles from the central vent. Later flows, which were smaller and thinner, did not spread as far, and gradually built the high main cone. While Mount Rainier grew here, several other volcanoes that can be seen from the Park were also forming, notably Mount Baker, Glacier Peak, Mount Adams, and Mount Hood.
5. As eruptions diminished, the Mount Rainier volcano began to deteriorate by explosion, collapse, and erosion. The slopes of lava flows on opposite sides of the mountain project more than a thousand feet above the present summit, thus the cone was once much higher than it is now. This upper part of the cone probably was removed by explosions and collapse. These caused avalanches of rock debris that slid down several sides of the volcano and collected in valleys where they mixed with water to form mudflows. One avalanche left a yellowish deposit of clay, sand, and rocks over most of Paradise Park; another moved as a mudflow down the White River valley all the way to the Puget Sound lowland about 5,000 years ago.

Of the three present summit eminences, Liberty Cap and Point Success are remnants of the old cone. The third and highest, Columbia Crest, lies on the rim of a small recent lava cone only $\frac{1}{4}$ mile across; this little cone is one of two built after the former top had been removed.

6. Even before Mount Rainier reached its greatest height, rivers and glaciers were cutting deep valleys and huge, bowl-shaped cirques into its sides. During the last major glaciation, which ended about 10,000 years ago, the valley glaciers grew to as much as 40 miles long, and small glaciers nestled in the cirques above 4,500 feet. As the climate warmed, between 8,000 and 4,000 years ago, these glaciers became smaller than they are today. Then, about 3,500 years ago, a small expansion of glaciers started, which is called the Little Ice Age. We are still in the Little Ice Age although the glaciers are now considerably smaller than they were only 50 years ago.

7. After the last major glaciation, the Park had nearly its present appearance. The volcano had become nearly dormant, throwing out only occasional bursts of rock fragments or pumice. The coarsest pumice, found mostly in the Yakima Park area, is chiefly from pea to walnut size, and is about 2,000 years old. Numerous eruptions of Rainier have been reported since white settlement of this region, but none resulted in the formation of pumice layers. The youngest pumice in the Park came from Mount St. Helens volcano 400 or 500 years ago. Interestingly, very fine pumice from the great eruption of Mount Mazama at Crater Lake, Oregon is also preserved here. Although the pumice layers are relatively thin, they form the soil that supports the fields of flowers so typical of the alpine meadows of Mount Rainier National Park.

Geologic time scale	Years ago	Geologic events in the Park
Recent (postglacial)	3,500 to present	Little Ice Age--rebirth and readvance of glaciers
		Building of new summit cones
Pleistocene (Ice Age)	5,000	Summit of Rainier destroyed by avalanches that formed huge mudflows
	25,000 to 10,000	Last major glaciation
Pliocene		Birth and growth of Rainier volcano and repeated glaciation
	1,000,000	
Miocene	13,000,000	Uplift and erosion of Cascade Range
		Intrusion of granodiorite Folding of older rocks Deposition of Fifes Peak and Stevens Ridge Formations
Oligocene	25,000,000	
Eocene	36,000,000	
	58,000,000	Deposition of Ohanapecosh Formation

Reference

Dwight R. Crandell and Don Millineaux, Geological Survey, Denver, Colorado - 6/64

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GLACIERS ON MOUNT RAINIER

One of the most outstanding features of interest in Mount Rainier National Park is the extensive glacier system on the broad flanks of the volcanic cone of Mount Rainier. This glacier system contains about 41 glaciers having a total area of 34 square miles. It is recognized as the most extensive single-peak glacier system in the contiguous United States and is as large as many of the single-peak systems found elsewhere in the world. These are the most easily accessible glaciers in the United States.

To understand the mechanics of a glacier, one may think of it as a combination plow, file, and sled. As a glacier flows, it plows up rocks and earth, rasps away and smooths the rock in its path, and carries away the plowed-up and filed-off debris, along with additional rock fragments which fall onto its upper surface. For many years it was felt that a glacier flowed down the mountain like a highly viscous fluid, such as asphalt. Recent work by glaciologists has shown that this is not quite true. Instead of behaving as a viscous fluid, ice behaves in much the same way as do other crystalline solids, such as metals. The slow deformation of the crystals of solid ice in a glacier obeys the same laws of plastic flow which govern the bending of an iron bar, or the slow distortion of rocks in the earth's crust.

Glaciers do not flow uniformly. The ice flow within a glacier and on its surface varies in a complicated manner depending upon such factors as ice thickness, surface slope, bottom roughness, and meltwater lubrication. The speed varies from day to day, winter to summer, and year to year. The average speed near the margins of small glaciers may be only several inches per year, but in the steep portions of the major glaciers on Mount Rainier, speeds of several thousand feet per year may occur. Ice in a valley glacier flows fastest at the center of a glacier, and speeds at the surface are greater than speeds below the surface, exactly as in a river. Unequal speeds at different places in a glacier give rise to stresses, which in turn cause crevasses. These dangerous, gaping cracks in the ice surface rarely extend to depths of greater than 100 feet or so, because the ice pressure at depth is so great that it tends to close all open holes or cracks. The faster the ice is stretched, due to unequal flow speeds, the deeper the crevasses will extend.

On the high areas of the glacier the winter snow accumulation exceeds the summer snow ablation (the loss due to melting, evaporation and erosion). Thus a portion of the winter snowpack remains at the end of each summer. The snow flows downhill, compacting into solid ice as it moves and is buried by subsequent snows, until it reaches an area where ablation exceeds accumulation, and where it will eventually disappear. Thus, the glacier may be viewed as a river of ice flowing downhill which is constantly replenished at its source and wasted at its terminus. The equilibrium line, which divides the area of predominant accumulation from the area of predominant ablation, varies from year to year according to the

complicated interplay of a number of meteorological factors: snowfall, sunshine, wind, cloud cover, etc. In a year of high snowfall or a very cool summer, the equilibrium line will be found at a low elevation. This indicates that the mass of the glacier increased that year, and the glacier is said to be healthy (growing). Conversely, an equilibrium line at a high elevation indicates that the mass has decreased that year, and the glacier is unhealthy (shrinking). If the glacier grows in mass over a period of many years, the terminus will advance. Thus the terminus responds to average conditions over a period of many years or decades, not to individual years of high or low snowfall. It is quite possible in any one year for a glacier to increase in mass (especially in thickness), while the terminus continues to retreat.

In 1946, Mr. Arthur Johnson of the U. S. Geological Survey measured an increase in thickness of the Misqually Glacier at the 6,800 foot level. At that time glaciers were thought to be shrinking all over the world. In subsequent years the ice surface continued to rise, much like the rise of a river's surface as a flood develops. This icy "flood wave" coursed down the glacier at a rate approaching 1,000 feet per year. At the 6,100 foot level, the ice velocity increased from 20 feet per year to 400 feet per year as the wave passed. This was the first indication of a general world-wide climatic change to a cooler, wetter climate, which occurred in the late forties and early fifties. Similar waves have now been observed on other glaciers around the world. It is interesting to note that this change of climate was revealed by glacier variations before it was deduced from studies of meteorological records.

Long-term climatic changes are revealed by the record of deposited rock debris (moraines) and plant devastation left by the glacier. During the middle of the 19th century, the glaciers of Mount Rainier covered about 56 square miles. By 1913 this area had shrunk to about 42 square miles. This shrinkage continued until about 1950 when the area was 34 square miles. Since then the glaciers have been for the most part stabilized with only very minor retreats taking place. The Misqually, Emmons, Carbon, and several other glaciers were advancing in 1963.

Although the observer will see the glaciers as static bodies of gleaming ice, he should realize that they are dynamic units in a state of constant flow and that they exist in a sensitive balance of climatic factors. Although science is rapidly gaining knowledge of glacier behavior and finds glaciers a useful tool in research, a full understanding of glaciers and their relation to their environment will come only after many years of intensive and persevering research.

Reference

U. S. Geological Survey, Mark F. Meir; Project Hydrologist and Bill Campbell; Glacier Meteorologist - 7/64

Div. Int.
7/64

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Mount Rainier National Park
Longmire, Washington 98397

October 26, 1947

Report on Kautz Creek Flood

MEMORANDUM for the Superintendent

In the report that follows will be found the account of the Kautz Flood as the evidence shows it likely occurred.

EVENTS PRECEDING THE KAUTZ FLOOD

The destructive Kautz Creek flood is without doubt one of the most spectacular events to occur within any of our National Parks since the creation of the Park Service.

As though it were a warning of things to come, the Nisqually River rose to flood stage on October 1, doing extensive damage along its course. At the Nisqually Glacier the force and cutting power of the water was so great that a deep, V-shaped gorge was cut into, but not through, the ice on one side for some distance near the snout. It was on October 2 that the torrential rainfall reached its peak when 2.38 inches fell at Longmire and 5.89 inches at Paradise.

At the same time that Paradise was experiencing its heaviest rainfall the Kautz drainage was, without any doubt, receiving rain in cloudburst proportions. It was this cloudburst that brought about the destructive flood that followed.

SCOPE AND CHARACTER OF THE FLOOD

When first viewed by the writer the flood had reached its final and climatic stage. A vast fan-shaped sea of rock and log debris was pouring down across the Nisqually Entrance Highway toward the Nisqually River. The force of the moving mass was terrific, with huge boulders being carried along like float material. One boulder was measured that reached approximately 13 feet in diameter. In many instances these boulders did not roll, but simply moved along buoyed up by the thick, cement-like material flowing across the region. Trees, even large ones with diameters in excess of three feet, were snapped off like sticks or else were uprooted. The stream channels, of which there were several, were constantly choked with log and rock debris, forcing the flood out into other areas. Depressions were filled with rock and mucky sand; so became dangerous quicksand areas until they later stabilized and settled. All of this activity was accompanied by a rumbling and earch shaking that was awesome in its magnitude.

FIELD STUDIES

Following the flood, the writer made a survey of the Kautz drainage through its entire length. The most important evidences were found at the headwaters of Kautz Creek in the area occupied by the Kautz Glacier. Because of the character of the terrain it was not safe to follow the stream to the terminus of the glacier, so all observations were made from the rim of the canyon near Van Trump Park and Mildred Point.

Evidence shows that approximately one mile in length of the Kautz Glacier was destroyed during the flood. Where the glacier once lay is now a deep canyon, ranging up to approximately 300 feet in depth and approximately 300 yards wide at the widest point. These figures are considered to be on the conservative side. Along the east side of the newly cut canyon is a large segment of the original glacier, now cut off and left stranded by itself. The segment is approximately 75 feet thick at the lower end of the ice mass. The canyon itself has been cut completely down to the original granite bedrock. In the sharply inclined walls of the canyon may be seen the old rock debris upon which the ice mass of the glacier was resting. Tributary to the main canyon are two extensive side canyons, showing the scope of the heavy rainfall in the area. While at this vantage point overlooking the upper Kautz, District Ranger Weldon and the writer saw reinvacted a "surge" believed to be a miniature of the destructive ones of October 2. From the steep canyon walls, rocks were falling at short intervals of only a few seconds. One of these slides developed into one of considerable volume, choking the stream bed with rubble. For a few moments the water was virtually halted, then it swept forward carrying with it the boulders and fine materials. It is believed that this demonstrated the mechanics of the larger "surges" that swept through the lower valley.

At the box canyon of the Kautz, where it is believed the major surges developed through a damming up of the narrow channel, the canyon has been cut approximately 60 feet in depth. Here an entirely new channel has been cut, with the old stream bed of the Kautz left high on the west side of the canyon. The terrific impact of the water as it came through the narrow box canyon is shown by the sheerness of the newly cut gorge and the large trees thrust like jackstraws out among the heavy forest east of the stream.

For the next two miles below the box canyon the gorge slowly becomes shallower and ranges from 60-10 feet in depth. The composition of the new walls and stream bed is made up of relatively fine gravels and small boulders. It is along this stretch of canyon that the surges developed their terrific destructiveness. In places the waters burst out through the forest cutting new channels, only to pour back into the main channel further downstream. Huge boulders have been piled along the east rim of the newly cut canyon. Large blocks of ice still could be found two weeks after the flood. The destruction of the forest cover is extensive, with hundreds of trees torn out bodily and splintered into smaller fragments. Here mud is found on standing trees higher than the writer can reach.

About two and one-half miles below the Kautz box canyon the gorge ends, and the millions of yards of boulders and fine debris spreads out fan-like through the forest on approximately a half mile front until it reaches the Nisqually River. It was in this region that the course of the "surges" changed rapidly as new channels were cut and then were choked by logs and rock. The destruction of the forest cover is terrific, with entire areas being completely denuded. Along with the rest of the area, the Nisqually Entrance Road is buried several feet beneath the rubble of boulders and fine volcanic materials.

PROBABLE EVENTS OF THE FLOOD

Based upon the field studies made, the writer believes the following events likely took place during the flood:

At the time the cloudburst hit in the upper Kautz drainage, the stream was already in virtual flood stage due to the heavy rains. As the water came down it poured through the tributary canyons into the Kautz Glacier, cutting a narrow gorge on the glacier similiar to the one being cut on the Nisqually Glacier at the same time. So great was the power of this rush of water that the ice was cut through, exposing the rock debris beneath. Immediately this material was whipped out and water began to impound in the depression thus formed. The remaining ice of the glacier now began to collapse, allowing the great head of water to surge downward toward the narrow walls of the box canyon. As this surge moved, its terrific grinding power ripped out a gorge many feet deep. At the box canyon the ice and boulders jammed in between the narrow walls, creating a temporary dam sufficient to partially hold back the on-rushing flood crowding behind. Greater and greater grew the pressure on the dam, and it finally burst through, creating the first explosive surge below the box canyon. So great was its force that it simply "blew out" a gorge through the forest, leaving its original channel intact on the west rim of its new channel. This surge swept on down through the forest, wiping out the highway and road bridge. In the meantime the partially destroyed dam at the box canyon became the source of what is believed to be smaller "surges" similar in nature to the first. These were not so destructive but did cut the new channel deeper. Finally, there came a second major surge, probably almost as large as first developed, which greatly deepened the new canyon. This was followed by a last major surge of great force. It is believed this last surge was caused by the final destruction of the Kautz Glacier in the huge amphitheater above the present isolated section of the glacier. Again the huge mass of ice and debris choked the narrow box canyon and again a surge developed. This one literally swept the upper canyon clean, cutting down to the basement rocks below the glacier and greatly deepening the gorge below the box canyon. Its volume of materials was beyond the imagination of the many local residents gathered on the highway to watch it, but it ran into millions of yards.

STATUS OF THE FLOOD

At the time of this report, now three weeks after the flood, the rock debris is far from stable. A heavy rain, damming up the present Kautz Creek with the dozens of logs still along its course, could quickly cause a change in the course of the stream by cutting a new channel. However, it is believed that the danger of wide-spread cutting is past, and that any that might occur would be local. The deposits are settling and if undisturbed by new shifts, will soon have a tendency to stabilize. Other factors are also making their importance felt. Upstream in the newly cut canyon, the great masses of potentially dangerous logs are rapidly being buried beneath rock slides as the canyon walls fall in. Thus the danger of new log jams from rising waters is being rapidly eliminated in all areas except below the canyon. It is the writer's belief that, if no new floods arise within the next 60 days, the danger from upstream will have largely passed, leaving only that area downstream from the canyon to be considered. By this time most of the logs will be anchored in place, the stream bed will have been cut deeper and its channel widened sufficiently to handle high water.

THE KAUTZ -- AN EXHIBIT IN PLACE

While the flood has been highly destructive and expensive, it has given to the park its third most important field exhibit in place, being surpassed only by the peak and its glacier system. Here completely displayed is a perfect example of natural forces in all their power. Here, too, is a golden opportunity to study the ecological processes that follow partial and complete destruction of the vegetative cover. Thus it bids fair to become one of the finest study areas found in any national park. By leaving it strictly undisturbed, except for any necessary cleanup of snags, etc., along the highway, it will give us an outdoor laboratory of great scope and value.

Russell K. Grater
Former Park Naturalist

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LIST OF EXOTIC PLANTS KNOWN TO OCCUR
IN MOUNT RAINIER NATIONAL PARK

Alsike clover	<i>Trifolium hybridum</i>
Beard grass	<i>Polypogon monspeliensis</i>
Bergamot mint	<i>Mentha citrata</i>
Bitter dock	<i>Rumex obtusifolius</i>
Black bindweed	<i>Polygonum convolvulus</i>
Black medick	<i>Medicago lupulina</i>
Bladder campion	<i>Silene cucubalus</i>
Blue grass	<i>Poa annua</i>
Brome grass	<i>Bromus commutatus</i>
Brome grass	<i>Bromus tectorum</i>
Bull thistle	<i>Cirsium lanceolatum</i>
Burdock	<i>Arctium minus</i>
Buttercup	<i>Ranunculus repens</i>
Canada thistle	<i>Cirsium arvense</i>
Cat's-ear	<i>Hypochaeris radicata</i>
Chickweed	<i>Stellaria sativa</i>
Chicory	<i>Cichorium intybus</i>
Common groundsel	<i>Senecio vulgaris</i>
Common mullein	<i>Verbascum thapsus</i>
Common tansy	<i>Tanacetum vulgare</i>
Common timothy	<i>Phleum pratense</i>
Cranesbill	<i>Geranium pusillum</i>
Crested dogtail grass	<i>Cynosurus cristatus</i>
Curled dock	<i>Rumex crispus</i>
Dandelion	<i>Taraxacum officinale</i>
Dock	<i>Rumex conglomeratus</i>
Evergreen blackberry	<i>Rubus laciniatus</i>
Fescue	<i>Festuca elatior</i>
Feverfew	<i>Chrysanthemum parthenium</i>
Field chamomile	<i>Anthemis arvensis</i>
Field mustard	<i>Brassica campestris</i>
Forget-me-not	<i>Myosotis sylvatica</i>
Foxglove	<i>Digitalis purpurea</i>
Foxtail grass	<i>Setaria viridis</i>
Ground ivy	<i>Nepeta hederacea</i> , var. <i>pariflora</i>
Hair grass	<i>Aira caryophylla</i>
Hair grass	<i>Aira praecox</i>
Hawksbeard	<i>Crepis capillaris</i>
Hedge mustard	<i>Sisymbrium officinale</i>
Hop clover	<i>Trifolium dubium</i>
Italian rye grass	<i>Lolium multiflorum</i>
Knotweed	<i>Polygonum aviculare</i>
Knotweed	<i>Polygonum lapathifolium</i>

Mallow	Malva neglecta
Mouse-ear chickweed	Cerastium vulgatum
Mouse-ear chickweed	Cerastium viscosum
Nightshade	Solanum villosum
Orchard grass	Dactylis glomerata
Ox-eye daisy	Chrysanthemum leucanthemum
Peppermint	Mentha piperita
Perennial rye grass	Lolium perenne
Pigweed	Chenopodium album
Plantain	Plantago major
Red clover	Trifolium pratense
Redtop	Agrostis alba
Ribwort plantain	Plantago lanceolata
Sandwort	Arenaria serpyllifolia
Scotch broom	Cytisus scoparius
Sheep-sorrel dock	Rumex acetosella
Shepherd's purse	Capsella brusa-pastoris
Soapwort	Saponaria vaccaria
Sow thistle	Sonchus asper
Sow thistle	Sonchus oleraceus
St. Johnswort	Hypericum perforatum
Tansy mustard	Descurainia sophia
Tumbling mustard	Sisymbrium altissimum
White clover	Trifolium repens
Wood groundsel	Senecio sylvaticus
Velvet grass	Holcus lanatus

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CHECK LIST OF TREES

Pines - Family Pinaceae

<u>Pinus monticola</u>	Western white pine
<u>Pinus albicaulis</u>	whitebark pine
<u>Pinus contorta</u>	lodgepole pine
<u>Pinus ponderosa</u>	ponderosa pine
<u>Picea engelmannii</u>	Engelmann spruce
<u>Picea sitchensis</u>	Sitka spruce
<u>Tsuga heterophylla</u>	Western hemlock
<u>Tsuga mertensiana</u>	mountain hemlock
<u>Pseudotsuga menziesii</u>	Douglas-fir
<u>Abies grandis</u>	grand fir
<u>Abies amabilis</u>	Pacific silver fir
<u>Abies procera</u>	noble fir
<u>Abies lasiocarpa</u>	subalpine fir

Cypress - Family Cupressaceae

<u>Thuja plicata</u>	Western redcedar
<u>Chamaecyparis nootkatensis</u>	Alaska-cedar

Yows - Family Taxaceae

<u>Taxus brevifolia</u>	Pacific yow
-------------------------	-------------

Willows & Poplars - Family Salicaceae

<u>Salix sitchensis</u>	Sitka willow
<u>Salix scouleriana</u>	Scouler willow
<u>Salix lasiandra</u>	Pacific willow
<u>Populus trichocarpa</u>	black cottonwood

Birches -- Family Betulaceae

Alnus rubra red alder

Dogwoods -- Family Cornaceae

Cornus nuttallii Pacific dogwood

Maples -- Family Aceraceae

Acer macrophyllum bigleaf maple

Acer circinatum vine maple *

Acer glabrum Douglas maple *
var. douglasii

Roses -- Family Rosaceae

Malus diversifolia Oregon crab apple

Prunus emarginata bitter cherry

* Often considered as shrubs

Forest Service, U.S.D.A., Check List of Native and Naturalized Trees of the United States (Including Alaska), Agriculture Handbook No. 41, Forest Service, Washington, D.C., 1953

As this is a preliminary checklist until further research can be carried out, any corrections or additions by readers would be greatly appreciated.

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CHECK LIST OF FISH

Salmon, trout, and charrs - Family Salmonidae

trout

cutthroat trout	<u>Salmo clarki clarki</u>
Montana black-spotted trout	<u>Salmo clarki lewisi</u>
brown trout	<u>Salmo trutta</u>
rainbow trout	<u>Salmo gairdneri gairdneri</u>

charrs

brook trout	<u>Salvelinus fontinalis</u>
Dolly Varden	<u>Salvelinus malma</u>

References

American Fisheries Society, A List of Common and Scientific Names of Fishes From the United States and Canada, 2nd edition. American Fisheries Society Special Publication No. 2. (Secure from Office of Secretary, American Fisheries Society, Box 483, McLean, Virginia.)

As this is a preliminary checklist until further research can be carried out, any corrections or additions by readers would be appreciated. Please contact: Chief Park Naturalist
Mount Rainier National Park
Longmire, Washington

KEY TO FIELD IDENTIFICATION OF TROUT, CHARRS, AND WHITEFISH

OF MOUNT RAINIER NATIONAL PARK

The game fish which may be taken in Mount Rainier National Park include the true trout, namely cutthroat, rainbow and brown; the charrs, including eastern brook and Dolly Varden, and the whitefish. When examining an unidentified game fish from waters of Mount Rainier National Park the following taxonomic characters and general descriptions may be found useful.

The salmon, trout, and charrs (Family Salmonidae), and the whitefishes possess the following characters in common:

1. An adipose fin is present.
2. A well developed lateral line is present.
3. A large fleshy appendage, sometimes called the accessory scale, is present at the base of each of the pelvic fins.
4. The body is covered with cycloid scales.

The whitefish may be separated from the trout and salmon by the following characters:

1. The mouth is not terminal; the upper jaw is longer than the lower jaw and projects over the latter.
2. The body of the adult is not spotted (round parr marks are found on fingerlings).
3. There are less than 100 (58-90) scales in the lateral line, and scales are fairly large.

The trout and charrs may be recognized by the following common characters:

1. The mouth is large and anterior in position.
2. The body is spotted.
3. There are more than 100 scales in the lateral line.
4. There are 8-12 rays in the anal fin. This character usually provides a distinctive separation from the Pacific salmon, which have 12-19 rays in the anal fin. However, since there is no salmon fishery in waters of Mount Rainier National Park, no key for the salmon appears necessary.

Trout (Genus *Salmo*) may be recognized by the following characters:

1. Trout have dark spots on a lighter background.
2. Vomer flat, with teeth on shaft.
3. Less than 190 scales in lateral line.

The cutthroat trout series may be recognized by the following characters:

1. Orange or red slash under the lower jaw on both sides along the dentary bones (not always present).
2. The maxillary extends well behind the eye.
3. Hyoid teeth are present at the base of the tongue on the lower jaw (See figure 5).
4. There are more than 140 scales in the lateral line.

Two sub-species of cutthroat trout are found in the Park and may be separated by the following characters:

1. The body is profusely spotted; spots are present on the anal fin and below the lateral line.
2. The scale count is usually less than 160 in the lateral line.
3. The body is elongate and more rounded than the Montana black-spotted trout.

--cutthroat (native) (*Salmo clarki clarki*)

1. The body is not profusely spotted, but spots are large, spotting is sparse anteriorly and few, if any, spots are found below the lateral line anterior to the anal fin, or on the anal fin.
2. The scale count is usually 165-170 in the lateral line.
3. The body is deeper and more compressed than the coastal cutthroat.

--Montana black-spotted trout (introduced)
(*Salmo clarki lewisi*)

In Mt. Rainier National Park waters the brown trout has been introduced but is known to occur in only one of the Golden Lakes located near the west boundary of the Park.

The brown trout may be identified by the following characters:

1. The "cutthroat" mark is not present on the dentary.
2. There are no hyoid teeth at the base of the tongue.
3. The color is a brownish-yellow hue, especially in the dorsal area, the sides sometimes silvery.
4. Small black spots and crosses dorsally and on top of head; large black spots on sides and below lateral line extending anteriorly onto operculum (gill cover), the large spots below lateral line usually ringed with pale pink, giving a halo appearance; usually some large orange-red spots on sides encircled by cream-colored halos.
5. The adipose fin often has an orange colored tip.
6. The caudal fin without black spots except for a few along the upper margin.

---Brown trout (introduced) (Salmo trutta)

The rainbow trout may be identified by the following characters.*

1. The "cutthroat" mark is not present on the dentary (under side of jaw)
2. The maxillary does not extend behind the eye; mouth is smaller than cutthroat.
3. There are no hyoid teeth at the base of the tongue.
4. The rainbow usually has 125-135 scales along the lateral line; scales larger than on cutthroat.
5. The body is profusely spotted, but spots are usually somewhat smaller than on the cutthroat.
6. The rainbow usually has a smaller head and a deeper body than either the cutthroat or the brown trout.
7. The coloration of the rainbow is typically gray to bluish above the lateral line. A broad orange or red band extends laterally along the sides in mature specimens and is more pronounced at spawning time. No red or orange spots are present.

---Rainbow trout (native) (Salmo gairdneri gairdneri)

* Characters also apply to the sea-run form or steelhead trout.

Charrs (Genus *Salvelinus*) may be recognized by the following characters:

1. Charrs have light spots on a darker background.
2. Vomer boat-shaped, with depressed shaft; shaft without teeth.
3. The charrs are fine-scaled; more than 190 scales in the lateral line.

Two species of charrs are found in Mt. Rainier National Park; the speckled charr, usually called brook trout was introduced. The Dolly Varden is a native fish. These fish may be separated and identified by the following characters:

1. Wavy olive and black colored vermiculations are found in the dorsal area and on the dorsal and caudal fins.
2. Bright pink or red spots along the sides.
3. The lower fins have bright silver colored anterior edgings.
4. The body is deep and robust in large specimens.
5. The posterior edge of the caudal fin is almost square.

—Speckled charr or brook trout (introduced)
(*Salvelinus fontinalis*)

1. Vermiculations are not present.
2. Grayish colored in dorsal area with white spots on back and sides; often with a few yellow or orange spots along the sides.
3. The lower fins often have narrow cream-colored anterior margins.
4. The body is less stout and more rounded and elongate than the speckled charr.
5. The caudal fin is forked.

—Dolly Varden (native) (*Salvelinus malma*)

Glossary of Terms

- Accessory scale. An enlarged or fleshy appendage on the upper side at the base of the pelvic fin.
- Adipose fin. A fleshy fin-like projection behind the rayed dorsal fin, on the back of certain fishes, usually lacking typical fin rays.
- Anal fin. The fin on the ventral median line behind the vent.
- Branchiostegals. The bony rays supporting the branchiostegal membranes, under the head of fishes and below the opercular bones behind the lower jaw and attached to the hyoid arch.
- Caudal fin. The fin on the tail of fishes.
- Caudal peduncle. The tapering portion of the body behind the base of the last ray of the anal fin. Its length is taken from that point to the base of the mid-caudal rays. The least depth of the caudal peduncle is taken at its slenderest part.
- Cycloid. Smooth-edged; said of scales concentrically striate, without any trace of minute spines.
- Dentary. The anterior bone of the lower jaw or mandible, usually bearing teeth.
- Dorsal fin The fin on the back, in front of the adipose fin.
- Gill arch. The bony arches to which the gills are attached.
- Gill filaments Organs for breathing the air contained in water.
- Gill rakers. A series of bony appendages, variously placed along the anterior edges of the gill arches.
- Hyoid teeth. Teeth along the hyoid arch which gives support to the tongue.
- Lateral line A series of sensory tubes opening to the exterior or a sensory canal along the sides of a fish, sometimes single, sometimes multiple.
- Mandible. Lower jaw
- Maxillary Upper jaw
- Opercle Gill cover; the posterior membrane bone of the side of the head, in fishes.
- Palatine. Membrane bones of the roof of the mouth, one on each side extending outward and backward from the vomer.
- Pectoral fin The anterior or uppermost of the paired fins.
- Premaxillaries The bones, one on either side, forming the front of the upper jaw of fishes.
- Pyloric caeca. Appendages of the form of blind sacs, connected with the alimentary canal at the posterior end of the stomach, or pylorus.
- Vomer. The front part of the roof of the mouth; a bone lying immediately behind the premaxillaries, and usually bearing teeth.

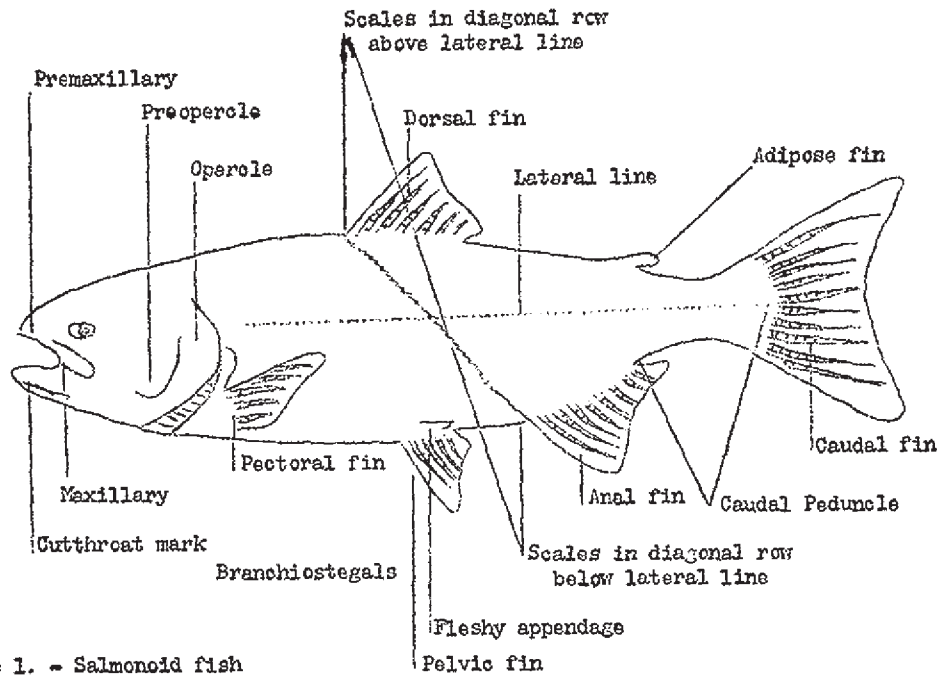


Figure 1. - Salmonoid fish

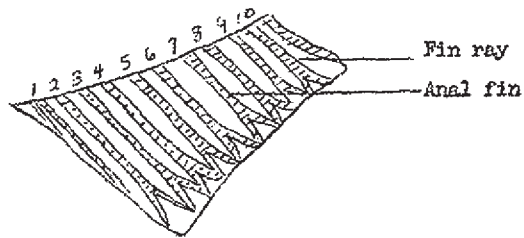


Figure 2. - Anal fin

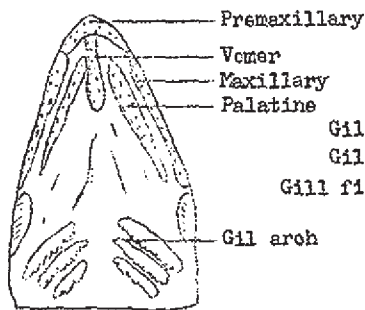


Figure 3. - Upper jaw and roof of mouth

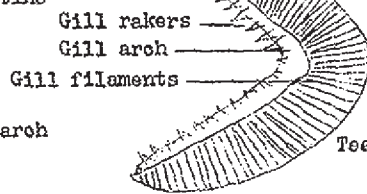


Figure 4. - 1st gill arch

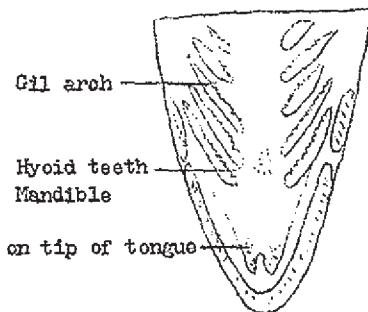


Figure 5. - Lower jaw

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CHECK LIST OF THE AMPHIBIANS AND REPTILES

Newts - Family Salamandridae

Northern rough-skinned newt Tricha granulosa granulosa

Salamanders - Family Ambystomidae

brown salamander Ambystoma gracile gracile

long-toed salamander Ambystoma macrodactylum

Pacific giant salamander Dicamptodon ensatus

Lungless Salamanders - Family Plethodontidae

Western red-backed salamander Plethodon vehiculum

Washington salamander Plethodon vandykei

Oregon salamander Ensatina eschscholtzi oregonensis

Tailed Frogs - Family Ascaphidae

tailed frog Ascaphus truei

Toads - Family Bufonidae

boreal toad Bufo boreas boreas

Treefrogs - Family Hylidae

Pacific treefrog Hyla regilla

Frogs - Family Ranidae

Northern red-legged frog Rana aurora aurora

Washington frog Rana cascadae

A KEY TO THE FIELD IDENTIFICATION OF ADULT AMPHIBIANS AND REPTILES
OF MOUNT RAINIER NATIONAL PARK

a. Vertebrates with bodies covered by plain skin (no scales, feathers or hairs) Class Amphibia.

b. Body slender, with prominent tail, fore and hind limbs about equal in development Order Caudata (salamanders).

c. Snout rounded, no minute groove connecting nostril and upper lip.

d. Costal grooves absent (or poorly defined) skin often rough with numerous tubercles.

---Northern rough-skinned newt (Taricha granulosa granulosa)

dd. Costal grooves present, skin smooth.

e. Costal grooves 11, 12 or 13 (rarely 14) size of adults large.

ee. Costal grooves less distinct, body robust and muscular, above brownish with dark mottling.

---Pacific giant salamander (Dicamptodon ensatus)

f. Costal grooves well defined.

ff. Parotoid glands at back of head, glands on top of tail, uniform brown-above and sides..

---brown salamander (Ambystoma gracile gracile)

g. No parotoid glands, tubercles on hands and feet.

gg. Broad yellowish or greenish-yellow band down the middle of back, sides dark brown to blackish, toes longer than soles of feet.

---long-toed salamander (Ambystoma macrodactylum)

cc. Minute groove connecting nostril and upper lip, no lungs.

d. Constriction at base of tail, back and sides reddish-brown.

--Oregon salamander (Ensatina eschscholtzi oregonensis)

dd. No constriction at base of tail, toes short.

e. Toes partly webbed, sides of body may be black or brown, tan stripe down middle of back, head squarish due to parotoid glands.

--Washington salamander (Plethodon vandykei)

ee. Toes not webbed, costal grooves 16 (sometimes 15) yellow or red stripe down the back, which in some may be lacking, making a nearly black salamander.

--Western red-backed salamander (Plethodon vehiculum)

bb. Body stout without prominent tail, hind limbs much larger than forelimbs Order Salientia (frogs and toads).

c. A very short tail-like process, larger in males than in females, no tympanic membrane.

--tailed frog (Ascaphus truei)

cc. No tail process, tympanic membrane present

d. Parotoid glands slightly longer than wide.

--boreal toad (Bufo boreas boreas)

dd. No parotoid glands, teeth on upper jaw.

e. Tips of digits broadened into adhesive disks, skin on belly granular.

--Pacific treefrog (Hyla regilla)

ee. Tips of digits not broadened.

f. Red on under parts of body (after one year from transforming), few to no definite spots.

--Northern red-legged frog (Rana aurora aurora)

ff. Small black spots, under surface straw colored.

--Washington frog (Rana cascadae)

- aa. Vertebrates with body covered with scales and air breathing.
 Class Reptilia.
- b. Body elongate with tail as long or longer than head and body, two pair of limbs about equal in development . . . (lizard)
 --Northern alligator lizard (Gerrhonotus coeruleus principis).
- bb. Limbs absent (very rudimentary in bottae) no movable eyelids, no external ear openings (serpents).
- c. A small spur on each side of anus, tail short and blunt, eyes very small, small smooth scales.
 --Northwestern rubber boa (Charina bottae plumbea).
- cc. No small spur on side of anus, tail long and tapering.
- d. Prominent bright red bars between dorsal and lateral lines.
 --valley garter snake (Thamnophis sirtalis fitchi)
- dd. No red bars (or very small) between dorsal and lateral lines.
- e. Head including eyes small, infralabials usually fewer than 10, scales rows 17-17-15.
 --Northwestern garter snake (Thamnophis ordinoides)
- ee. Supralabials normally eight, dorsal stripe invaded by black dots. No red in coloration.
 --Puget Sound garter snake (Thamnophis elegans nigrescens)

Reference

Dr. James R. Slater, Professor Emeritus, University of Puget Sound - 6/64

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CHECK LIST OF BIRDS

Preliminary studies of bird life in Mount Rainier National Park were begun in 1897 when C.H. Merriam, A.K. Fisher, and V. Bailey worked an area including what was to become the park two years later. In 1919 a more extensive study was carried out under the cooperative auspices of the National Park Service, Bureau of Biological Survey, and State College of Washington. Representatives of the last two agencies, W.P. Taylor and W.T. Shaw, authored Mammals and Birds of Mount Rainier National Park, which was published by the National Park Service in 1927.

Since that time every effort has been made to maintain current and accurate records of bird collections and observations. Park visitors and employees have been encouraged to report their observations to the office of the Chief Park Naturalist where the records are maintained. The park collection of study skins is lodged in the visitor center at Longmire.

The Taylor-Shaw work gradually became obsolete due to the passage of time, and the need for a more current work developed. The publication, in 1937, of E.A. Kitchins, A Distributional Checklist of the Birds of Mount Rainier National Park filled this need. Changes in nomenclature, designation of new subspecies, recording of species new to the park, etc., have occurred in the twenty-four years since that publication appeared, requiring that a more current checklist be made available. The present work is an attempt to fill this need.

The present checklist has been compiled from records maintained in the office of the Chief Park Naturalist at Longmire, Washington. As a number of the observations reported are from persons unfamiliar with local wildlife, it has been necessary to exercise a certain amount of "editorial judgment." In general, observations by persons of known ability, several reports by a number of persons, or (of course) collection of a specimen are considered sufficient to establish that species as occurring in the park. A single observation of a rare species or of one not native to Washington when reported by a person of unknown ability is at best doubtful.

Scientific and common names and order of listing are the same in the fifth edition of the Checklist of North American Birds, 1957.

Occurrence is described in the following terms:

1. Resident: Most "resident" species nest in the park. The adjectives "summer" and "permanent" are employed to differentiate those birds that migrate out of the park in winter and those that remain.
2. Migrant: "Migrant" species regularly pass through the park en route to other points, but are not known to remain in the park for very long periods. The adjectives "spring" and "fall" will be used only to indicate birds appearing only at one season.
3. Visitant: "Visitant" species occur in the park regularly (seasonally or throughout the year), generally without record of nesting and in small numbers. Many may enter the park as a result of post-nesting dispersal.
4. Casual: "Casual" species occur rarely and very irregularly, but are native to Washington or adjacent areas.
5. Accidental: "Accidental" occurrence is that of exotic species and is exceedingly rare. It can result from severe storms or human conveyance, carrying birds from distant parts to the vicinity of the park, or from aberrant behavior on the part of the bird.

Note: Bird studies in the park are incomplete. Determination of status in many cases has been "deduced" from unsatisfactory and unsubstantial evidence. As observation records grow it is assumed that many "visitants" will become "residents." Some "casuals" will become "residents," others will become "visitants." Both "casual" and "accidental" species should occur in extremely low numbers in so small an area as the park.

Loons - Family Gaviidae

common loon. Gavia immer

Casual; observed in 1938 on Lakes Louise (Kitchin) and George (Best) and in 1939 on Lake George (Tice).

Grebes - Family Podicipedidae

Western grebe. Aechmophorus occidentalis

Casual; dead bird found at Reflection Lake in 1938 (Kitchin) is sole record.

pieb-billed grebe. Podilymbus podiceps podiceps

Visitant; observed at Reflection Lake in 1934, 1937, 1938 (Kitchin) and 1951 (Potts).

Cormorants - Family Phalacrocoracidae

double-crested cormorant. Phalacrocorax auritus

Casual; 5 individuals observed on Reflection Lake in 1947 (McIntyre) were identified as P. a. cincinatus. As P. a. albociliatus is very similar, and as no specimen was collected, the subspecific identification is questionable.

Hérons - Family Ardeidae

great blue heron. Ardea herodias famini

Visitant (possibly a resident); observed at various locations during all months of the year except February and November. No nesting record.

Ducks and Geese - Family Anatidae

Canada goose. Branta canadensis

Casual during fall migration; individual seen at Three Lakes identified as B. c. leucoparcia, but no specimen collected.

white-fronted goose. Anser albifrons frontalis

Casual; flock of 35 observed at Longmire in 1934 (Kitchin) is sole record. Rarely occurs so far from salt water.

snow goose. Chen hyperborea hyperborea

Casual; flock of ten observed at Longmire in 1950 (McIntyre) is sole record.

mallard. Anas platyrhynchos platyrhynchos

Visitant; observed in a variety of locations, generally in late summer and fall. There is a record of mallards nesting at Longmire in 1940 (Kitchin), but the species is too infrequently reported for it to be considered a regular summer resident.

pintail. Anas acuta

Visitant (or fall migrant?); reported in various locations August through October. Two adults with four flightless young reported from Ghost Lake in August, 1940 (McIntyre).

green-winged teal. Anas carolinensis

Casual during fall migration; reported from several locations in 1937-1939 (Kitchin) and in 1948 (Clark).

shoveler. Spatula clypeata

Casual; 7 individuals on Fryingpan Creek in 1948 (Clark) is only record. Shovelers are usually restricted to lower elevations.

Barrow's goldeneye. Eucephala islandica

Summer resident; numerous reports from various park locations. Family groups reported in the park in 1934 (Kitchin) and 1939 (Butler); several breeding records immediately adjacent to the park.

bufflehead. Bucephala albcola

Casual; a single male at Reflection Lake in 1939 (Kitchin) is the sole record.

Harlequin duck. Histrionicus histrionicus

Summer resident; the duck seen most often in the park. Sole nesting record is for 1920 (Flett) but presence of many pairs throughout the breeding season is indicative of regular nesting within the park.

white-winged scoter. Melanitta deglandi dixonii

Casual; normally a salt water species. (Butler) observed and collected a female at Lake Louise in 1935.

hooded merganser. Lophodytes cucullatus

Casual; 4 birds observed on Lake James in 1935 (Kitchin) are the sole record.

common merganser. Mergus merganser americanus

Summer resident, but without record of nesting; numerous reports at various locations spring through fall. Frequent reports of pairs during the breeding season suggests that they may nest in the park.

red-breasted merganser. Mergus serrator serrator

Casual; a female collected at Longmire in 1938 (Kitchin) is sole record. U.S. Fish and Wildlife Service Personnel sighted a loose flock of 20-30 on the Ohanapecosh River near La Wis Wis Campground (about 3 miles south of the park) in April, 1959 (Personal communication).

Vultures - Family Cathartidae

turkey vulture. Cathartes aura teter

Casual (possibly summer resident): several birds reported in 1950 and 1952 (McIntyre). Vultures are frequently reported immediately adjacent to the park.

Hawks and Eagles - Family Accipitridae

goshawk. Accipiter gentilis laingi

Summer resident; numerous reports from a variety of park locations. Reported nesting on Cowlitz Divide in 1937 (Kitchin).

sharp-shinned hawk. Accipiter striatus velox

Fall migrant; reported from various locations July through October and in February.

Cooper's hawk. Accipiter cooperii

Probable summer resident; reported at various park locations in March, June through August, and October. No nesting record.

red-tailed hawk. Buteo jamaicensis calurus

Summer resident; reported in the park more frequently than any other hawk. Frequency of reports may, in part, be due to the birds habit of soaring (which puts it in a position to be easily seen) and to its being easily identifiable.

Swainson's hawk. Buteo swainsoni

Casual; observations in 1919 (reported by Jewett in Birds of Washington State, p. 172) and 1952 (Evans) are only records.

rough-legged hawk. Buteo lagopus s. johannis

Casual; only records are reports in 1947 (Potts) and 1953 (Armstrong).

golden eagle. Aquila chrysaetos canadensis

Summer resident; reported at various locations March through October. Presence of young birds in July, 1937 (Kitchin) and 1947 (Gullion) suggest breeding birds. The pair of adults that attacked Gullion in July, 1947 may have been defending a nest. Reported to 11,000 feet elevation in 1939 (Bodenberg).

bald eagle. Haliaeetus leucocephalus leucocephalus

Summer resident? Although reported from various park locations throughout spring, summer and fall months, there is no further indication of nesting within the park.

marsh hawk. Circus cyaneus hudsonius

Visitant during fall migration; infrequently reported in late summer and fall. All reports from elevations between 5,000 and 7,500 feet.

Osprey - Family Pandionidae

osprey. Pandion haliaetus carolinensis

Casual; one bird reported in flight at Paradise in 1952 (Wagener) is the sole record.

Falcons - Family Falconidae

prairie falcon. Falco mexicanus

Fall visitant; several fall observations in Yakima Park area.

peregrine falcon. Falco peregrinus anatum

Casual; 3 reports, 1 each in 1935, 1937, and 1930 (Kitchin) comprise the entire record.

pigeon hawk. Falco columbarius sucklevi

Casual; reported from Sunset Park in 1938 (Kitchin) and Sourdough Ridge in 1947 (Gullion).

pigeon hawk. Falco columbarius bendirei

Casual; reported only in the Yakima Park area in fall of 1937 (Kitchin) and 1947 (Gullion).

sparrow hawk. Falco sparverius sparverius

Summer resident; commonly reported from various locations May through October. Occurs to at least 6,400 feet elevation.

Grouse - Family Tetraonidae

blue grouse. Dendragapus obscurus fuliginosus

Permanent resident; the most frequently reported galliforma bird in the park. Nests at least to an elevation of 5,500 feet, where it also occurs throughout the winter.

ruffed grouse. Bonasa umbellus sabinii

Permanent resident; occasionally reported from the southern quarter of the park.

white-tailed ptarmigan. Lagopus leucurus rainierensis

Permanent resident; fairly common above 5,000 feet elevation. There apparently is some dispersion to lower elevations in winter.

Quails and Pheasants - Family Phasianidae

California quail. Lophortyx californicus

Permanent resident; occasionally reported in the southern quarter of the park prior to 1949. Not reported since 1960.

ring-necked pheasant. Phasianus colchicus

Permanent resident; like the preceding species, pheasants occurred occasionally prior to 1949 but have not been reported since that time. All reports were from Nisqually Entrance and the adjacent west boundary of the park.

Killdeer - Family Charadriidae

killdeer. Charadrius vociferus vociferus

Summer visitant; occasional reports from various locations. All reports in July and August.

Snipe and Sandpipers - Family Scolopacidae

common snipe. Capella gallinago delicata

Fall migrant; all reports are for August through November. Reported at various locations up to 5,500 feet elevation.

long-billed curlew. Numenius americanus parvus

Casual; 2 birds observed at close range on Burroughs Mountain in 1952 (Hamilton) constitute the entire record.

spotted sandpiper. Actitis macularia

Summer resident; common throughout the park May through September. Numerous nesting records.

solitary sandpiper. Tringa solitaria cinnamomea

Fall migrant; regularly passes through the park late July through September.

semipalmated sandpiper. Ereunetes pusillus

Accidental? The only record of this species being collected in the State of Washington is a specimen taken at St. Andrews Park in 1919 (Warburton) and now in the State College of Washington (Washington State University) collection. Birds of Washington State notes four visual records for the state, one of which is also for St. Andrews Park (Kitchin).

Gulls - Family Laridae

California gull. Larus californicus

Summer visitant; reported regularly over a span of many years, nearly all reports being for July. Probably appears here as a result of post-nesting dispersal

Doves and Pigeons - Family Columbidae

band-tailed pigeon. Columba fasciata monilis

Summer resident; common throughout the park in summer, becoming abundant locally. A large flock remains at Longmire Meadow all summer, the birds apparently being attracted to the warm mineral springs there. MRNPM 5 and 74.

mourning dove. Zenaidura macroura marginella

Casual; although fairly common in open areas at lower elevations, this species rarely wanders into heavily forested areas like the park. Reported from the park at Longmire in 1940 (Kitchin) and 1943 (Hewitt).

Typical Owls - Family Strigidae

screech owl. Otus asio kennicottii

Probably a resident; no nesting record. Reported at Longmire in 1930 (Macy) and collected at Nisqually Entrance in 1934 and 1935 (Kitchin). A screech owl, "probably of this species" was reported calling at Spray Park in 1919 (Taylor-Shaw).

great horned owl. Bubo virginianus saturatus

Resident; numerous reports from densely wooded portions of the park. In July and August of 1959 a horned owl was repeatedly reported standing in the center of the Stevens Canyon Road about $\frac{1}{2}$ mile west of the summit of Backbone Ridge. The bird would flush from the road only when closely approached.

pygmy owl. Glaucidium gnoma grinnelli

Resident; numerous reports from various locations below 6,000 feet elevation. As in the case in the preceding species, constant presence in the park is indicative of a breeding population. Although resident in much of western Washington, the pygmy owl has never been reported nesting in the state.

spotted owl. Strix occidentalis caurina

Uncommon resident; a breeding pair reported at Ochanapecosh in 1919 (Stones) indicates the southernmost point of this species' range. Also reported at the North Puyallup River in 1937 (Kitchin) and near Longmire in 1950 (Potts).

long-eared owl. Asio otus tuftsi

Casual; 2 birds reported at Sunset Park in 1938 (Kitchin) comprise the entire park record.

saw-whet owl. Accipiter acadicus acadicus

Resident; the timidity and small size of this species probably explains the lack of nesting records, for newly fledged young have been reported from several locations. Although a fairly common resident of Washington, there is but one nesting record for the state. Reported in the park up to 6,500 feet elevation.

Goatsuckers - Family Caprimulgidae

common nighthawk. Chordeiles minor hesperis

Summer resident; numerous reports and nesting records, all below 5,000 feet elevation in the southern 1/3 of the park.

Swifts - Family Apodidae

black swift. Cypseloides niger borealis

Summer resident; recorded in numbers at several locations June through August, but without record of nesting.

Vaux's swift. Chaetura vauxi vauxi

Summer resident; very numerous reports and nesting records below 4,000 feet elevation. Occasionally reported to 6,500 feet.

Hummingbirds - Family Trochilidae

rufous hummingbird. Selasphorus rufus

Summer resident; common throughout the park late April through early September. Most numerous near alpine flower fields (at about 5,000 feet elevation). It has been observed on Mount Rainier to elevations of 13,000 feet, so apparently makes occasional sorties far above timberline.

Calliope hummingbird. Stellula calliope
Summer resident; numerous reports from various park locations for May through August suggest a breeding population although nests have not been reported.

Kingfisher - Family Alcedinidae

belted kingfisher. Megaceryle alcyon caurina
Permanent resident; present throughout the year but numbers much reduced in winter. Reported up to elevations of 6,000 feet in summer.

Woodpeckers - Family Picidae

red-shafted flicker. Colaptes cafer cafer
Permanent resident; but numbers much reduced in winter. Common throughout the park in summer. Numerous nesting records.

red-shafted flicker. Colaptes cafer collaris
Permanent resident; similar to the preceding species in all respects excepting that collaris is much less common. Kitchin collected a male in 1939, but subsequent reports cannot be verified. As both subspecies do occur in the park, hybridization probably takes place. As even pure forms of the subspecies are nearly identical, it would seem necessary that a specimen be collected before one attempted to identify it.

pileated woodpecker. Dryocopus pileatus picinus
Permanent resident; presence of apparently mated pairs in same area throughout the breeding season is a good indication of nesting. Although this species is fairly common in dense forests in Washington, the nest is rarely reported. Present throughout the park below 5,500 feet elevation.

Lewis' woodpecker. Asyndesmus lewis
Summer resident; there appears to be only a small breeding population, but this species becomes locally abundant during the fall migration.

yellow-bellied sapsucker. Sphyrapicus varius ruber
Permanent resident; no nesting record. Reported at all seasons and from various locations, generally below 3,000 feet elevation.

Williamson's sapsucker. Sphyrapicus thyroideus thyroideus
Casual; a female collected at Yakima Park in 1939
is the sole record. Rarely reported in Western
Washington

hairy woodpecker. Dendrocopos villosus harrisi
Permanent resident; numerous reports and nesting
records at various locations below 6,500 feet
elevation.

hairy woodpecker. Dendrocopos villosus orius
Fall migrant? Recorded 3 times in the park as a fall
migrant. No other record. Birds of Washington State
states that breeding specimens have been collected in
the park.

downy woodpecker. Dendrocopos pubescens gairdnerii
Permanent resident; numerous reports throughout the
park below 5,000 feet elevation. Nesting records at
Longmire.

black-backed three-toed woodpecker. Picoides arcticus
Probably casual; Kitchin (1937) refers to this as a
resident species, but it has been reported in the
park only 3 times. Westernmost limit of range is said
to be east of Cascade Crest.

Northern three-toed woodpecker. Picoides tridactylus fasciatus
Permanent resident; reported at various locations
throughout the park up to 6,500 feet elevation. Nest
with young reported at Narada Falls in 1934 (Landes)

Tyrant Flycatchers - Family Tyrannidae

Traill's flycatcher. Empidonax traillii brewsteri
Summer resident; infrequently reported, but nesting
record included. In 1940 dead specimens (number
unknown) were found in the crater of Mount Rainier,
elevation 14,410 feet.

Western flycatcher. Empidonax difficilis difficilis
Summer resident; several reports and a nesting record,
all below 4,000 feet elevation.

olive-sided flycatcher. Mtallornis borealis
Summer resident; numerous reports throughout the park
below 6,500 feet elevation. Recorded breeding at
Paradise (Lumley) and Reflection Lake (Kitchin).

Larks - Family Alaudidae

horned lark. Eremophila alpestris alpina

Summer resident; very abundant on the high plateau of Burroughs Mountain, but only rarely reported from other park locations. E. a. alpina is notable as the only lark breeding at high elevations. In all other respects it is very similar to arcticola, which it was considered to be prior to 1943.

Swallows - Family Hirundinidae

violet-green swallow. Tachycineta thalassina lepida

Summer resident; numerous reports from various locations throughout the park up to 9,000 feet elevation. Nest at several locations; in all known cases the nest being located on a building (under eaves, in walls, etc.)

tree swallow. Iridoprocne bicolor

Summer visitant; several reports from various locations during breeding season, but no reports of nesting. This is probably a summer resident which occurs in small numbers.

rough-winged swallow. Stelgidopteryx ruficollis serripennis

Casual; a pair observed for half a day at Longaire in 1940 (Kitchin) is the only record of this species in the park. Not uncommon in the state, it is generally restricted to elevations lower than found in the park.

Jays and Crows - Family Corvidae

gray jay. Perisoreus canadensis obscurus

Permanent resident; one of the most abundant birds in the park. Most abundant at elevations over 4,000 feet in summer and under that in winter. Although it nests commonly throughout the park and newly fledged young are common in July, an occupied nest has been discovered only once (Dodd)²

Steller's jay. Cyanocitta stelleri stelleri

Permanent resident; a very abundant species throughout the park. Nests most abundantly below 3,500 feet elevation. It is not uncommon to find it nesting on window sills, beams, etc.

black-billed magpie. Pica pica hudsonia

Visitant; has been reported in all months except June, July and November. It has been reported throughout the park most often above 5,000 feet in mid-winter. A dead individual was found at the summit of Mount Rainier (14,410) in 1952.

common raven. Corvus corax principalis

Common throughout the park at all seasons. Although no nests are recorded, continual presence in the park and annual appearance of newly fledged young is evidence of nesting. Jewett et al. placed the park west of the range of C. c. sinuatus, calling all ravens west of Yakima Valley C. c. principalis. As no specimen has been collected and identified, the present author follows suit.

common crow. Corvus brachyrhynchos hesperis

Visitant; rarely seen in the park although a common permanent resident at lower elevations. Three sight records constitute the entire record.

Clark's nutcracker. Nucifraga columbiana

Permanent resident; present all year at higher elevations. Seldom seen at less than 3,000 feet. No nesting records although young being fed by parents have been observed at Tipsoo Lake in late June.

Titmice - Family Paridae

black-capped chickadee. Parus atricapillus occidentalis

Casual; very uncommon in the park and no record of nesting. May actually be a very uncommon permanent resident, but this is principally a deciduous forest species. Occurs to 6,500 feet elevation.

mountain chickadee. Parus gambeli abbreviatus

Permanent resident; rarely reported below 5,000 feet elevation, and more often reported from Yakima Park (6,400 feet) than any other location. Only on Mount Rainier and Mount St. Helens does this species regularly breed west of the Cascade Crest.

chestnut-backed chickadee. Parus rufescens rufescens

Permanent resident; this species replaces the preceding at lower elevations. Very common below 5,000 feet elevation, seldom reported above that.

common bushtit. Psaltriparus minimus minimus

Summer resident; although reported only 3 times in the park, two reports were of family groups and it is presumed the species nest in the park.

Nuthatches - Family Sittidae

white-breasted nuthatch. Sitta carolinensis aculeata

Permanent resident; not as frequently reported as the following, but not by any means rare. Reported from various park locations up to 7,000 feet elevation.

red-breasted nuthatch. Sitta canadensis

Permanent resident; most common nuthatch in the park. Occurs to 7,000 feet elevation throughout the park, but is most often reported below 4,000 feet elevation.

pygmy nuthatch. Sitta pygmaea melanotis

Casual; one observation report, at Yakima Park in 1938 (Kitchin), constitutes the entire record for this species in the park. A permanent resident east of the mountains it is rarely seen in western Washington.

Creepers - Family Certhiidae

brown creeper. Certhia familiaris occidentalis

Permanent resident; most frequently seen in the dense forest at lower elevations, but reported from various locations up to 5,000 feet elevation.

Dippers - Family Cinclidae

dipper. Cinclus mexicanus unicolor

Permanent resident; common along streams throughout the park. Often nests behind or near waterfalls, generally nest early in the year (March - May at lower elevations).

Wrens - Family Troglodytidae

winter wren. Troglodytes troglodytes pacificus

Permanent resident; most frequently reported from wetter portions of dense forests at lower elevations, but occurs and nests to at least 6,500 feet.

Thrushes - Family Turdidae

robin. Turdus migratorius caurinus

Summer resident; common throughout the park during breeding season, April - July. Flocks of several hundred feed on huckleberries in late summer and fall (Kitchin). Earliest recorded arrival is February 26, 1953 (McIntyre)

varied thrush. Ixoreus naevius naevius

Permanent resident, but numbers greatly reduced December through February. Are very common throughout the park to 6,500 feet elevation, although most numerous in wet parts of dense forests.

hermit thrush. Hylocichla guttata slevini

Summer resident; common throughout the park during the nesting season, although most often reported at elevations above 4,500 feet.

Swainson's thrush. Hylocichla ustulata ustulata

Summer resident; fairly common below 4,000 feet elevation during the breeding season, but seldom seen due to its secretive habits.

Western bluebird. Sialia mexicana occidentalis

Casual; although fairly numerous at adjacent lower elevations, this species has only been reported 3 times in the park. The Taylor-Shaw party noted them twice in 1919; McIntyre reported 5 in 1950.

mountain bluebird. Sialia currucoides

Summer resident; common in open areas above 4,000 feet throughout the park. Majority of reports are from Reflection Lakes and Yakima Park areas.

Townsend's solitaire. Myadestes townsendi townsendi

Summer resident; fairly common throughout the park May through September. Most reports are for 4,000 feet elevation or higher.

Kinglets - Family Sylviidae

golden-crowned kinglet. Regulus satrapa olivaceus

Permanent resident; most often seen in heavily forested areas. Park records credit all collections and sightings to R. s. olivaceus., whereas Birds of Washington State puts the park in the range of R. s. amoenus. Differentiation is by rather slight color differences; birds in the Mount Rainier area may be intermediate.

ruby-crowned kinglet. Regulus calendula grinnelli
Spring migrant, casual at other times; although chiefly reported in migratory flocks March through early May, there are reports of individuals sighted in summer and winter.

Pipits - Family Motacillidae

water pipit. Anthus spineletta pacificus
Summer resident; numerous reports for summer months, including several nesting records. All nesting records and all but a few sight records are for elevations above 5,000 feet. One individual reported at Camp Muir (10,000 feet) in 1927 (Schmoer).

Waxwings - Family Bombycillidae

cedar waxwing. Bombycilla cedrorum
Summer resident (?), no nesting record; several reports for various locations, most of which are above 5,000 feet in elevation.

Vireos - Family Vireonidae

solitary vireo. Vireo solitarius cassinii
Uncommon fall migrant (or visitant); 3 reports (4 individuals) reported from Longmire. Apparently more common in deciduous forests.

warbling vireo. Vireo gilvus swainsonii
Summer resident; numerous reports throughout the park below 4,000 feet; rarely higher. Several reports of breeding.

Wood Warblers - Family Parulidae

orange-crowned warbler. Vermivora celata lutescens
Summer visitant; occasionally reported to elevations of 7,000 feet all reports being for late July and August. Lack of reports in spring or of breeding records suggest their appearance is due to post-nesting dispersal.

- Nashville warbler. Vermivora ruficapilla ridgwayi
 Casual; although not uncommon in situations very similar to Mount Rainier (Mount Adams, Mount St. Helens), this species has been reported only once. "Quite a large" number was reported at Yakima Park on August 28, 1947 (Gullion).
- yellow warbler. Dendroica petechia morcomi
 Summer resident; reported from 6 locations on the south side of the park. In 1937 Kitchin termed it "common" in Longmire and "common breeder" at Stevens Creek.
- Myrtle warbler. Dendroica coronate auduboni
 Summer resident; commonly reported May through late August at various locations to 6,500 feet elevation. Several breeding records.
- black-throated gray warbler. Dendroica nigrescens
 Casual; a single report of this lowland species in 1948 (McIntyre) comprises the entire record.
- Townsend's warbler. Dendroica townsendi
 Summer resident; commonly reported May through September from various locations to 6,500 feet elevation. Several breeding records.
- hermit warbler. Dendroica occidentalis
 Summer resident? Reported during breeding seasons of 1947-49 and 1953; no other records. This species apparently occurs in scattered groups in western Washington.
- Northern waterthrush. Seiurus noveboracensis notabilis
 Status undetermined; the occurrence of this species in Washington is supported only by 2 unsubstantiated reports. In Birds of Washington State, Jewett et al., it appears only in the hypothetical list. It was reported by Gullion on April 7, 1943 and the characteristic "teetering" was noted.
- MacGillivray's warbler. Oporornis tolmiei tolmiei
 Summer resident; no breeding record, but reports of singing males in mid-June (Stagner, 1944) and other reports in breeding season suggest that small numbers breed at lower elevations in the park.
- Wilson's warbler. Wilsonia pusilla chryseola
 Summer resident; fairly common to elevations of 4,500 feet. Kitchin reported "breeding birds with young" at Lake Ethel in August, 1935.

Blackbirds - Family Icteridae

Western meadowlark. Sturnella neglecta confluenta
Casual; individuals reported by Hall (1940) and
McIntyre (1947) in late summer probably appeared
as a result of post nesting dispersal.

redwinged blackbird. Agelaius phoeniceus caurinus
Summer resident; reported only from Longmire Meadow;
where they nest every year.

Brewer's blackbird. Euphagus cyanocephalus
Summer resident; commonly reported at various locations
up to elevations of 7,000 feet. At least one report
each month March through October. No nesting record.

Tanagers - Family Thraupidae

Western tanager. Piranga ludoviciana
Summer resident; frequently reported throughout the
park at 6,500 feet elevation. Numerous nesting records
at lower elevations.

Grosbeaks, Finches, Buntings, and Sparrows--
Family Fringillidae

black-headed grosbeak. Pheucticus melanocephalus maculatus
Summer resident?; all available dated records (3 reports)
are for June (1947 and 1952). Small breeding population
is likely, but not definitely known to be present.

Lazuli bunting. Passerina amoena
Casual; a single individual observed at Longmire May 29,
1953 (Potts) is the sole record.

evening grosbeak. Hesperiphona vespertina brooksi
Permanent resident; present at lower elevations (at
least to 2,700 feet) in winter, to 7,000 feet in
summer. Gather into flocks in late July and August
which break up in spring. Assumed to nest in park,
but no records of nesting.

Cassin's finch. Carpodacus cassinii
Summer resident; reported from various locations to
7,000 feet elevation. Presence in numbers February
through August suggests a breeding population, but no
nesting records.

pine grosbeak. Pinicola enucleator montana

Visitant; reported at Yakima Park or Paradise for May, July, and September. Additional data might change status to summer resident.

gray-crowned rosy finch. Leucosticte tephrocotis littoralis

Probably permanent resident; reported for all months except November, January, and February. If present through winter, numbers greatly reduced. Commonly reported at Camp Muir (elevation 10,000 feet) and occasionally higher on Mount Rainier in summer. Several nesting records.

common redpoll. Acanthis flammea flammea

Visitant; 12 individuals seen feeding in alders at Longmire on December 17, 1952 (Potts) are the sole record.

pine siskin. Spinus pinus pinus

Permanent resident; reported throughout the park to elevations of 10,000 feet. Several nesting records. Park records credit all siskin reports to S. p. pinus which is a rare visitant to Washington. S. p. vagans, however, is a common permanent resident in the state, and all reports of siskins must be assumed to be western pine siskins unless a collected specimen can be referred to the rarer subspecies. Reported in all months but March and October.

American goldfinch. Spinus tristis jewetti

Status undetermined; reported in the park on 3 occasions (August and October). One August report of 2 adults and 4 young (McIntyre) suggests a small breeding population. Status of fall migrant seems more likely.

red crossbill. Loxia curvirostra sitkensis

Permanent resident; reported January through September. No record of breeding in park.

white-winged crossbill. Loxia leucoptera leucoptera

Visitant; considered "rare and irregular" in Washington, this species has been reported on 6 occasions in the park. Specimens were collected in 1919 by Jewett.

rufous-sided towhee. Pipilo erythrophthalmus oregonus

Visitant or rare summer resident; reported on 3 occasions. The park is almost entirely above the elevation at which this species is expected.

- savannah sparrow. Passerculus sandwichensis anthinus
Rare fall migrant; although reported as "common toward the end of August and early in September" at various alpine meadows in the park in 1919, this species has not been reported since.
- black-throated sparrow. Amphispiza bilineata
Accidental; a single individual reported at Ohanapecosh in 1959. The bird fed at and near the ranger station for 2 days. It was frequently observed during that time by Rangers Sellers and May and, although this southwestern species is extremely unlikely in Washington, its distinctive appearance makes it difficult to mis-identify.
- Oregon junco. Junco oreganus oreganus
Status undetermined; this species has not been collected in the park, but some sight records have been credited to it. As it is identical to J. j. shufeldti (see below), some or all of the records of J. o. oreganus are probably referable to J. o. shufeldti.
- Oregon junco. Junco oreganus shufeldti
Summer resident; common to 6,400 feet elevation in spring and summer. Numerous nesting records.
- chipping sparrow. Spizella passerina arizonae
Summer resident; reported from various park locations, generally at higher elevations (4,500 - 6,400 feet). Kitchin found it to be a "common breeder" at Reflection Lake in 1937.
- white-crowned sparrow. Zonotrichia leucophrys gambelii
Migrant; reported in spring and fall, generally above 5,000 feet elevation.
- white-crowned sparrow. Zonotrichia leucophrys ougetensis
Summer resident; no breeding records, but all reports are for May and June. This is the only subspecies of white-crowned sparrow that nests in Washington.
- golden-crowned sparrow. Zonotrichia atricapilla
Migrant; reported at various locations, generally above 4,500 feet elevation, in spring and fall.
- fox sparrow. Passerella iliaca fuliginosa
Casual; this subspecies is fairly common on the coast in adjacent lowlands, but it is not to be expected in the park. A female collected in Longmire on September 10, 1937 (Pike) is the sole record.

fox sparrow. Passerella iliaca olivacea
Summer resident; numerous reports from various locations, generally between 4,000 and 6,500 feet elevation. Several breeding records.

Lincoln's sparrow. Melospiza lincolni
Summer resident; at least 2 subspecies of Lincoln sparrow occur in the park, but local records credit all reports to M. l. lincolni. Jewett refers to it as a migrant and describes M. l. alticola as more numerous and as the only Lincoln sparrow that nests in Washington. As the differences between these 2 subspecies are rather slight, it would appear desirable that subspecific identification be attempted only when a specimen is collected.

song sparrow. Melospiza melodia morphna
Permanent resident; numbers apparently much reduced in winter. Numerous reports at various locations to 5,000 feet elevation. Winter and nesting records all at elevations of less than 3,000 feet.

snow bunting. Plectrophenax nivalis nivalis
Casual; "a great flock of snow buntings" reported at Indian Henry's Hunting Ground on October 1, 1924 (Schmoe) is the sole record.

1. Birds of Washington State, p. 347
2. See Mount Rainier Natural History Association Nature Notes, Vol. XII No. 8, July 1934

American Ornithologists' Union, The A.O.U. Check-list of North American Birds, American Ornithologists' Union, Baltimore, 1957

As this is a preliminary checklist until further research can be carried out, any corrections or additions by readers would be appreciated. Please contact:

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Mount Rainier National Park
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CHECK LIST OF MAMMALS

Moles - Family Talpidae

shrew-mole	<u>Neurotrichus gibbsii gibbsii</u>
Townsend mole	<u>Scapanus townsendii</u>
Pacific mole	<u>Scapanus orarius orarius</u>

Shrews - Family Soricidae

common or masked shrew	<u>Sorex cinereus cinereus</u>
Trowbridge shrew	<u>Sorex trowbridgii trowbridgii</u>
vagrant shrew	<u>Sorex vagrans vagrans</u>
dusky shrew	<u>Sorex obscurus setosus</u>
Northern water shrew	<u>Sorex palustris navigator</u>
Pacific water shrew	<u>Sorex bendirii bendirii</u>

Bats - Family Vespertilionidae

Yuma myotis bat	<u>Myotis yumanensis saturatus</u>
long-legged myotis bat	<u>Myotis volans longicrus</u>
silver-haired bat	<u>Lasionycteris noctivagans</u>
Western lump-nosed or big-eared bat	<u>Corvinorhinus rafinesquii townsendii</u>

Raccoons - Family Procyonidae

raccoon	<u>Procyon lotor pacificus</u>
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Weasels, Skunks & Allies - Family Mustelidae

Northwestern pine marten	<u>Martes caurina caurina</u>
short-tailed weasel	<u>Mustela erminca gulosa</u>
long-tailed weasel	<u>Mustela fronata washingtoni</u>
mink	<u>Mustela vison energumenos</u>
little spotted skunk	<u>Spilogale gracilis latifrons</u>
striped skunk	<u>Mephitis mephitis spissigrada</u>

Foxes, Wolves and Coyotes - Family Canidae

coyote	<u>Canis latrans lestes</u>
gray or timber wolf	<u>Canis lupus fuscus</u>
red fox	<u>Vulpes fulva cascadenis</u>

Cats - Family Felidae

cougar	<u>Felis concolor oregonensis</u>
bobcat	<u>Lynx rufus fasciatus</u>

Bears - Family Ursidae

black bear	<u>Euarctos americanus altifrontalis</u>
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Marmots, Squirrels and Chipmunks - Family Sciuridae

hoary marmot	<u>Marmota caligata cascadenis</u>
golden-mantled ground squirrel	<u>Citellus saturatus</u>
yellow pine chipmunk	<u>Eutamias amoenus ludibundus</u>
Townsend chipmunk	<u>Eutamias townsendii cooperi</u>
Douglas squirrel	<u>Tamiasciurus douglasii douglasii</u>
Northern flying squirrel	<u>Glaucomys sabrinus fuliginosus</u>

Pocket Gophers - Family Geomyidae

Northern pocket gopher Thomomys talpoides shawi

Beavers - Family Castoridae

beaver Castor canadensis pacificus

Mice, Rats & Voles - Family Cricetidae

long-tailed deer mouse Peromyscus maniculatus oregonus

bushy-tailed woodrat Neotoma cinerea occidentalis

Northern red-backed mouse Clothrionomys gapperi cascadenis

Northern vole Phonacomys intermedius oramontis

Oregon vole Microtus oregoni oregoni

Richardson vole Microtus richardsoni arvicoloides

long-tailed vole Microtus longicaudus macrurus

Aplodontias - Family Aplodontiidae

aplodontia Aplodontia rufa rainieri

Jumping Mice - Family Zapodidae

Western jumping mouse Zapus trinotatus trinotatus

Porcupines - Family Erethizontidae

porcupine Erethizon dorsatum nigrescens

Pikas - Family Ochotonidae

pika Ochotona princeps brunescens

Rabbits & Hares - Family Leporidae

snowshoe hare, varying hare Lepus americanus washingtonii

" " " " Lepus americanus cascadenis

Deer - Family Cervidae

elk	<u>Cervus canadensis nelsoni</u>
mule deer	<u>Odocoileus hemionus hemionus</u>
" "	<u>Odocoileus hemionus columbianus</u>

Goats - Family Bovidae

mountain goat	<u>Oreamnos americanus americanus</u>
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As this is a preliminary checklist until further research can be
carried out, any corrections or additions by readers would be
appreciated. Please contact: Chief Park Naturalist
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