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Roger Lake Research Natural Area: Guidebook Supplement 29

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Abstract

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Roger Lake Research Natural Area (RNA), a 174.7-ha reserve in north-central Washington, contains a rich diversity of landforms, plant communities, and wildlife habitats. Spreading outward from the lake itself, sedge and sphagnum fens give way to upland coniferous forest, granitic cliffs, and a relictual, high-altitude big sagebrush-whitebark pine (*Artemisia tridentata-Pinus albicaulis*) meadow. Five sensitive plant species and several vertebrate species that are rare in the region occur in the RNA. Dynamic ecological processes in action in the RNA are revealed in the paludification of the forest edge; aging, broken beaver dams; and widespread bark beetle-induced conifer mortality.

Keywords: Research natural area, Roger Lake, vascular plants, sensitive plants.

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Introduction

Roger Lake Research Natural Area (RNA) is a 174.7-ha reserve in the Okanogan-Wenatchee National Forest in north-central Washington. It contains a considerable diversity of topography and habitats for an area so limited in size, with sedge fens and willow bogs adjacent to the lake giving way to spruce swamps around the wetland perimeter, and then to xeric lodgepole pine forests in the uplands. Habitat diversity gives rise to floral and faunal diversity, including the presence of plant and animal species[1] that are otherwise rare in the state.

Roger Lake is a shallow, 3.2-ha waterbody in an advanced seral stage in the progression from glaciated lake basin to sediment-filled mountain meadow. A 500-m-thick river of ice eroded the bench containing the lake during the last glacial advance, which intruded into the area approximately 20,000 years ago (Waitt 1972). The lake may have formed from a pothole or kettle left after the ice retreated 12,000 years ago. Low relief in the lake combined with many years of accumulated plant biomass and successive waves of beaver activity has led to an infilling of the original lake basin, such that, at present, the shallow lake is surrounded by saturated soils high in peat (undecomposed organic matter).

Beyond the lake and wetlands, the RNA extends northward and upward in elevation for 1 km, encompassing most of the small drainage that feeds Roger Lake. The upland vegetation is dominated by lodgepole pine (*Pinus contorta*) and Engelmann spruce (*Picea engelmannii*). Several low granite cliffs stand guard over the northern boundary, and the forest gives way to a high-elevation (2105 m) grass-dominated meadow in the northeast corner of the RNA.

Two hundred and seven vascular plant species have been identified in the RNA, along with 61 lichen species and 44 bryophytes, for a total of 311 plant and lichen taxa. Among these are five species currently listed as sensitive or threatened by the Washington Natural Heritage Program, *Carex tenuiflora* (sparse-flowered sedge), *Mimulus suksdorfii* (Suksdorf's monkeyflower), *Rubus acaulis* (nagoonberry), *Salix glauca* (glaucous willow), and *Polytrichum strictum* (hummock haircap moss) (Washington Natural Heritage Program 2005).

Access and Accommodations

Roger Lake Research Natural Area is 21.3 mi (34.3 km) by road from the town of Winthrop, Washington, which is on State Highway 20 in the Methow Valley, in

[1] See appendix for species list.

Figure 1—Monkshood, one of 207 vascular plants at Roger Lake Research Natural Area.

the north-central area of the state. From Winthrop, take the East Chewuch River Road 7.9 mi (12.7 km) to Forest Service Road 37 (also known as the Boulder Creek Road), bearing right at this junction. At 14.1 mi (22.7 km) (cumulative from Winthrop) Road 37 crosses a bridge and turns from asphalt to gravel. There is also a junction with Forest Service Road 800 at this point, which diverges to the left to First Butte Lookout; stay on Road 37 (bear right). At 19.1 mi (30.7 km) there is a junction with Forest Service Road 39; at this point leave Road 37 and take Road 39, which is on the left. Follow this road 2.2 mi (3.5 km) to the turnoff to Roger Lake, a dirt drive on the right, which is usually marked with a sign reading "Roger Lake." Turn into the entrance road and park soon after in the turnaround area.

An abandoned trail departs from the north end of the turnaround and enters the adjacent coniferous forest. Follow this trail for 50 yd (45.7 m) until it starts up an incline. Leave the trail, turning to the west (left), and walk 30 yd (27.4 m) to the

edge of the sedge fen that surrounds the lake. The fen has standing water in spring and early summer; rubber boots are advisable.

It is possible to camp adjacent to the parking lot at Roger Lake, but it is completely undeveloped, there is no potable water, and sometimes no water at all. Eight mi (12.9 km) north of Roger Lake, farther along Road 39 there is a developed Forest Service campground (with tables and toilet) called Tiffany Springs; no reservations are necessary. The town of Winthrop has numerous motels.

Geology

Two hundred million years ago, the Pacific coast line of the North American continent was in the area where Spokane is located today, 225 km east of the Roger Lake RNA (Alt and Hyndman 1984). Much of the rest of the northern portion

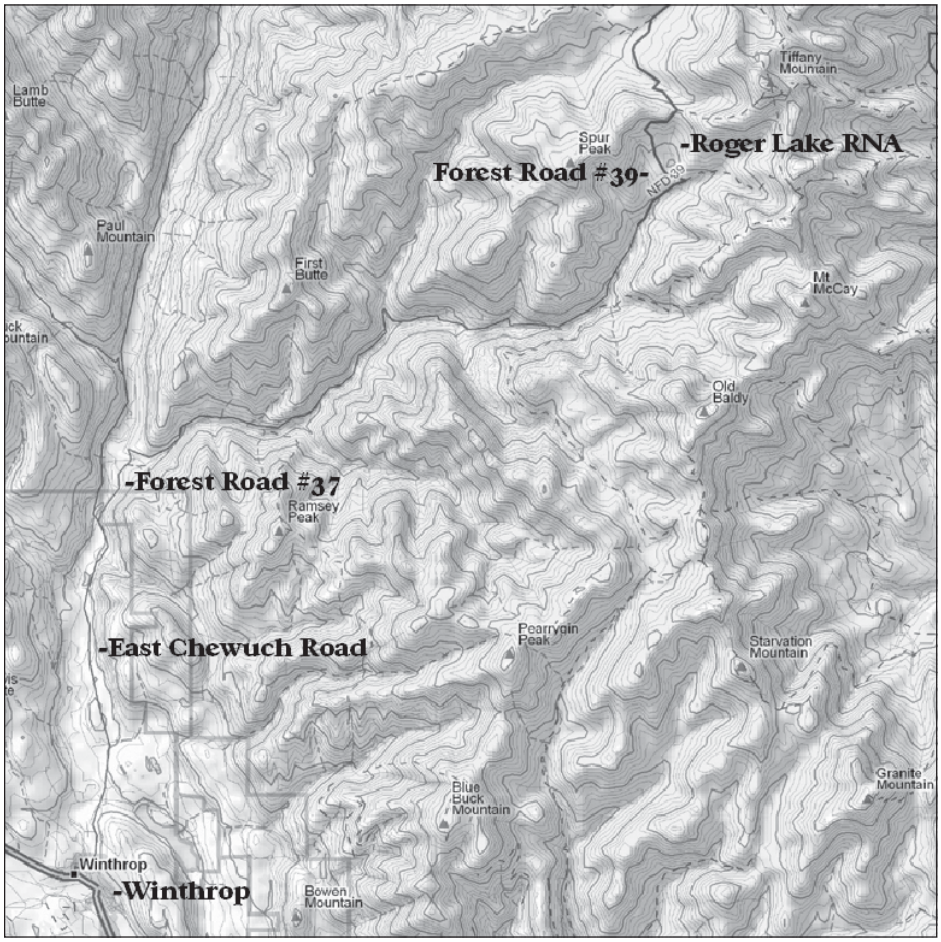

Figure 2—The route from the town of Winthrop, Washington, to the Roger Lake Research Natural Area.

Figure 3—Several granitic cliffs form part of the northern boundary of the Roger Lake Research Natural Area.

of what is now Washington state has accreted onto the continent over the intervening eons owing to the movement of the Earth's crust, a process known as plate tectonics.

Molten rock is escaping from the Earth's mantle to the surface along a ridge in the mid-Pacific, forcing oceanic crust to move both east and west from the area of upwelling magma. As this crust moves, it breaks up into segments called plates. The rock that makes up oceanic crust is denser than that which forms the continents; so that when the two are forced against one another, the heavier oceanic rock subducts (sinks) under the lighter continents.

Sometimes there are fragments of continental rock in the form of small to large islands embedded in and moving with the drifting oceanic crust. Large islands of continental rock embedded in oceanic crust are known as microcontinents. When oceanic crust is subducted beneath the edge of a continent, the more buoyant microcontinents typically do not sink, but rather are welded onto the coast line of the existing continent.

The rock composing Tiffany Mountain, on which the Roger Lake RNA is located, is on the eastern edge of the Okanogan Highlands physiographic province. The land mass making up the Okanogan Highlands was a microcontinent that was carried westward on a moving oceanic plate, and then welded onto the North American continent approximately 100 million years ago as the oceanic crust sank beneath it (Alt and Hyndman 1984).

In general terms, Tiffany Mountain and most of the Okanogan Highlands are granitic, a rock type that forms deep underground from a large mass of molten material that cools very slowly, known as a pluton. No doubt some of the heat and pressure necessary to melt rock and create the pluton came from the tectonic forces that have for millions of years been forcing oceanic crust into and under continental crust at the boundary between the two.

Specifically, Tiffany Mountain and the bedrock of the Roger Lake RNA are gneissic trondhjemite, a type of light-colored, slightly metamorphosed granitic rock common throughout the world (and named after the town of Trondhjem, Norway). The age of the Tiffany trondhjemite ranges from 94 to 104 million years, whereas the parent igneous rock from which the trondjhemite was derived dates to near the Cretaceous-Jurassic boundary, 145 million years ago (Waitt 1972).

The North Cascade Range, just west of the Okanogan Highlands, is similarly composed of a number of microcontinents that accreted onto the western edge of North America over the past 100 million years (Alt and Hyndman 1984). The nearby Methow Valley, which lies between the Okanogan Highlands and the North Cascades, is composed largely of ocean sediments that were laid down in a shallow sea between continent and microcontinent as the two landforms slowly came together.

The Earth's atmosphere experienced a marked cooling about 2 million years ago, ushering in the geologic epoch we are still in, the Pleistocene. The signature phenomenon of the Pleistocene has been the repeated advance and retreat of continental glaciers from the high latitudes near the poles toward the mid latitudes, south of the 60th parallel. Because each succeeding glacial advance erases much of the evidence of the one that preceded it, it is not known for sure how many times in the last 2 million years these rivers of ice have flowed southward in the Northern Hemisphere; the current estimate is that there have been at least 18 glacial advances (Pielou 1991).

The last glacial age, known as the Wisconsin, was initiated approximately 70,000 years ago. Continental ice sheets reached the 49th parallel from Canada about 22,000 years before the present (b.p.), reaching their maximum extent 15,000 years b.p., and melting completely away by 12,000 years b.p. (Pielou 1991).

On Tiffany Mountain, glacially rounded boulders are found up to an altitude of 2300 m. Although the 2498-m summit of the mountain apparently remained ice free during the last glacial advance, the lower portion of the Roger Lake RNA, at 1800 m, would have been covered with 500 m of ice at glacial maximum. The upper reaches of the RNA, at 2100 m, would have been covered with 200 m of ice. The topography of the RNA is gentle and rounded, owing at least in part to the erosive power of the mass of ice that moved across it 15,000 years ago (Waitt 1972).

Soils

The wetland portions of the Roger Lake RNA are largely histic Cryaquepts. Histic refers to soil that is shallow, with poorly aerated organic material, and Cryaquepts are soils that flood seasonally and have a shallow surface layer of partially decomposed organic matter that grades into a dark, sandy loam. Roger Lake and its associated wetlands are located on a very low gradient bench, which is inundated with water every spring from snowmelt, giving rise to the saturated, anoxic soil (Greene 2006).

The upland portion of the RNA consists largely of the Myerscreek soil series. Myerscreek consists of well-drained soils formed in glacial till with a mantle of volcanic ash. These soils are found on moraines and on the slopes of glaciated mountains. The average annual precipitation where these soils occur is about 76 cm, a close match with the moisture regime at Roger Lake (Greene 2006).

Streams

Two 1st-order streams feed into Roger Lake, each about 1.6 km long. The lower portions of both streams run all year when there is at least average annual precipitation.

Climate

Precipitation in the eastern Cascades, including the Tiffany Mountain/Roger Lake area, is transitional between the maritime regime of western Washington and the continental regime of the Columbia Plateau. Mount Baker, 136 km due west of

Tiffany on the western edge of the North Cascades, receives 350 cm of precipitation annually, whereas the town of Tonasket, 40 km due east of Tiffany on the Columbia Plateau, receives 30 cm of annual precipitation. Precipitation at Roger Lake averages 76 cm a year, with 75 percent of the total arriving between December and March as snowfall (USDA FS 2006).

The weather station at First Butte, 15 km southwest of the Roger Lake RNA, indicates an average minimum January temperature of 16 °C and an average maximum January temperature of 10 °C. The average minimum July temperature is 4 °C, and the average July maximum is 31 °C (USDA FS 2006).

Vegetation

Most of the Okanogan Highlands physiographic province was completely devegetated during the Wisconsin glacial advance. Plant species have repopulated the area after the glacial demise, starting approximately 12,000 years b.p. Because the summit area of Tiffany Mountain and adjoining peaks were not glaciated, they may have served as refugia for some plant species (Pielou 1991).

Pollen analyses of lake and bog sediment cores provide a valuable window into vegetation transition over time. A cooler and wetter climate than that of today is reconstructed for the period from 11,000 b.p. to 10,000 b.p. An initial vegetation composed of sagebrush and haploxyon (five-needle) pines is common in pollen profiles of the Okanogan Highlands for that period (Whitlock 1992). An analogue of this historical community exists today in the northwest corner of the Roger Lake RNA, where big sagebrush (*Artemisia tridentata*) grows adjacent to whitebark pine (*Pinus albicaulis*, a five-needle pine) in what appears to be a relictual plant community surviving since postglacial recolonization.

The wetland surrounding Roger Lake is a “poor fen.” A fen is here defined as a moss- or graminoid-dominated wetland that receives nutrients from ground water or surface runoff or both. So-called poor fens are the most acidic of the fen types, and are typically codominated by bryophytes (especially sphagnum mosses) and a relatively small number of vascular species (notably sedges and species in the Heather family). The pH for poor fens ranges from 4 to 6. Some indicator species for poor fens include *Carex limosa, Carex lasiocarpa,* and *Potentilla palustris*. Moss species typically include sphagnum moss and the moss species *Calliergon stramineum* and *Aulacomnium palustre*. All of the species mentioned here as indicators of a poor fen occur at Roger Lake (Chadde et al. 1998).

There is a slow process of paludification, or swamp-formation, occurring at the outer margins of the fen, as the accumulating peat in the fen impedes drainage and raises the water table. This elevated water table kills the trees at the edge of the wetland and allows mosses and graminoids to extend their territory.

The forested portion of the RNA is dominated by lodgepole pine, even though these forested areas can be classified as Engelmann spruce and subalpine fir series plant associations (one or both of these latter two species are usually present in the forest understory). Under low-disturbance conditions (e.g., lack of fire and absence of insect attack and windthrow), spruce and subalpine fir would be the climax species in the area, because lodgepole needs mineral soil and sunlight to germinate and thrive. Fire disturbance analysis (see section on "Disturbance History," below) indicates that forest fires occur at fairly close intervals and are often stand-replacement burns, creating conditions favorable to lodgepole pine domination.

Plant Associations

Seven nonforested and five forested plant associations are found within the Roger Lake RNA (Kovalchik and Clausnitzer 2004). Of the nonforested associations, five are located adjacent to Roger Lake itself, whereas two are in the upper elevations at the northern edge of the RNA. The 12 plant associations are listed below, with their assigned number identifying their location on figure 4:

Nonforested associations:

1. The emergent wetland around the perimeter of the lake is a yellow water-lily association (*Nuphar polysepalum*), characterized by at least 25 percent cover of this species.
2. The adjacent shore is a Farr's willow/bladder sedge association (*Salix farriae/ Carex utriculata*), characterized by the presence of at least 25 percent cover of Farr's willow, and 10 percent canopy cover of bladder sedge. This association has saturated soil for at least part of the growing season, but does not usually have standing water.
3. Farther from the lake there is a bladder sedge association (*Carex utriculata*). In portions of this association the bladder sedge forms almost pure stands. This association has at least several inches of standing water in the spring.

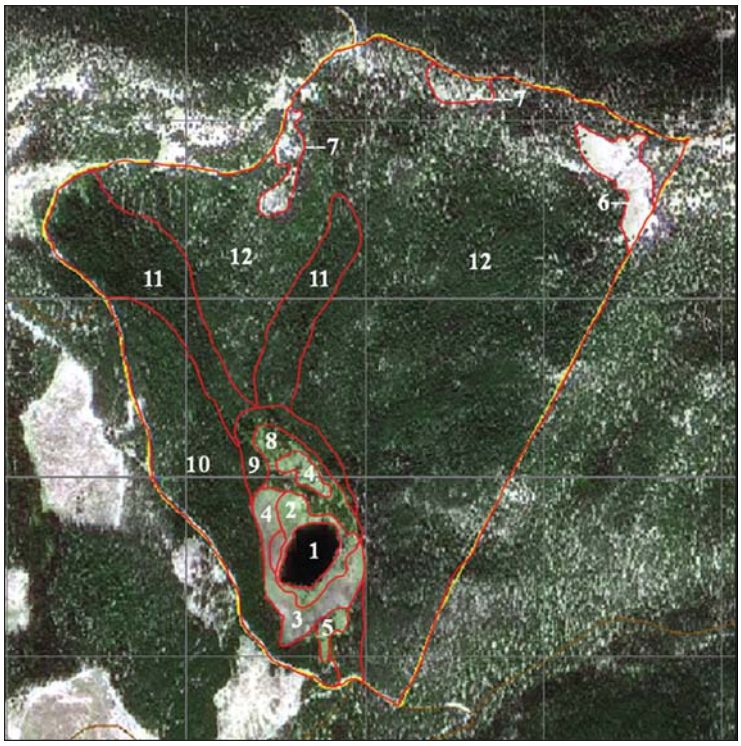

Figure 4—Plant associations of Roger Lake Research Natural Area. The associations are numbered 1 through 12 on the map and in the text; descriptions are in the text.

Figure 5—The bladder sedge fen (association No. 3) surrounding Roger Lake.

Figure 6—Yellow water-lily growing as a dominant emergent plant near shore.

Figure 7—Lodgepole pine dying near Roger Lake as a result of mountain pine beetles.

Figure 8—Engelmann spruce/saw-leaved sedge association (association No. 7) just north of Roger Lake.

Figure 9—Big sagebrush growing in an upland meadow, in association with whitebark pine, at Roger Lake Research Natural Area.

4. A mud sedge (*Carex limosa*) association exists on the west side of the lake, defined by the presence of at least 25 percent of this sedge species. This association also has standing water in the spring.
5. Although Drummond's willow can be found intermittently around the outer portion of the wetland that surrounds Roger Lake, there is an area approximately an acre in size dominated by this shrub at the south end of the wetland, forming a Drummond's willow/bladder sedge (*Salix drummondiana/Carex utriculata*) association.
6. In the northeast corner of the RNA, the coniferous forest opens up into an upland meadow populated primarily by grasses, forming a spike trisetum-Idaho fescue (*Trisetum spicatum-Festuca idahoensis*) plant association.
7. There are several granitic cliffs near the north boundary of the RNA up to 250 m in height. Plants are sparse in this environment; common juniper (*Juniperus communis*) is the dominant plant species present.

The five forested plant associations in the Roger Lake RNA include the following:

8. The swamp (forested wetland) just north of the lake and associated peatlands has saturated soil for much of the year and forms an Engelmann spruce/saw-leaved sedge (*Picea engelmanni/Carex prionophylla*) association. At least 90 percent of the mature spruce in this association have been killed in the past five years because of spruce beetle (*Dendroctonus ruffipennis* Kirby) attacks.
9. Just north of and adjoining the previous association is an Engelmann spruce/horsetail (*Picea engelmanni/Equisetum arvense*) association.
10. On low-relief ground south of the lake, a subalpine fir/Labrador tea-grouseberry (*Abies lasiocarpa/Ledum glandulosum-Vaccinium scoparium*) association occurs.
11. In the upland areas north of the lake that are adjacent to streams is a subalpine fir/mountain arnica-skunkleaf polemonium (*Abies lasiocarpa/Arnica latifolia-Polemonium pulcherrimum*) association. Note that neither mountain arnica nor skunkleaf polemonium occur in the RNA, but the association utilizes Sitka valarian (*Valariana sitchensis*)—common in the RNA—as an alternative indicator species.

12. The most abundant association in the RNA is subalpine fir/grouseberry (*Abies lasiocarpa/ Vaccinium scoparium*), covering the relatively dry slopes north of the lake that do not adjoin streams.

Sensitive Plant Species

Five species listed as sensitive by the Washington Natural Heritage program are found in the Roger Lake RNA (Washington Natural Heritage Program 2005). Four of these species are essentially northern boreal or tundra-inhabiting species, and are at or near the southern end of their range at Roger Lake. This group includes *Carex tenuiflora, Polytrichum strictum* (a moss species), *Rubus acaulis*, and *Salix glauca.* The fifth listed species, *Mimulus suksdorfii*, is at the northern edge of its range at Roger Lake.

Sparse-flowered sedge, *Carex tenuiflora* (sensitive): In Washington, sparse-flowered sedge is known only at Roger Lake. It is listed as "vulnuerable" in British Columbia, and is common in the Yukon and Northwest Territories. It is fairly abundant in the fen surrounding the lake, but is delicate and inconspicuous and therefore can be hard to locate. There are well over 1,000 stems at the site. The long-term viability of the species at Roger Lake is dependent upon hydrology, and therefore upon climate. It is likely that a persistent diminution of precipitation in the area would reduce the viability of this species in the RNA.

Suksdorf's monkeyflower, *Mimulus suksdorfii* (sensitive): Suksdorf's monkey-flower is extremely rare in Washington, with only five locations known. This is the most northerly population of this species located to date (it has not been found in Canada). Its primary range is to the south, extending into Mexico. It is not abundant at Roger Lake; only 25 individual plants have been found. The only evident threat is the small size of this population and, being an annual, its need to reseed itself each year (fig. 10).

Hummock haircap moss, *Polytrichum strictum* (sensitive): Hummock haircap moss is primarily a boreal species, and is rare and listed as sensitive in Washington. It is strongly associated with sphagnum moss, and indeed is found intertwined with sphagnum at Roger Lake. It is fairly abundant in the RNA in appropriate habitat. The only foreseeable threat to the population is a change in the hydrological regime at the lake.

Glaucous willow*, Salix glauca* (sensitive): There are five known sites for glaucous willow in Washington, one of which is Roger Lake. Only three individual

Figure 10—Suksdorf's monkeyflower.

plants of this species have been found in the RNA, those being small shrubs 0.9 to 1.2 m tall. With such an extremely small population, the species is not secure in the Roger Lake RNA.

Nagoonberry, *Rubus acaulis* (sensitive): The only known occurrence of nagoonberry in Washington is at the Roger Lake RNA, where it is found in the sedge fen around the perimeter of the lake. The size of the population is estimated to be 250 to 300 plants. The sole threat to this population is hydrological; it grows on soil and peat that is saturated for part of the year. A reduction in annual precipitation or change in hydrological flow could reduce the number of plants at the RNA (fig. 11).

Fauna

Vertebrate species confirmed and expected at the Roger Lake RNA are listed in the appendix. Several merit comment here:

Boreal owl (*Aegolius funereus*): Boreal owls are a northern boreal species, common in Alaska and across the northern forests of Canada, but rare in the lower 48 States. There is one verified occurrence of a boreal owl at Roger Lake, from 1993.

Figure 11—Nagoonberry.

Boreal chickadee (*Poecile hudsonica*): Like boreal owls, boreal chickadees are primarily an Alaskan and Canadian species, but do occur in north-central and northeastern Washington. Boreal chickadees are known to nest in the Roger Lake RNA.

Moose (*Alces alces*): Primarily an arctic and northern boreal species, moose occur in Washington in the northeast and north-central portions of the state. Although rarely encountered, moose do occur on an annual basis at the Roger Lake RNA, where much of the willow is heavily browsed by this species (fig. 12).

Lynx (*Lynx canadensis*): Lynx are listed as threatened in Washington. Lynx are known to occur in the general area of Tiffany Mountain and the Roger Lake RNA. The national forest land adjoining the Roger Lake RNA to the west is designated by the Forest Service as Management Area 12, which is managed to provide for a stable lynx population (USDA FS 1989).

Disturbance History

Fire

Richard Schellhaas documented the effects of past fire disturbance in the Tiffany Meadows area, in four study areas located between 1 km and 8 km from the Roger Lake RNA (Schellhaas et al. 2001). Examining tree cores, fire scars, and

Figure 12—A moose at Roger Lake.

cross sections removed from trees, snags, and logs, in forest associations very similar to the RNA, this study established an average fire frequency interval of 5.5 years for the area. In the 450-ha polygon closest to the RNA, past fires were estimated to have occurred in 1625, 1732, and 1841. Adjoining polygons burned in 1917. Fire severity was generally very high, resulting in widespread stand replacement. Charred remnant logs of lodgepole pine and Engelmann spruce indicated that the size of the trees in previous stands were similar to those found in the area today.

On July 3, 2006, a forest fire was ignited by lightning on Spur Peak, 3.2 air kilometers from the Roger Lake RNA. This fire eventually merged with a second fire ignited on July 24, 12.9 km to the south on Tripod Peak. The combined "Tripod Complex" fire burned 70 820 ha of national and state forest before it was contained in October 2006. On August 21 the Spur Peak fire burned through the Roger Lake RNA, killing an estimated 80 percent of the trees in the reserve.

The trees that survived are scattered throughout the RNA. In several places the fire made its way through the drying sedge fen to the edge of the lake. High fire severity, causing widespread tree mortality that replaces the entire stand, is common in lodgepole pine forests such as the one that recently dominated this RNA. Lodgepole pine is a short-lived species that is "dying to burn"; stand replacement fires of

Figure 12—An area of high-severity burn at the west end of Roger Lake, in which all trees were killed.

dead and dying trees can create optimum conditions for stand regeneration. Lodgepole seeds require mineral soil and bright sunlight to germinate, and some lodgepole cones will not open and release their seeds until they are heated above 125 °F. All of these conditions are provided by fire, at the same time that competition from less fire-adapted plant species is greatly reduced.

Although a fire event in the RNA was predictable given the dominance of lodgepole pine in the overstory and the established fire frequency interval of 75.5 years mentioned above, the 70 820-ha size of the Tripod Complex fire is larger than historical norms.

Recent fires in the same general areas include the Thunder Fire of 1994, which burned 3237.5 ha, the Thirtymile Fire of 2001, which covered 3763.6 ha, and the 2004 Isabelle Fire at 1821.1 ha. Richard Schelhaas's study of fire history in the nearby Twentymile Planning Area indicated that in the prefire suppression period between 1660 and 1889, the average area burned in a fire during that period was 607.8 ha (Schellhaas 2001). Longer fire intervals owing to fire suppression have caused an increase in fuel loading of both dead plant material on the ground and living material in the canopy, resulting in fires that are often larger than the historical norm when they do occur.

Figure 13—The forest edge at the north end of Roger Lake, where there is a matrix of dead and living trees.

Ecologically, the Roger Lake RNA remains in a dynamic state. Most of the forested portion of the RNA has returned to an early seral stage of succession. Meanwhile, Roger Lake and the surrounding fen continue the now 12,000-year-old transition (dated from the end of the last glacial advance) from high mountain lake to montane meadow.

Insects

Insects play a major role in the ecology of the coniferous forest in and around the Roger Lake RNA. Bark beetles in particular have had an appreciable impact on the forest, and there is some evidence that, like fire, bark beetles have played a major ecological role in the area for hundreds or thousands of years.

Visitors to the Roger Lake RNA and to Tiffany Mountain in recent years first reported signs of dying spruce and lodgepole pine trees in the area in 1995. The proximal causal agents proved to be the spruce beetle (*Dendroctonus rufipennis*) attacking and killing Engelmann spruce, and the mountain pine beetle (*Dendroctonus brevicomis*) killing lodgepole pine. The ultimate cause of the widespread beetle attacks and tree mortality is not fully understood; it may be related to climate-induced tree stress. Attacks on spruce in the area peaked in 2002 and 2003, and by 2005 an estimated 90 percent of the mature spruce in the RNA were dead.

Lodgepole pine is much more abundant in the area than spruce, and new outbreaks for mountain pine beetle in lodgepole pine continue at the time of this writing (2006).

Engelmann spruce can live for 500 years or more, but cores from samples of the larger spruce in the RNA indicated that in general spruce live no more than 200 years in this area. Spruce beetles and mountain pine beetles have co-evolved with their host tree species, and are an expected element of the ecosystem. A study of historical spruce beetle impact of Engelmann spruce in Colorado indicated a mean return interval of spruce beetle outbreaks of 116 years, and a turnover of all spruce trees every 259 years (Bebi et al. 2003). The fact that there are few or no spruce trees older than 200 years in the Roger Lake RNA suggests that the combined effects of fire and bark beetles create a recurring turnover of lodgepole pine and spruce in the Roger Lake RNA.

Grazing

The Roger Lake RNA is near the southern end of the Toats Coulee grazing allotment, which has been continuously permitted since 1906. Although grazing is not allowed in the RNA, the area is not fully fenced and some grazing does occur each year. The impact in recent years has been minimal.

Beaver

Beaver have had a major effect on the wetland portion of the Roger Lake RNA, although there are no beaver present at the site today. A series of grass-, sedge- and willow-covered beaver dams at the downstream (south) end of the wetland complex retard waterflow through the area and thereby raise the water table in the fen around the lake. Upstream of the lake, in the spruce swamp, there is another series of beaver dams that impede surface flow during spring runoff. Some of these dams have deteriorated or broken owing to the current absence of beaver, and the ponds behind them have drained. At the forest edge there are numerous small conifers that were felled by beaver in years past. Beaver only pursue conifer cambium as a food source when they have decimated their preferred food source, deciduous shrubs and trees, and are near starvation.

Research History

In 1993, two ecology plots were established in the wetlands adjacent to Roger Lake as part of the data-gathering process that resulted in the 2004 publication of Kovalchik and Clausnitzer's eastern Washington wetland guide.

The author of this guidebook conducted an amphibian survey of Roger Lake in 1995 through 1996 as part of an inventory of amphibians in the Methow watershed, and conducted a vascular and nonvascular plant survey in the RNA for the Washington Native Plant Society in 2003 through 2004 (Visalli 2004).

Maps

The U.S. Geological Survey topographic map applicable to the Roger Lake RNA is the 7.5 minute Tiffany Mountain, Washington quadrangle, scale 1:24,000. Green Trails produces a 15 minute topographic map of the area: Tiffany Mountain, Washington, No. 53, scale 1:62,500.

English Equivalents

1 centimeter (cm) = 0.394 inch (in)
1 meter (m) = 3.28 feet (ft)
1 meter (m) = 1.094 yards (yd)
1 kilometer (km) = 0.62 miles (mi)
1 hectare (ha) = 2.47 acres (ac)
1.8 x degrees Celsius + 32 = degrees Fahrenheit

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Appendix

Table 1—Vascular plants of Roger Lake Research Natural Area[a b]

Scientific name	Common name
Abies lasiocarpa (Hook.) Nutt.	subalpine fir
Achillea millefolium L.	common yarrow
Aconitum columbianum Nutt.	monkshood
Agoseris aurantiaca (Hook.) Greene	orange agoseris
Agoseris glauca (Pursh) Raf.	pale agoseris
Agrostis scabra Willd.	winter bentgrass
Angelica arguta Nutt.	sharptooth angelica
Antennaria anaphaloides Rydb.	tall pussytoes
Antennaria microphylla Rydb.	rosy pussytoes
Antennaria racemosa Hook.	raceme pussytoes
Antennaria umbrinella Rydb.	umber pussytoes
Aquilegia formosa Fisch.	red columbine
Arabis holboellii Hornem.	Holboell's rockcress
Arenaria capillaris Poir.	thread-leaved sandwort
Arnica cordifolia Hook.	heartleaf arnica
Arnica parryi A. Gray	rayless arnica
Artemisia michauxiana Besser	Michaux artemisia
Artemisia tridentata Nutt.	big sagebrush
Aster conspicuus Lindl.	showy aster
Aster foliaceus Lindl.	leafy aster
Astragalus agrestis Dougl.	purple milkvetch
Betula glandulosa Michx.	bog birch
Bromus carinatus Hook. & Arn.	California brome
Bromus ciliatus L.	fringed brome
Bromus inermis ssp. *inermis* Leyss.	smooth brome
Calamagrostis canadensis (Michx.) Beauv.	bluejoint reedgrass
Calamagrostis rubescens Buckl.	pinegrass
Calypso bulbosa L. Oakes	fairy slipper
Cardamine pensylvanica Muhl.	Pennsylvania bittercress
Carex aurea Nutt.	golden sedge
Carex canescens L.	silvery sedge
Carex concinnoides Mack.	northwest sedge
Carex disperma Dewey	two-seeded sedge
Carex hoodii Boott	Hood's sedge
Carex lasiocarpa Ehrh.	slender sedge
Carex leptalea Wahlenb.	bristle-stalked sedge
Carex limosa L.	mud sedge
Carex multicostata Mack.	many-ribbed sedge
Carex petasata Dewey	Liddon's sedge
Carex prionophylla Holm	saw-leaved sedge
Carex raynoldsii Dewey	Raynold's sedge
Carex rossii Boott	Ross' sedge
Carex scopulorum Holm	mountain sedge
Carex spectabilis Dewey	showy sedge
Carex tenuiflora Wahlenb.	sparse-flowered sedge

Table 1—Vascular plants of Roger Lake Research Natural Area[a] [b] (continued)

Scientific name	Common name
Carex utriculata Boott	bladder sedge
Castilleja miniata Dougl.	scarlet paintbrush
Chimaphila umbellata (L.) W. Bart.	pipsissewa
Cirsium arvense (L.) Scop.	Canada thistle
Cirsium vulgare (Savi) Ten.	bull thistle
Claytonia lanceolata Pall.	springbeauty
Collinsia parviflora Lindl.	blue-eyed Mary
Collomia linearis Nutt.	narrow-leaf collomia
Cornus canadensis L.	bunchberry
Cornus stolonifera Michx.	red-osier dogwood
Cryptantha torreyana (A. Gray) Greene	Torrey's cryptantha
Cystopteris fragilis (L.) Bernh.	fragile fern
Danthonia intermedia Vasey	timber oatgrass
Delphinium nuttallianum Pritz.	Upland larkspur
Dodecatheon dentatum Hook.	white shootingstar
Dodecatheon pulchellum (Raf.) Merr.	few-flowered shootingstar
Draba crassifolia Graham	snowbed draba
Eleocharis pauciflora (Lightf.) Link	fewflowered spikerush
Elymus glaucus Buckl.	blue wild rye
Empetrum nigrum L.	crowberry
Epilobium angustifolium L.	fireweed
Epilobium watsonii Barbey	Watson's willowherb
Equisetum arvense L.	field horsetail
Equisetum palustre L.	marsh horsetail
Equisetum scirpoides Michx.	sedgelike horsetail
Erigeron aureus Greene	alpine yellow fleabane
Erigeron compositus Pursh	cutleaf daisy fleabane
Erigeron lonchophyllus Hook.	spear-leaf fleabane
Erigeron peregrinus (Pursh) Greene	sublapine fleabane
Erigeron subtrinervis Rydb.	three-veined fleabane
Eriogonum umbellatum Torr.	sulfur-flower buckwheat
Eriophorum polystachion L.	many-spiked cottongrass
Festuca idahoensis Elmer	Idaho fescue
Fragaria virginiana Duchesne	wild strawberry
Galium bifolium S. Wats.	low mountain bedstraw
Galium triflorum Michx.	fragrant bedstraw
Gayophytum diffusum Torr. & Gray	spreading groundsmoke
Geum macrophyllum Willd.	large-leaved avens
Geum triflorum Pursh	prairie smoke avens
Goodyera oblongifolia Raf.	rattlesnake plantain
Habenaria dilatata (Pursh) Hook.	white bog-orchid
Habenaria hyperborea L.	green bog-orchid
Hackelia micrantha (Eastw.) J.L. Gentry	blue stickseed
Heuchera cylindrica Dougl.	roundleaf alumroot
Hieracium albiflorum Hook.	white-flowered hawkweed
Hieracium scouleri Hook.	woolly-weed

Table 1—Vascular plants of Roger Lake Research Natural Area[a] [b] (continued)

Scientific name	Common name
Hydrophyllum capitatum Dougl.	ballhead waterleaf
Juncus drummondii E. Mey.	Drummond rush
Juncus parryi Englem.	Parry's rush
Juniperus communis L.	common juniper
Koeleria cristata Pers.	Junegrass
Ledum glandulosum Nutt.	western labrador tea
Lemna minor L.	duckweed
Ligusticum grayi Coult. & Rose	Gray's lovage
Linnaea borealis L.	twinflower
Listera sp. R. Br.	twayblade
Lithophragma parviflorum (Hook.) Nutt	small-flowered fringecup
Lomatium ambiguum (Nutt.) Coult. & Rose	swale desert parsley
Lonicera involucrata Banks	black twinberry
Lupinus polyphyllus Lindl.	many-leaved lupine
Lupinus sericeus Pursh	silky lupine
Luzula campestris (L.) DC.	field woodrush
Luzula parviflora (Ehrh.) Desv.	small-flowered woodrush
Lycopodium annotinum L.	stiff clubmoss
Lycopodium sitchense Rupr.	sitka clubmoss
Melica smithii (Porter ex Gray) Vasey	Smith's melic
Melica spectabilis Scribn.	showy oniongrass
Menyanthes trifoliata L.	bogbean; buckbean
Microseris nutans (Hook.) Sch. Bip.	nodding microseris
Microsteris gracilis (Hook.) Greene	pink-eyed Mary
Mimulus suksdorfii Gray	Suksdorf's monkeyflower
Mitella breweri Gray	Brewer's mitrewort
Mitella pentandra Hook.	alpine mitrewort
Myriophyllum spicatum L.	water-milfoil
Nemophila breviflora Gray	Great Basin nemophila
Nuphar polysepalum Engelm.	yellow water-lily
Osmorhiza chilensis Hook. & Arn.	mountain sweet-cicely
Pedicularis bracteosa Benth.	bracted lousewort
Penstemon davidsonii Greene	Davidson's penstemon
Penstemon fruticosus (Pursh) Greene	shrubby penstemon
Penstemon washingtonensis Keck	Washington penstemon
Phleum alpinum L.	alpine timothy
Picea engelmannii Parry ex Engelm.	Engelmann spruce
Pinus albicaulis Engelm.	whitebark pine
Pinus contorta Dougl. ex Loud.	lodgepole pine
Plantago major L.	common plantain
Poa palustris L.	lake bluegrass
Poa pratensis L.	Kentucky bluegrass
Poa secunda J. Presl	Sandberg bluegrass
Polygonum kelloggii Greene	Kellogg's knotweed
Polygonum majus (Meisn.) Piper	wiry knotweed
Populus tremuloides Michx.	quaking aspen

Table 1—Vascular plants of Roger Lake Research Natural Area[a] [b] (continued)

Scientific name	Common name
Potamogeton berchtoldii Fieber	Berchtold's pondweed
Potamogeton friesii Rupr.	flat-stalked potamogeton
Potamogeton natans L.	floating-leaved potamogeton
Potentilla diversifolia var. *diversifolia* Lehm.	varileaf cinquefoil
Potentilla drummondii Lehm	Drummond's cinquefoil
Potentilla fruticosa L.	shrubby cinquefoil
Potentilla glandulosa Lindl.	sticky cinquefoil
Potentilla gracilis Dougl. ex Hook.	slender cinquefoil
Potentilla palustris (L.) Scop.	marsh cinquefoil
Pseudotsuga menziesii (Mirbel) Franco	Douglas-fir
Pyrola asarifolia Michx.	pink wintergreen
Pyrola secunda (L.) House	sidebells pyrola
Ranunculus glaberrimus Hook.	sage buttercup
Ranunculus uncinatus D. Don ex G. Don	woodland buttercup
Ribes bracteosum Dougl. ex Hook.	stink currant
Ribes cereum Dougl.	wax currant
Ribes hudsonianum Richards.	stinking currant
Ribes lacustre (Pers.) Poir.	swamp currant
Ribes viscosissimum Pursh	sticky currant
Rubus acaulis Michx.	nagoonberry
Rubus idaeus L.	red raspberry
Salix boothii Dorn	Booth's willow
Salix drummondiana Barratt ex Hook.	Drummond willow
Salix farriae Ball	Farr's willow
Salix glauca L.	glaucous willow
Salix planifolia Pursh	tea-leaved willow
Salix scouleriana Barratt ex Hook.	Scouler's willow
Sambucus cerulea Raf.	blue elderberry
Sambucus racemosa L.	red elderberry
Saxifraga arguta auct. non D. Don	brook saxifrage
Saxifraga occidentalis S. Wats.	western saxifrage
Sedum lanceolatum Torr.	spearleaf stonecrop
Selaginella densa Rydb.	compact clubmoss
Senecio indecorus Greene	rayless mountain butterweed
Senecio integerrimus Nutt	western butterweed
Senecio pauciflorus Pursh	rayless alpine butterweed
Senecio triangularis Hook.	arrowleaf groundsel
Shepherdia canadensis (L.) Nutt.	buffaloberry, soopolallie
Sibbaldia procumbens L.	creeping sibbaldia
Silene parryi C.L. Hitchc. & Maguire	Parry's silene
Smilacina stellata (L.) Desf.	star-flowered solomon's seal
Sparganium minimum Fries	small bur-reed
Spergularia rubra (L.) J.& K. Presl	red sandspurry
Spiraea betulifolia Pall.	white spiraea
Spiranthes romanzoffiana Cham.	white ladies-tresses
Stellaria calycantha (Ledeb.) Bong.	northern starwort

Table 1—Vascular plants of Roger Lake Research Natural Area[a] [b] (continued)

Scientific name	Common name
Stellaria longipes Goldie	tongstalk starwort
Stenanthium occidentale A. Gray	western featherbells
Streptopus amplexifolius (L.) DC.	twisted-stalk
Suksdorfia ranunculifolia (Hook.) Engl.	buttercup-leaved saxifrage
Taraxacum officinale Weber ex F.H. Wigg.	common dandelion
Thalictrum occidentale Gray	western meadowrue
Trientalis latifolia Hook.	western starflower
Trifolium repens L.	white clover
Trisetum spicatum (L.) Richter	spike trisetum
Trollius laxus Salisb.	American globeflower
Utricularia vulgaris L.	common bladderwort
Vaccinium caespitosum Michx.	dwarf bilberry
Vaccinium myrtillus L.	low blueberry
Vaccinium scoparium Leib. ex Coville	grouseberry
Vaccinium uliginosum L.	bog blueberry
Valeriana dioica L.	northern valerian
Valeriana sitchensis Bong.	Sitka valerian
Veratrum viride Aiton	American false hellebore
Veronica americana Schwein. ex Benth.	American brooklime
Veronica wormskjoldii Roemer & J.A. Schultes	alpine speedwell
Viola macloskeyi Lloyd	small white violet
Viola orbiculata Geyer ex Holz.	darkwoods violet
Woodsia scopulina D.C. Eaton	Rocky Mountain woods
Zigadenus venenosus S. Watson	meadow death-camas

[a] Species list from Visalli 2004.

[b] Nomenclature follows Hitchcock and Cronquist 1973.

Table 2—Bryophytes and lichens of Roger Lake Research Natural Area

Scientific name
Bryophytes[a b]
Amblystegium serpens (Hedwig) B.S.G.
Anoectangium aestivum (Hedwig) Mitten
Aulacomnium androgynum (Hedwig) Schwaegr.
Aulacomnium palustre (Hedwig) Schwaegr.
Atrichum selwynii Austin
Brachythecium albicans (Hedwig) B.S.G.
Brachythecium collinum (Schleicher ex C. Muller) B.S.G.
Brachythecium frigidum (C. Muller) Bescherelle
Brachythecium leibergii Grout
Brachythecium nelsonii Grout
Bryum angustirete Kingberg
Bryum weigelii Sprengel
Calliergon giganteum (W. P. Schimper) Kindberg
Calliergon stramineum (Dickson ex Bridel) Kindberg
Calliergon trifarium (Weber & D. Mohr) Kindberg
Campylium stellatum (Hedwig) C. E. O. Jensen
Ceratodon purpureus (Hedwig) Bridel
Cratoneuron commutatum (Hedwig) G. Roth
Desmatodon latifolius (Hedwig) Bridel
Dicranella rufescens (Withering) W. P. Schimper
Dicranum howellii Renauld & Cardot
Dicranum tauricum Sapehin
Drepanocladus aduncus (Hedwig) Warnstorf
Drepanocladus exannulatus (W. P. Schimper in B.S.G.) Warnstorf
Drepanocladus uncinatus (Hedwig) Warnstorf
Fontinalis antipyretica Hedwig
Fontinalis howellii Renauld & Cardot
Grimmia montana Bruch & W. P. Schimper in B.S.G.
Homalothecium nevadense (Lesquereux) Renauld & Cardot
Hypnum lindbergii Mitten
Philonotis americana Dismier
Philonotis capillaris Lindberg
Plagiomnium cuspidatum (Hedwig) T. Koponen
Plagiomnium rugicum (Laurer) T. Koponen
Plagiothecium laetum B.S.G.
Pohlia nutans (Hedwig) Lindberg
Polytrichum commune Hedwig
Polytrichum juniperinum Hedwig
Polytrichum strictum Menzies ex Bridel
Rhizomnium gracie T. Koponen
Rhizomnium perssonii T. Koponen
Sphagnum capillifolium (Ehrhart) Hedwig
Sphachnum spaaericum Hedwig
Tortula ruraliformes (Bescherelle) Ingham

Table 2—Bryophytes and lichens of Roger Lake Research Natural Area (continued)

Scientific name
Lichens
Alectoria sarmentosa (Ach.) Ach.
Allantoparmelia alpicola (Th. Fr.) Essl.
Aspicilia sp. A. Massal.
Bellemerea alpina Clauzade & Cl. Roux
Bryoria fremontii Brodo & D. Hawksw.
Bryoria glabra Brodo & D. Hawksw.
Bryoria trichodes ssp. *americana* Brodo & D. Hawksw.
Calicium viride Pers.
Caloplaca tiroliensis Zahlbr.
Cladonia cenotea (Ach.) Schaerer
Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel
Cladonia coniocraea (Flörke) Sprengel
Cladonia ecmocyna Leighton
Cladonia fimbriata (L.) Fr.
Cladonia gracilis (L.) Willd. ssp. *turbinata* (Ach.) Ahti
Cladonia pleurota (Flörke) Schaerer
Cladonia sulphurina (Michaux) Fr.
Dermatocarpon moulinsii (Mont.) Zahlbr.
Diplotomma penichrum (Tuck.) Szatala
Hypogymnia austerodes (Nyl.) Räsänen
Hypogymnia imshaugii Krog
Hypogymnia occidentalis L. Pike
Hypogymnia physodes (L.) Nyl.
Lecanora cenisia Ach.
Lecanora circumborealis Brodo & Vitik.
Lecanora polytropa (Hoffm.) Rabenh
Lecidea leucothallina Arnold
Lecidella sp. Körber
Lepraria incana (L.) Ach.
Lepraria neglecta (Nyl.) Erichsen
Letharia vulpina (L.) Hue
Melanelia granulosa (Lynge) Essl.
Ochrolechia androgyna (Hoffm.) Arnold
Parmelia saxatilis (L.) Ach
Parmelia sulcata Taylor
Parmeliopsis ambigua (Wulfen) Nyl.
Parmeliopsis hyperopta (Ach.) Arnold
Peltigera canina (L.) Willd.
Peltigera kristinssonii Vitik.
Peltigera leucophelebia (Nyl.) Gyelnik
Peltigera malacea (Ach.) Funck
Peltigera membranacea (Ach.) Nyl.
Physcia phaea (Tuck.) J. W. Thomson
Platismatia glauca (L.) Culb. & C. Culb.

Table 2—Bryophytes and lichens of Roger Lake Research Natural Area (continued)

Scientific name
Protoparmelia badia (Hoffm.) Hafellner
Pseudephebe miniscula (Nyl. ex Arnold) Brodo & D. Hawksw.
Pseudephebe pubescens (L.) M. Choisy
Psoroma hypnorum (Vahl) Gray
Rhizocarpon geographicum (L.) DC.
Rhizoplaca melanopthalma (DC.) Leuckert & Poelt
Rinodina bolanderi H. Magn.
Solorina crocea (L.) Ach.
Stereocaulon tomentosum Fr.
Trapeliopsis granulosa (Hoffm.) Lumbsch
Umbilicaria caroliniana Tuck.
Umbilicaria deusta (L.) Baumg.
Umbilicaria hyperborea (Ach.) Hoffm.
Umbilicaria polyrrhiza (L.) Fr.
Umbillicara torrefacta (Lightf.) Schrader
Xylographa abietina (Pers.) Zahlbr.
Xylographa vitilago (Ach.) J. R. Laundon

[a] Species list from Visalli 2004.

[b] Nomenclature follows Lawton 1971.

Table 3—Amphibians of Roger Lake Research Natural Area[a] [b]

Scientific name	Common name
Ambystoma macrodactylum	long-toed salamander
Rana luteiventris	spotted frog

[a] Species list from Visalli 2004.

[b] Nomenclature follows Leonard et al. 1993.

Table 4—Birds of Roger Lake Research Natural Area[a b]

Scientific name	Common name	Confirmed (c) or expected (x)
Accipiter cooperii	Cooper's hawk	c
Accipiter gentilis	northern goshawk	c
Accipiter striatus	sharp-shinned hawk	c
Actitis macularia	spotted sandpiper	c
Aegolius acadicus	northern saw-whet owl	x
Aegolius funereus	boreal owl	c
Aeronautes saxatalis	white-throated swift	*x*
Anas platyrhnchos	mallard	x
Anas discors	blue-winged teal	x
Anas cyanoptera	cinnamon teal	x
Anas crecca	green-winged teal	x
Anthus spinoletta	American pipit	*c*
Aquila chrysaetos	golden eagle	c
Ardea herodias	great blue heron	x
Bubo virginianus	great horned owl	*c*
Bucephala clangula	common goldeneye	c
Bucephala islandica	barrow's goldeneye	c
Buteo jamacensis	red-tailed hawk	c
Buteo lagopus	rough-legged hawk	x
Calcarius lapponicus	Lapland longspur	x
Carduelis flammea	common redpoll	x
Carduelis hornemanni	hoary redpoll	x
Carduelis pinus	pine siskin	c
Carpodacus cassinii	Cassin's finch	c
Carpodacus purpureus	purple finch	x
Cathartes aura	turkey vulture	x
Catharus guttatus	hermit's thrush	c
Catharus ustulatus	Swainson's thrush	x
Circus cyaneus	northern harrier	x
Ceryle alcyon	belted kingfisher	c
Cinclus mexicanus	American dipper	x
Coccothraustes vespertinus	evening grosbeak	x
Colaptes auratus	northern flicker	c
Contopus borealis	olive-sided flycatcher	c
Corvus corax	common raven	c
Cypseloides niger	black swift	c
Dendragapus canadensis	spruce grouse	c
Dendragapus obscurus	blue grouse	c
Dendroica coronata	yellow-rumped warbler	c
Dendroica townsendi	Townsend's warbler	c
Empidonax dificilis	Pacific slope flycatcher	x
Empidonax hammondii	Hammond's flycatcher	c
Empidonax traillii	willow flycatcher	x
Falco columbarius	merlin	x
Falco mexicanus	prairie falcon	c
Falco peregrinus	peregrine falcon	x

Table 4—Birds of Roger Lake Research Natural Area[a b] (continued)

Scientific name	Common name	Confirmed (c) or expected (x)
Falco rusticolus	gyrfalcon	x
Falco sparverius	American kestrel	c
Gallinago gallinago	common snipe	c
Grus canadensis	sandhill crane	x
Haliaeetus leucocephalus	bald eagle	x
Ixoreus naevius	varied thrush	x
Junco hyemalis	dark-eyed junco	c
Lagopus leucurus	white-tailed ptarmigan	x
Leucosticte tephrocotis	gray-crowned rosy finch	x
Loxia curvirostra	red crossbill	c
Loxia leucoptera	white-winged crossbill	x
Melospiza lincolnii	Lincoln's sparrow	c
Melospiza melodia	song sparrow	x
Myadestes townsendi	Townsend's solitaire	c
Nucifraga columbiana	Clark's nutcracker	c
Oporonis tolmiei	MacGillivray's warbler	x
Otus flammeolus	flammulated owl	x
Otus kennicottii	western screech owl	x
Pandion haliaetus	osprey	x
Passerella iliaca	fox sparrow	x
Perisoreus canadensis	gray jay	c
Phalaropus lobatus	red-necked phalarope	x
Phalaropus tricolor	Wilson's phalarope	x
Pheucticus melanocephalus	black-headed grosbeak	c
Picoides arctus	black-backed woodpecker	x
Picoides pubescens	downy woodpecker	c
Picoides tridactylus	three-toed woodpecker	x
Picoides villosus	hairy woodpecker	c
Pinicola enucleator	pine grosbeak	x
Piranga ludoviciana	western tanager	x
Plectrophenax nivalis	snow bunting	x
Poecile atricapilla	black-capped chickadee	c
Poecile gambeli	mountain chickadee	c
Poecile hudsonica	boreal chickadee	c
Regulus calendula	ruby-crowned kinglet	c
Regulus satrapa	golden-crowned kinglet	c
Salpinctes obsoletus	rock wren	c
Selasphorus rufus	rufous hummingbird	c
Sialia currucoides	Mountain bluebird	c
Sitta canadensis	red-breasted nuthatch	c
Sitta carolinensis	white-breasted nuthatch	c
Sphyrapicus thyroideus	Williamson's sapsucker	x
Spizella passerina	chipping sparrow	c
Stellula calliope	calliope hummingbird	x
Strix nebulosa	great gray owl	x

Table 4—Birds of Roger Lake Research Natural Area[a] [b] (continued)

Scientific name	Common name	Confirmed (c) or expected (x)
Strix varia	barred owl	x
Surnia ulula	northern hawk-owl	x
Tringa melanoleuca	greater yellowlegs	x
Tringa solitaria	solitary sandpiper	c
Tachycineta bicolor	tree swallow	c
Tachycineta thalassina	violet-green swallow	c
Troglodytes troglodytes	winter wren	x
Turdus migratorius	American robin	c
Wilsonia pusilla	Wilson's warbler	x
Zonotrichia atricapilla	golden-crowned sparrow	x
Zonotrichia leucophrys	white-crowned sparrow	c

[a] Species list from field observations by the author (confirmed species) and Cannings et al. 1987 (expected species).
[b] Nomenclature follows Sibley 2003.

Table 5—Mammals of Roger Lake Research Natural Area[a] [b]

Family	Scientific name	Common name	Confirmed (c) or expected (x)
Insectivora:			
Shrews and moles	*Sorex cinereus*	masked shrew	x
	Sorex monticolus	montane shrew	x
	Sorex palustris	water shrew	x
	Sorex vagrans	vagrant shrew	x
Chiroptera:			
Bats	*Eptesicus fuscus*	big brown bat	x
	Lasionycteris noctivagrans	silver-haired bat	x
	Myotis californicus	California myotis	x
	Myotis evotis	long-eared myotis	x
	Myotis lucifugus	little brown bat	x
	Myotis volans	long-legged myotis	x
Lagomorpha:			
Pikas, hares, and rabbits	*Lepus americanus*	snowshoe hare	c
Rodentia:			
Rodents	*Castor canadensis*	beaver	x
	Clethrionomys gapperi	Gapper's red-backed vole	x
	Erethizon dorsatum	porcupine	x
	Glaucomys sabrinus	northern flying squirrel	c
	Microtus longicaudus	long-tailed vole	x
	Microtus pennsylvanicus	meadow vole	x

Table 5—Mammals of Roger Lake Research Natural Area[a] [b](continued)

Family	Scientific name	Common name	Confirmed (c) or expected (x)
	Microtus richardsoni	Richardson's vole	x
	Neotoma cinerea	bushy-tailed wood rat	c
	Ondatra zibethicus	muskrat	c
	Peromyscus keeni	forest deer mouse	x
	Peromyscus maniculatus	deer mouse	c
	Phenacomys intermedius	heather vole	x
	Spermophilus columbianus	Columbian ground squirrel	c
	Spermophilus saturatus	golden-mantled gr. squirrel	x
	Tamias amoenus	yellow-pine chipmunk	c
	Tamiasciurus hudsonicus	red squirrel	c
	Thomonys talpoides	northern pocket gopher	c
	Zapus princeps	western jumping mouse	x
Carnivora:			
Carnivores	*Canis latrans*	coyote	x
	Felis concolor	mountain lion (cougar)	x
	Gulo gulo	wolverine	x
	Lynx canadensis	lynx	x
	Lynx rufus	bobcat	x
	Martes americana	American marten	x
	Mustela ermina	short-tailed weasel	x
	Mustela frenata	long-tailed weasel	x
	Ursus americanus	black bear	c
Artiodactyla:			
Hoofed animals	*Alces alces*	moose	c
	Odocoileus hemionus	mule deer	c

[a] List from field observations by the author (confirmed species) and Johnson and Cassidy 1997 (expected species).

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