

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Establishment Report

LITTLE GRANITE RESEARCH NATURAL AREA

Wallowa Whitman National Forest
Idaho County, Idaho



SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Little Granite Research Natural Area

Wallowa Whitman National Forest

Idaho County, Idaho

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation and FSM 4063.41 5.e(3) in arriving at this recommendation.

Prepared by Dick Vander Schaaf Date 2-8-99
Dick Vander Schaaf,
The Nature Conservancy

Recommended by Kendall Clark Date 1/20/99
Kendall Clark, Area Ranger,
Hells Canyon National Recreation Area

Recommended by Karyn Wood Date 2/19/99
Karyn Wood, Forest Supervisor,
Wallowa Whitman National Forest

Concurrence of Thomas J. Mills Date 3/22/99
Thomas J. Mills, Director,
for Pacific Northwest Research Station

TITLE PAGE

Establishment Record for
Little Granite Research Natural Area
within Wallowa Whitman National Forest
Idaho County, Idaho

ESTABLISHMENT RECORD FOR
LITTLE GRANITE RESEARCH NATURAL AREA
WITHIN WALLOWA WHITMAN NATIONAL FOREST
IDAHO COUNTY, IDAHO

INTRODUCTION

Little Granite Research Natural Area (RNA) is centered on the Little Granite Creek watershed of Hells Canyon National Recreation Area in the Idaho Batholith Ecoregion of Idaho (Map 1). The RNA spans a broad spectrum of vegetation zones, running from 610 m (2000 feet) along the Snake River in the bottom of Hells Canyon to over 3130 m (9000 feet) at the higher peaks in the Seven Devils Wilderness Area (Map 2). On the lower slopes, grasslands predominate which are dominated by bluebunch wheatgrass (*Agropyron spicatum*)¹ and Idaho fescue (*Festuca idahoensis*) canyon plant associations. The grasslands transition to shrublands and ponderosa pine (*Pinus ponderosa*) woodlands with gains in elevation; the shrublands are quite varied with dominant species including sumac (*Rhus glabra*), mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*), mountain mahogany (*Cercocarpus ledifolius*), and spiny greenbush (*Glossopetalon nevadense*). The pine woodlands quickly transition to conifer forests dominated by ponderosa pine, Douglas-fir (*Psuedotsuga menziesii*), grand fir (*Abies grandis*), and subalpine fir (*Abies lasiocarpa*). The forested portion contains trees of several age classes including a number of groves of impressive old growth. There is ample evidence of the effects of fire in the drainage with large patches of even age stands present and a recent burn having taken place in the mid to higher elevations.

In addition to the phenomenal diversity of upland vegetative communities there is also great diversity of riparian and aquatic communities present in the lakes and streams. The RNA begins along the lower reaches of Granite and Little Granite Creeks and proceeds upslope to include essentially the entire watershed of Little Granite Creek. At higher elevations, the lakes basin consists of a number of permanent lakes and ponds situated in a mosaic of subalpine vegetation including parklands, forests, and alpine rock gardens amongst steep, boulder-strewn ridges. Adding to the vegetative and elevation diversity of the site is the diverse geology which includes extensive granitic intrusions among the overlying basalts; glaciation was an important force in sculpting the lakes basin and surrounding ridges at the higher elevations.

¹ Nomenclature for vascular plants follows Hitchcock and Cronquist (1973), except for trees which follows Little (1979).

Land Management Planning

Little Granite RNA was proposed as a candidate RNA by the Wallowa Whitman National Forest to represent some of the diverse vegetative communities which occur within Hells Canyon. It was included as a candidate RNA in the FEIS for the Wallowa Whitman National Forest (USDA Forest Service 1990a)², in the Forest Plan (USDA Forest Service 1990b) and in the Record of Decision (USDA Forest Service 1990c).

Little Granite RNA contains representative examples of the following ecosystems in the Idaho Batholith Ecoregion:

TERRESTRIAL ECOSYSTEMS

- Bluebunch wheatgrass-Sandberg's bluegrass grassland
- Idaho fescue-bluebunch wheatgrass grassland
- Idaho fescue-Prairie junegrass grassland
- Sumac/bluebunch wheatgrass shrubland
- Spiny greenbush/bluebunch wheatgrass shrubland
- Mountain mahogany/bluebunch wheatgrass shrubland
- Ponderosa pine/bluebunch wheatgrass community
- Douglas-fir/mallow ninebark community
- Douglas-fir/pinegrass community
- Grand fir/thinleaf huckleberry community
- Subalpine fir/grouse huckleberry community
- Whitebark pine-subalpine fir community

AQUATIC ECOSYSTEMS

- Mid to high elevation lake
- Montane wet sedge meadow
- Mountain laurel-heather moist montane meadow

OBJECTIVE

The objective of the Little Granite RNA is to preserve, in an area relatively undisturbed by humans, the diverse terrestrial and aquatic natural communities which are the research focus of the RNA. The RNA will serve as a reference area for study, as a baseline area for determining long-term ecological changes, and as a monitoring area to determine effects of management techniques and practices applied to similar ecosystems.

² Author's names in parentheses refer to references cited.

JUSTIFICATION

Little Granite RNA was selected to meet an unfilled RNA need for the diverse natural communities of Hells Canyon including both canyon grassland communities as well as forests, subalpine meadows and aquatic communities. The site is representative of an elevational transect in Hells Canyon that extends from the Snake River to high elevation forests and meadows within a single watershed. The RNA characterizes much of what makes Hells Canyon so unique within the larger Idaho Batholith Ecoregion. It is rare to find an entire watershed in as good a condition as is represented at Little Granite RNA.

PRINCIPAL DISTINGUISHING FEATURES

Little Granite RNA contains the following principal features:

- 1. Steep slope, canyon grasslands:** Rising up from the bottom of Hells Canyon, the steep lower slopes are covered with bluebunch wheatgrass (*Agropyron spicatum*) canyon grasslands. These grasslands are often co-dominated by Sandbergs bluegrass (*Poa sandbergii*). With increasing elevation grasslands are dominated by Idaho fescue (*Festuca idahoensis*) with prairie junegrass (*Koeleria cristata*), common snowberry (*Symphoricarpos albus*), and Hoods sedge (*Carex hoodii*) found in lesser amounts. Shrubs are prominent on the steep slopes with sumac (*Rhus glabra*), hackberry (*Celtis reticulata*), mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) and mountain mahogany (*Cerocarpus ledifolius*) found mixed in with the grasslands. On steep, near vertical rockwalls spiny greenbush (*Glossopetalon nevadense*) is prominent with bluebunch wheatgrass.
- 2. Ponderosa pine-Douglas-fir forests:** Ponderosa pine and Douglas-fir forests occur within the RNA in several habitats across many locations. Intermingled within the steep canyon grasslands, pine forests are found in predominantly north-facing canyons. Understories in these stands are typically bluebunch wheatgrass and Idaho fescue. At mid elevations ponderosa pine and Douglas-fir forests are prominent across the broader landscape but are more often found on north-facing slopes or in canyon bottoms. Understories are diverse at mid-elevation stands and include common snowberry, pinegrass (*Calamagrostis rubescens*), big huckleberry (*Vaccinium membranaceum*), and ninebark (*Physocarpus malvaceus*). The upper end of the Douglas-fir belt is marked by grand fir forests which cover the greatest aerial extent of any forest type present in the RNA (see p. 10). Grand fir forest understories may be herb-dominated with beadlelily (*Clintonia uniflora*), violet (*Viola glabella*), or pinegrass present or shrub-dominated with Rocky Mountain maple (*Acer glabrum*), thinleaf huckleberry (*Vaccinium membranaceum*).
- 3. Subalpine fir forests:** Extensive subalpine fir forests occupy the upper slopes of Little Granite drainage and the lakes basin within the Seven Devils Mountains. These diverse forests

are characterized by subalpine fir found in mono-typic stands as well as in a co-dominant status with Engelmann spruce (*Picea engelmannii*) and whitebark pine (*Pinus albicaulis*). Understories in the subalpine forests are often sparse and dominated by only a few species of small shrubs, including foals huckleberry (*Menziesia ferruginea*), grouse whortleberry (*Vaccinium scoparium*) and red mountain heather (*Phyllodoce empetrifomis*). The spruce-subalpine fir stands may occupy sites that have late lying snowbeds, standing water or frost pockets while whitebark pine-subalpine fir stands can be found on shallow soils and on rocky ridges. On the highest ridges only pure stands of whitebark pine occur, surviving severe winds and dessication.

4. Subalpine lakes basin: At high elevations in the Seven Devils there are numerous lakes and ponds surrounded by subalpine fir forests and parklands. Some of these lakes are above timberline and are bordered by talus and boulderfields with rocky wet meadows around the lake margins. These lakes and ponds have their origins from the glacial action which scoured the high peaks and upper valleys of the Seven Devils during the Pleistocene epoch. The lakes are quite varied but most are permanent and many support resident trout of respectable size, although most of the trout result from discontinued stocking programs. Emergent vegetation occurs in only a few ponds as the lakes are relatively deep, however, quillworts (*Isoetes sp.*) are common in the shallows of several of the lakes. The lakes are popular with hikers and horse users who travel the backcountry during the summer months.

5. Diverse riparian and wetland communities: Associated with the lakes, ponds and streams is a diversity of riparian and wetland communities. In the lakes basin there are several wet sedge and herbaceous meadows that appear to have been former ponds that have filled in with sediment. Streams which flow between lakes often border larger wetlands that contain a mosaic of natural communities which include willow dominated associations as well as sedge or herb dominated associations. Within forested portions of the RNA, riparian communities are located along Little Granite Creek and other small streams and include willow associations as well as Sitka alder (*Alnus sinuata*) associations. Mid-elevation riparian areas are mostly conifer dominated with only a couple of shrub species such as oceanspray (*Holodiscus discolor*) and thin-leaf huckleberry (*Vaccinium membranaceum*) in the understory. The lower elevation riparian zones mimic Hells Canyon plant associations with white alder (*Alnus rhombifolia*) in the overstory and mixed shrubs in the understory. Springs and seeps scattered around the RNA often have herb dominated associations and sometimes cover large areas that include willows in the overstory.

LOCATION

Maps 1, 2, and 3 show the location of Little Granite RNA. The RNA is located in the Riggins Ranger District of the Hells Canyon National Recreation Area (HCNRA) within the Idaho unit of the Hells Canyon Wilderness Area in the Seven Devils Mountains. The RNA is centered on the Little Granite Creek watershed, a major drainage in Hells Canyon that is located entirely within

the central portion of the Wilderness Area. The wilderness boundary is approximately 18 miles (29 km) west of Riggins, Idaho. The center of the RNA is at latitude 45°19' 43" north and longitude 116° 35' 45" west. The 6259 acre (2532 ha.) site lies within Sections 12-14, 23, 24 Township 23 North, Range 3 West; and Sections 7-9, 14-24, 26-29 Township 23 North, Range 2 West (Map 3).

Boundary

Basis of bearing is astronomic north. Basis of elevation is mean sea level as shown on the USGS 7.5 minute topographic quadrangle maps Squirrel Prairie, Oreg.-Idaho (1990 provisional edition) and He Devil, Idaho (1990 provisional edition). Boundary description for the RNA is attached separately.

Area

Total area for the Little Granite Research Natural Area is approximately 6259 acres (2532 ha).

Elevations

Elevations range from 2000 feet (610 m) along the Hells Canyon Wild River boundary which forms the western border of the RNA to 9393 feet (2865 m) at He Devil Mountain on the eastern border of the site.

Access

The RNA is accessible from the west by boat up the Snake River in Hells Canyon and from the east via Riggins, Idaho. Access from Hells Canyon is best accomplished in the spring with landings often possible at the mouth of Little Granite Creek; if Granite Creek Rapids is not runnable because of high flows the river trail provides an easy hike to the Hibbs Ranch site at the confluence of Granite and Little Granite Creeks. Jet boat travel can be initiated at Pittsburg Landing 25 miles (40 km) downstream from the RNA or from the more remote Hells Canyon Creek (OR) launch site 8 miles (13 km) upstream. The river provides convenient access to the lower half of the RNA. To access the higher elevations of the RNA from Riggins, Idaho, proceed 2 miles south of town on US Highway 95 to the junction of Forest Road #517 which leads to Seven Devils Campground at the eastern boundary of the Hells Canyon Wilderness Area. Park at the trailhead of Windy Saddle and follow the Seven Devils Trail to Hibbs Cow Camp and then to Echo Lake which lies within the RNA. The trail is approximately 10 miles long. There is also a good trail to Baldy Lake as well as an established trail down Little Granite

Creek to the confluence of Little Granite and Granite Creeks. Within the high lakes basin fishermen's trails exist between lakes while cross-country travel is required to access high divides and mountain peaks. Route finding and map and compass skills are necessary for safe travel within the RNA.

Maps

Little Granite RNA is located on USGS 7.5 minute topographic quadrangle maps, Squirrel Prairie, Oregon - Idaho (1990 provisional edition) and He Devil, Idaho (1990 provisional edition). The Hells Canyon National Recreation Area Recreation Map, 1987, is useful for ownership and general access information, however, this map does not delineate the RNA boundaries.

Photos

Aerial photos of the Little Granite RNA site are available in the Forest Supervisor's and District Ranger's offices.

AREA BY TYPES

Vegetation of the RNA has been formally classified at Forest Service ecological plots on the site (Johnson 1997 personal communication) and was informally inventoried in preparation for drafting this document. The following determination of cover types and plant series and their estimated covers have been made from the survey information and from air photo interpretation. Map 4 depicts the locations of the plant series described below.

The most current information regarding plant associations present at the RNA is described in the plant association guide for the Wallowa-Snake Province (Johnson and Simon 1987). Wetland plant associations are described in a wetland plant association guide for the Malheur, Umatilla and Wallowa-Whitman National Forests (Crowe and Clausnitzer 1997). Plant series (Hall 1978) have been identified in the RNA using aerial photo interpretation (Map 4). The series are represented by a large number of plant associations within the RNA, all of which are types described in Johnson and Simon (1987) and Crowe and Clausnitzer (1997). Plant associations known to occur within the RNA are listed later in the report.

		Estimated	
		Acres	Hectares
<u>SAF Cover Types</u> (Eyre 1980)			
206	Engelmann Spruce--Subalpine fir	1519	614
208	Whitebark pine	200	81
213	Grand fir--Larch--Douglas-Fir	1706	690
237	Interior Ponderosa Pine	452	183
	Non-forested	2382	964

Kuchler Types (Kuchler 1966)

11	Western ponderosa forest (<i>Pinus</i>)	1826	739
14	Grand fir-Douglas fir forest (<i>Abies-Pseudotsuga</i>)	2086	844
15	Western spruce-fir forest (<i>Picea-Abies</i>)	2347	949

Plant Series (Hall 1978)

1) GB	Bunchgrass type grasslands	1333	539
2) GX	Climax grassland (no assn specified)	29	12
3) GS	Subalpine grassland	26	10
4) SX	Climax shrubland (no assn specified)	41	16
5) CP	Ponderosa pine forest	452	183
6) CD	Douglas-fir forest	482	195
7) CW	Grand fir forest	1224	495
8) CL	Lodgepole pine forest	167	68
9) CE	Alpine fir - spruce closed forest	862	349
10) CA	Alpine fir open forest parks	690	279
11) NR	Rocky land	104	42
12) NT	Talus	763	309
13) WL	Lakes and ponds	86	35
Total		6259	2532

PHYSICAL AND CLIMATIC CONDITIONS

Physical Conditions

Little Granite RNA is located on steep, generally west-facing slopes above Hells Canyon on the Snake River. As Hells Canyon is the deepest canyon in North America it is no exaggeration to say that the landscape is exceedingly rugged and composed of narrow ridges and ravines which appear to tumble off to the river to the west. The lower slopes of the Little Granite drainage rising up from the bottom of Hells Canyon are nearly vertical, ascending 3000 feet (914 m) within a mile (1.6 km) from the Snake River. The drainage is less than 2 miles (3.2 km) wide for much of its length with steep side slopes rising up to lateral ridges that average 5000 to 7000 feet (1524-2134 m) in elevation. Around the 6000 foot level (1829 m) the stream gradient lessens and benches appear on the side slopes. These benches as well as the stream bottom rise steadily to two major lakes basins which form the headwaters of the Little Granite Creek.

The lake basins are located in subalpine cirques formed by glaciation in the Pleistocene Epoch. The basins are relatively flat and broad with steep side slopes ascending the surrounding ridges of the cirques. These formations could be considered hanging valleys in some instances where there is an abrupt break between the lower edge of the basin and the drainage below, often creating a waterfall for the outlet stream. The lake basins have considerable surface rock with large boulders evident throughout. Soil formation is varied in the basins with some deposits having high organic content forming mucks and other deposits from granitic rocks being characterized more as gravelly sands. In general, the basins have more shallow soils which are often poorly developed.

The southern lake basin contains Baldy Lake, the largest Lake in the Seven Devils area. The outlet creek below the lake stair-steps through boulder dominated cascades where the water sometimes disappears under the rocks altogether. The more gentle terrain of the basin harbors several ponds and wet meadows below the larger lake but above the lake the terrain rises steadily upwards to the surrounding headwall of the basin. Mountain peaks above Baldy Lake include Potato Hill, Twin Imps, and Devils Throne.

The northern lake basin is larger and contains five named lakes: Echo, Quad, He Devil, Triangle, and Purgatory Lakes as well as a number of ponds. As one proceeds up the basin the lakes are separated by distinct elevation gains averaging 200 feet (61 m). These terraces are likely related to successive waves of glaciation events. The upper most lake, Purgatory Lake, sits in a steep-walled cirque whose ridges rise up to Mt. Belial and He Devil, the high point in the RNA at 9393 feet (2863 m). One curiosity about the lake basins in the RNA that remains unanswered is what ever happened to the incredible amount of rock that must have been excavated from the cirques

during glaciation. There are no substantial moraines evident in Hells Canyon so one can only assume that the material was carried down the Snake and Columbia Rivers to the ocean.

Flooding occurs at all elevations in the drainage during periods of high runoff creating habitats for specific plant communities. Though the lower slopes of the Little Granite Creek drainage are steep there are still places where floodwaters deposit their bedloads when the stream gradient lessens. Deposition may result in terraces being formed that may persist for long periods of time and become colonized by riparian hardwoods. The Hibbs Ranch site at the lower reaches of the drainage used such terraces for pasture and cropland. At higher elevations terraces along streams are much smaller but have been created in the same manner.

The bedrock origins of the Seven Devils area is based in ancient seafloors which were volcanic in nature. Overlaying the seafloor metavolcanics were more recent basalt flows which are evident throughout Hells Canyon. Intruding all through the basalt flows are granitic rocks composed of granodiorite, quartz diorite and quartz monzonite which are related to the Idaho Batholith intrusive formations. The geologic forces of uplifting in the Seven Devils, downcutting by the Snake River and Little Granite Creek, and glaciation created the landscape evident in the RNA today.

Climatic Conditions

The climate of Hells Canyon varies with the elevation, which spans an incredible gradient at the RNA, but is generally characterized by hot summers and cool winters which are moderated by the low elevation of the canyon bottom. The canyon itself is quite mild with an extended growing season that spawned numerous homesteads, such as the Hibbs Ranch at the mouth of Granite Creek. At the upper lakes basin in the Seven Devils conditions are quite different with frosts potentially occurring at any time and winter storms bringing frigid weather with temperatures falling below 0 °F. Most precipitation falls as snow during the winter with significant rains often falling during the spring as well. Summers are characterized by warm, sunny weather with afternoon and evening thunderstorms, especially during July and August, that may be accompanied by light rains. Little Granite RNA is within the Idaho Batholith ecoregion and receives typical central Idaho mountain weather. Summer winds are predominantly from the northwest and are usually light to moderate. East winds may occur in the fall and spring, blowing at higher velocities and causing drying conditions that enhance the fire hazard for the season. Within the canyon, winds are usually stronger and blow up and down stream depending on time of day and the location of atmospheric high pressure areas.

The recording NOAA weather station that most closely duplicates conditions in the RNA and contains complete yearly records is located in New Meadows, Idaho, 27 miles (43 km) to the southeast of the RNA. A weather station situated at Riggins, Idaho, is closer to the RNA but its lower elevation does not give an accurate portrayal of weather conditions for the RNA. Climatic

conditions at New Meadows should be a fair approximation for at least the mid elevations of Little Granite RNA with adjustments being factored in for temperature and precipitation differences due to the extremes in elevation at the RNA. These differences would likely result in an increase in annual precipitation and a slightly lower average temperature within the Seven Devils portion and higher temperatures within the canyon. Average precipitation recorded for New Meadows is probably similar to the canyon which is wetter than one would expect for its low elevation. The station receives an annual precipitation of 24.79 inches (62.97 cm) and the mean annual temperature is 41.1 °F (5.1 °C) (National Oceanographic and Atmospheric Administration 1998). Summer high temperatures regularly reach into the high 80's°F, while winter lows often dip into the 20's °F or lower. The monthly climatic data for New Meadows averaged over the past 30 years is listed below (National Oceanographic and Atmospheric Administration 1998).

Climatic Records for New Meadows, Idaho
Elevation 3870 feet (1180 m)
(National Oceanographic and Atmospheric Administration 1998)

Month	Temperature		Precipitation	
	°F	°C	inches	cm
January	18.9	-7.3	3.34	8.48
February	24.1	-4.4	2.47	6.27
March	31.6	-0.2	2.41	6.12
April	40.5	4.7	1.87	4.75
May	48.7	9.3	1.88	4.75
June	56.9	13.8	1.84	4.67
July	63.1	17.3	0.70	1.78
August	62.1	16.7	0.82	2.08
September	52.5	11.4	1.44	3.66
October	42.4	5.8	1.76	4.47
November	31.7	-0.2	2.85	7.24
December	20.7	-6.3	3.41	8.66
Mean Annual	41.1	5.1		
Total Precipitation			24.79	62.97

DESCRIPTION OF VALUES

Flora

The flora of Little Granite RNA is representative of the incredible elevational gradient that characterizes the Hells Canyon area of the Idaho Batholith ecoregion. The site spans vegetational zones which include canyon grasslands, ponderosa pine and grand fir dominated forests, subalpine forests, wet meadows and timberline areas that are in and of themselves very diverse. There are at least 13 plant series (Hall 1978) represented in the RNA and at least 27 upland plant associations as well as a considerable diversity of riparian and aquatic associations. The species assemblages found within these numerous series and associations at times have much overlap with one another but overall there are a great number of plant species present within the site. Estimates regarding the number of potential species here likely run upwards to several hundred or more. The flora has not been systematically collected or studied other than those taxa encountered during surveys conducted during the recommendation phase of the RNA and during the course of the drafting of the Establishment Record; taxa have also been recorded in ecological inventory plots at the site. No state or federal threatened, endangered or sensitive plant species are known to occur within the RNA. Observations and plot data collected by the US Forest Service Area Ecologist, Charlie Johnson (personal communication) and Vander Schaaf (1997) have resulted in the following list of plants. Introduced species associated with the Hibbs Ranch homestead site are not included in the list but weedy exotics such as cheatgrass *Bromus tectorum* are listed. The plant habitat-types listed below are a synthesis of the plant series listed on page 7.

The plant habitat-types and corresponding plant series are characterized as follows:

- 1) Bunchgrass grasslands
--Ecoclass GB, SX; Idaho fescue and bluebunch wheatgrass series, shrubland series
- 2) Ponderosa pine-Douglas-fir forest
--Ecoclass CP, CD; ponderosa pine and Douglas-fir series
- 3) Montane and Closed Canopy Subalpine forests
--Ecoclass CW, CE, CL; grand fir, subalpine fir closed canopy, lodgepole pine series
- 4) Subalpine Parklands and Wetlands
--Ecoclass CA, GX, GS, WL, NT, NR; alpine fir parklands series, unspecified grasslands, subalpine grasslands, lakes, talus, rockland series

Riparian species are listed within the the habitat-types that the riparian plant associations occur. Species identifications were determined from Hitchcock and Cronquist (1973) and trees were determined from Little (1979).

Scientific name	Common name	Plant Communities			
		1	2	3	4

TREES					
<i>Abies grandis</i>	grand fir		X	X	
<i>Abies lasiocarpa</i>	subalpine fir			X	X
<i>Alnus rhombifolia</i>	white alder	X	X		
<i>Picea engelmannii</i>	Engelmann spruce			X	X
<i>Pinus albicaulis</i>	whitebark pine				X
<i>Pinus contorta</i>	lodgepole pine			X	X
<i>Pinus ponderosa</i>	ponderosa pine	X	X	X	
<i>Populus tremuloides</i>	quaking aspen			X	X
<i>Populus trichocarpa</i>	black cottonwood			X	
<i>Pseudotsuga menziesii</i>	Douglas-fir		X	X	
SHRUBS AND SUBSHRUBS					
<i>Acer glabrum</i>	mountain maple	X	X	X	
<i>Alnus incana</i>	mountain alder			X	
<i>Alnus sinuata</i>	Sitka alder		X	X	
<i>Amelanchier alnifolia</i>	serviceberry	X	X	X	
<i>Artemisia tridentata</i>					
var. <i>vaseyana</i>	mountain big sagebrush		X	X	
<i>Berberis repens</i>	creeping oregongrape		X		
<i>Betula occidentalis</i>	western birch	X			
<i>Celtis reticulata</i>	hackberry	X			
<i>Cercocarpus ledifolius</i>	mountain mahogany			X	
<i>Chimaphila umbellata</i>	prince's pine		X	X	X
<i>Chrysothamnus nauseosus</i>	gray rabbitbrush	X			
<i>Cornus stolonifera</i>	red osier dogwood	X	X		
<i>Crataegus douglasii</i>	hawthorne	X	X		
<i>Glossopetalon nevadensis</i>	spiny greenbush	X			
<i>Holodiscus discolor</i>	oceanspray	X	X	X	
<i>Kalmia microphylla</i>	alpine laurel			X	X
<i>Lonicera involucrata</i>	bearberry honeysuckle			X	X
<i>Lonicera utahensis</i>	Rocky Mtn honeysuckle			X	X
<i>Menziesia ferruginea</i>	fools huckleberry			X	X
<i>Philadelphus lewisii</i>	mockorange	X	X		
<i>Phyllodoce empetrifolmis</i>	red heather				X
<i>Physocarpus malvaceus</i>	mallow ninebark	X	X		
<i>Potentilla fruticosa</i>	shrubby cinquefoil				X

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Prunus virginiana</i>	chokecherry	X	X		
<i>Rhamnus purshiana</i>	cascara	X	X		
<i>Rhus glabra</i>	smooth sumac		X		
<i>Rhus radicans</i>	poison ivy	X	X		
<i>Ribes cereum</i>	squaw currant	X	X		
<i>Ribes hudsonianum</i>	western black currant		X	X	
<i>Ribes irriguum</i>	inland black gooseberry	X	X		
<i>Ribes lacustre</i>	prickly currant		X	X	
<i>Ribes montigenum</i>	alpine prickly currant				X
<i>Ribes velutinum gooddingii</i>	Goodding's gooseberry	X			
<i>Ribes viscosissimum</i>	sticky currant		X	X	
<i>Rosa gymnocarpa</i>	baldhip rose		X		
<i>Rubus parviflorus</i>	thimbleberry		X		
<i>Salix boothii</i> X <i>commutata</i>	willow sp.				X
<i>Salix scouleriana</i>	Scouler willow			X	
<i>Spiraea douglasii</i>	western spiraea	X	X	X	X
<i>Symphoricarpos albus</i>	common snowberry	X	X		
<i>Taraxicum officinale</i>	dandelion	X			
<i>Vaccinium membranaceum</i>	thin-leaf huckleberry			X	
<i>Vaccinium scoparium</i>	grouse whortleberry			X	X
FORBS					
<i>Adenocaulon bicolor</i>	pathfinder		X		
<i>Achillea millefolium</i>	yarrow	X	X		X
<i>Agoseris glauca</i>	pale agoseris	X		X	
<i>Allium acuminatum</i>	tapertip onion	X			
<i>Alyssum alyssoides</i>	pale alyssum	X			
<i>Antennaria corymbosa</i>	meadow pussy-toes			X	
<i>Antennaria racemosa</i>	raceme pussy-toes			X	
<i>Antennaria microphylla</i>	rosy pussytoes			X	
<i>Aquilegia formosa</i>	columbine			X	X
<i>Arabis sp.</i>	arabis	X			
<i>Arabis hirsuta</i>	hairy rockcress	X			
<i>Arenaria aculeata</i>	prickly sandwort			X	X
<i>Arenaria macrophylla</i>	big-leaf sandwort		X	X	
<i>Arenaria serpyllifolia</i>	thyme-leaf sandwort	X			
<i>Arnica cordifolia</i>	heartleaf arnica		X	X	X
<i>Arnica latifolia</i>	mountain arnica				X

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Arnica longifolia</i>	seep-spring arnica				X
<i>Artemisia ludoviciana</i>	wormwood		X		
<i>Aster conspicuous</i>	showy aster		X	X	
<i>Aster foliaceus</i>	leafy aster			X	
<i>Aster modestus</i>	few-flowered aster			X	
<i>Aster sibiricus</i>	arctic aster			X	
<i>Astragalus atropubescens</i>	Kelsey's milkvetch	X	X		
<i>Astragalus cusickii</i>	Cusick's milkvetch	X			
<i>Astragalus inflexus</i>	bent milkvetch	X		X	
<i>Athyrium filix-femina</i>	lady fern		X		
<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	X			
<i>Brodiaea douglasii</i>	Douglas brodiaea	X			
<i>Calochortus sp.</i>	mariposa lily	X		X	
<i>Castilleja hispida</i>	harsh paintbrush	X			
<i>Castilleja miniata</i>	scarlet paintbrush			X	
<i>Cerastium arvense</i>	chickweed	X			
<i>Chionophila tweedyi</i>	chionophila				X
<i>Chrysopsis villosa</i>	hairy goldenaster	X			
<i>Circaea alpina</i>	enchanter's nightshade	X			
<i>Cirsium brevifolium</i>	Palouse thistle	X			
<i>Cirsium undulatum</i>	wavy-leaf thistle	X			
<i>Clematis columbiana</i>	Columbia clematis			X	
<i>Collinsia parviflora</i>	collinsia	X			
<i>Conyza canadensis</i>	horseweed	X			
<i>Crepis acuminata</i>	tapertip hawksbeard	X			
<i>Cryptantha flaccida</i>	common cryptantha	X			
<i>Cryptogramma crispa</i>	cliffbrake				X
<i>Cystopteris fragilis</i>	brittle bladder-fern				X
<i>Delphinium nuttallianum</i>	Nuttalls larkspur	X			
<i>Descurainia richardsonii</i>					
<i>var. sonnei</i>	mountain tansymustard	X			
<i>Dryopteris filix-mas</i>	male fern		X		
<i>Epilobium angustifolium</i>	western fireweed			X	X
<i>Epilobium glandulosum</i>	common willow-herb				X
<i>Epilobium watsonii</i>	Watson's willow-herb			X	
<i>Epipactis gigantea</i>	giant helleborine	X	X		
<i>Equisetum arvense</i>	common horsetail			X	
<i>Equisetum hyemale</i>	common scouring rush	X	X		

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Erigeron peregrinus</i>	subalpine daisy			X	X
<i>Erigeron pumilus</i>	low fleabane	X			
<i>Eriogonum heracleoides</i>	Wyeth buckwheat	X			
<i>Eriogonum strictum</i>	strict buckwheat	X			
<i>Eriophyllum lanatum</i>	wooly sunflower	X			
<i>Erodium cicutarium</i>	storksbill	X			
<i>Fragaria vesca</i>	woods strawberry		X	X	
<i>Fritillaria sp.</i>	fritillary				X
<i>Galium aparine</i>	bedstraw	X			
<i>Galium triflorum</i>	sweetscented bedstraw			X	
<i>Goodyera oblongifolia</i>	rattlesnake plantain		X	X	X
<i>Hackelia jessicae</i>	blue stickseed			X	
<i>Halimolobos perplexa</i>					
var. <i>p.</i>	puzzling halimolobos	X			
<i>Heuchera cylindrica</i>	roundleaf alumroot	X			
<i>Heuchera grossulariifolia</i>	gooseberryleaved alumroot				X
<i>Hieracium albertinum</i>	western hawkweed	X	X		
<i>Hieracium albiflorum</i>	white-flowered hawkweed			X	
<i>Hieracium gracile</i>	slender hawkweed				X
<i>Hypericum perforatum</i>	St. Johns wort	X			
<i>Lactuca serriola</i>	prickly lettuce	X			
<i>Lepidium virginicum</i>	tall pepperweed	X			
<i>Lewisia columbiana</i>					
var. <i>wallowensis</i>	Columbia lewisia				X
<i>Ligusticum tenuifolium</i>	slender-leaved lovage			X	
<i>Linum perenne</i>	wild blue flax			X	
<i>Lithophragma parviflora</i>	small-flowered fringe cup	X			
<i>Lithospermum ruderales</i>	wayside gromwell	X			
<i>Lomatium macrocarpum</i>	bigseed lomatium	X			
<i>Lomatium serpentium</i>	Snake Canyon lomatium	X			
<i>Lupinus sp.</i>	lupine		X		
<i>Lupinus caudatus</i>	tailcup lupine	X		X	X
<i>Lychnis coronaria</i>	rose campion	X			
<i>Mertensia paniculata</i>	panicle bluebells				X
<i>Microseris nutans</i>	nodding microseris	X			
<i>Mimulus guttatus</i>	yellow monkeyflower		X		
<i>Mimulus lewisii</i>	Lewis' monkeyflower			X	
<i>Mitella pentandra</i>	alpine mitrewort			X	

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Montia cordifolia</i>	broad-leaved montia			X	
<i>Montia perfoliata</i>	miners lettuce	X			
<i>Osmorhiza chilensis</i>	mountain sweet cicely			X	X
<i>Osmorhiza occidentalis</i>	western sweet cicely			X	
<i>Parnassia fimbriata</i>	grass-of-parnassus			X	X
<i>Pedicularis contorta</i>	white coiled-beak lousewort				X
<i>Pedicularis groenlandica</i>	elephant's head			X	
<i>Pedicularis racemosa</i>	leafy lousewort			X	X
<i>Penstemon sp.</i>	beardstongue		X		
<i>Penstemon globosus</i>	globe penstemon		X	X	X
<i>Penstemon triphyllus</i>	whorled penstemon	X			
<i>Penstemon fruiticosus</i> var. <i>scouleri</i>	shrubby penstemon				X
<i>Phlox sp.</i>	phlox	X			
<i>Phlox longifolia</i>	long-leaf phlox	X			
<i>Phlox colubrina</i>	Snake River phlox	X			
<i>Phacelia heterophylla</i>	virgate phacelia	X		X	
<i>Phacelia linearis</i>	threadleaf phacelia	X			
<i>Physalis longifolia</i>	ground-cherry	X			
<i>Polemonium pulcherimum</i>	Jacob's ladder			X	X
<i>Potentilla flabellifolia</i>	fanleaf cinquefoil			X	X
<i>Pyrola asarifolia</i>	alpine pyrola		X		
<i>Pyrola picta</i>	white-vein pyrola		X		
<i>Pyrola secunda</i>	sidebells pyrola			X	X
<i>Saxifraga arguta</i>	brook saxifrage			X	
<i>Sedum lanceolatum</i>	stonecrop	X			
<i>Senecio crassulus</i>	thick-leaved groundsel				X
<i>Senecio cymgalarioides</i>	few-leaved groundsel			X	
<i>Senecio integerrimus</i>	lambstongue groundsel	X		X	
<i>Senecio steptanthifolius</i>	Rocky Mountain butterweed		X	X	
<i>Senecio triangularis</i>	arrowleaf groundsel			X	X
<i>Silene acaulis</i>	moss silene	X			
<i>Silene antirrhina</i>	sleepy cat	X			
<i>Smilacina racemosa</i>	false solomonseal		X	X	
<i>Smilacina stellata</i>	starry solomonseal			X	
<i>Solidago sp.</i>	goldenrod	X			
<i>Solidago missouriensis</i>	missouri goldenrod	X			

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Spiraea betulifolia</i>	birchleaf spiraea		X	X	
<i>Thalictrum occidentale</i>	meadowrue			X	X
<i>Tonella floribunda</i>	large-flowered tonella	X			
<i>Trifolium dubium</i>	suckling clover	X			
<i>Trifolium eriocephalum</i> var. <i>piperi</i>	wooly-headed clover	X	X		
<i>Urtica dioica</i>	stinging nettles		X		
<i>Valeriana sitchensis</i>	Sitka valerian			X	X
<i>Veratrum californicum</i>	California false hellebore				X
<i>Verbascum thapsus</i>	common mullein	X			
<i>Veronica perigrina</i>	speedwell	X			
<i>Viola sp.</i>	violet			X	
<i>Viola orbiculata</i>	round-leaved violet			X	X
<i>Woodsia oregana</i>	woodsia	X	X		
<i>Xerophyllum tenax</i>	beargrass				X
<i>Zigadenus venosus</i>	death camas	X			
GRAMINOIDS					
<i>Agropyron spicatum</i>	bluebunch wheatgrass	X	X		
<i>Agropyron caninum</i>	bearded wheatgrass	X			
<i>Bromus brizaformis</i>	rattlesnake grass	X			
<i>Bromus carinatus</i>	California brome	X		X	
<i>Bromus japonica</i>	japanese brome	X			
<i>Bromus mollis</i>	soft brome	X			
<i>Bromus tectorum</i>	cheatgrass	X	X		
<i>Bromus vulgaris</i>	Columbia brome			X	
<i>Calamagrostis rubescens</i>	pinegrass	X	X	X	
<i>Carex deweyana</i>	Dewey's sedge	X	X		
<i>Carex eurycarpa</i>	widefruit sedge			X	
<i>Carex geyeri</i>	elk sedge		X	X	
<i>Carex hoodii</i>	Hood's sedge			X	
<i>Carex illoia</i>	sheep sedge				X
<i>Carex microptera</i>	small-winged sedge			X	
<i>Carex nigricans</i>	black alpine sedge				X
<i>Carex rossii</i>	Ross' sedge	X	X	X	X
<i>Carex scopulorum</i>	Holm's Rocky Mtn sedge				X
<i>Carex utriculata</i>	beaked sedge				X
<i>Danthonia intermedia</i>	timber oatgrass			X	

Scientific name	Common name	Plant Communities			
		1	2	3	4
<i>Elymus glaucus</i>	blue wildrye			X	
<i>Festuca idahoensis</i>	Idaho fescue	X	X	X	
<i>Festuca megalura</i>	foxtail fescue	X			
<i>Juncus confusus</i>	Colorado rush				X
<i>Juncus parryi</i>	Parry's rush				X
<i>Koeleria cristata</i>	prairie junegrass	X	X		
<i>Luzula hitchcockii</i>	Hitchcock's woodrush				X
<i>Melica subulata</i>	Alaska oniongrass			X	
<i>Poa sp.</i>	bluegrass sp.	X			
<i>Poa bolanderi</i>	Bolander's bluegrass				X
<i>Poa cusickii</i>	Cusick's bluegrass	X			
<i>Poa gracillima</i>	Pacific bluegrass				X
<i>Poa juncifolia</i>	alkali bluegrass				X
<i>Poa nervosa</i>	Wheeler's bluegrass		X	X	
<i>Poa pratensis</i>	Kentucky bluegrass		X	X	
<i>Poa sandbergii</i>	Sandberg's bluegrass	X			
<i>Poa scabrella</i>	pine bluegrass	X	X		
<i>Sitanion hystrix</i>	bottlebrush squirreltail			X	
<i>Stipa sp.</i>	needle and thread	X			
<i>Stipa occidentalis</i>	western needle and thread			X	
<i>Trisetum spicatum</i>	downy oatgrass			X	X

Little Granite RNA has a large number of natural communities or plant associations represented within its boundaries, owing to the substantial elevational gradient that occurs on the natural area. An early inventory of the area that resulted in the nomination of the site for RNA status on the Nez Perce National Forest identified 30 vegetation types for the grasslands, shrublands and forests present there (Wellner, 1980). This report did not attempt to classify the diverse riparian, wetland and aquatic communities within the RNA. Another effort at classifying the diverse communities at the RNA identified 13 ecoclasses at the site; ecoclasses are roughly equivalent to series level classifications (ie, ponderosa pine series) with the addition of habitats such as talus, lakes, and boulder fields (Hall 1978). The RNA has been mapped according to ecoclasses (Map 4).

More recent classification work has identified, though not mapped, at least 45 grassland, shrubland, forest and riparian plant associations and communities (Johnson 1998; Crowe 1998). These associations and communities include:

Terrestrial Associations

Agropyron spicatum-*Posa sandbergii* (metamorphosed)
Agropyron spicatum-*Posa sandbergii* (granite)
Agropyron spicatum-*Posa sandbergii*/*Erigeron pumilus*
Festuca idahoensis-*Agropyron spicatum*/*Phlox colubrina*
Festuca idahoensis-*Koeleria cristata* (low elevation)
Festuca idahoensis-*Koeleria cristata* (high elevation)
Carex geyeri-*Festuca idahoensis*
Cercocarpus ledifolius/*Festuca idahoensis*
Glossopetalon nevadensis/*Agropyron spicatum*
Pinus ponderosa/*Agropyron spicatum*
Pinus ponderosa/*Festuca idahoensis*
Pinus ponderosa-*Pseudotsuga menziesii*/*Physocarpus malvaceus*/*Calamagrostis rubescens*
Pseudotsuga menziesii/*Calamagrostis rubescens*
Pseudotsuga menziesii (*Abies lasiocarpa*)/*Polemonium pulcherrimum*
Pseudotsuga menziesii (*Abies lasiocarpa*)/*Pyrola secunda*
Abies grandis/*Vaccinium membranaceum*
Populus tremuloides/*Carex geyeri*
Pinus contorta/*Lupinus caudatus*
Pinus contorta (*Abies lasiocarpa*)/*Vaccinium scoparium*
Picea engelmannii (*Abies lasiocarpa*)/*Menziesia ferruginea*/*Xerophyllum tenax*
Picea engelmannii-*Abies lasiocarpa*/*Viola orbiculata*
Picea engelmannii-*Abies lasiocarpa*/*Vaccinium scoparium*-*Phyllodoce empetrifomis*
Picea engelmannii-*Abies lasiocarpa*/*Xerophyllum tenax*
Abies lasiocarpa/*Menziesia ferruginea*
Pinus albicaulis/*Luzula hitchcockii*
Pinus albicaulis-*Abies lasiocarpa*/*Polemonium pulcherrimum*
Pinus albicaulis-*Abies lasiocarpa*/*Vaccinium scoparium*
Pinus albicaulis-*Abies lasiocarpa*/*Vaccinium scoparium*/*Lewisia columbiana wallowensis*
Pinus albicaulis-*Abies lasiocarpa*/*Vaccinium scoparium*/*Luzula hitchcockii*
Pinus albicaulis-*Abies lasiocarpa*/*Vaccinium scoparium*/*Polemonium pulcherrimum*

Riparian Communities and Associations

Alnus rhombifolia/mixed shrub
Ponderosa pine riparian
Terrace with *Poa pratensis*
Pseudotsuga menziesii-*Pinus ponderosa* (= *Pseudotsuga menziesii*/*Holodiscus discolor*)
Springs (*Alnus incana*/*Atherium filix-femina*-*Dryopteris filix-mas*)
Pseudotsuga menziesii/*Holodiscus discolor* (= *Pseudotsuga menziesii*/*Physocarpus malvaceus*)

Celtis reticulata/Agropyron spicatum (=Bromus tectorum)
Populus trichocarpa
Abies grandis/Vaccinium membranaceum
Mixed subalpine forb
Ribes lacustre-Ribes hudsonianum/mixed subalpine forb
Carex utriculata wet meadow
Carex scopulorum-Carex nigricans
Alnus sitchensis-Ribes lacustre-Ribes hudsonianum (Abies grandis-Picea engelmannii
overstory)
Pinus contorta/Spiraea douglasii-Kalmia microphylla/Carex scopulorum
Salix sp./Carex scopulorum-forb
Senecio triangularis wet meadow

Beginning at the lowest elevations of the RNA on steep slopes rising above Hells Canyon and bordering Granite and Little Granite Creeks, canyon grasslands ascend the hillsides for several thousand feet. Grassland communities dominated by bluebunch wheatgrass, Sandbergs bluegrass, Idaho fescue, and prairie junegrass are interspersed with shrub communities on rocky substrates that are dominated by spiny greenbush, mountain mahogany, and mountain big sagebrush. The grasslands in the RNA are so diverse as to contain nearly all of the grassland plant associations dominated by bluebunch wheatgrass or Idaho fescue that have been described for Hells Canyon and the Wallows by Johnson and Simon (1987). The major drainages on these lower slopes contain diverse riparian plant associations with north-facing drainages having stringers of ponderosa pine and riparian shrubs running from low elevations to continuous pine forests thousands of feet higher. On depositional surfaces white alder dominates the riparian zones with an understory of riparian shrubs that may include red-osier dogwood, Rocky Mountain maple, and oceanspray among others. Patches of continuous forest can also be found at lower elevations, although usually only on upper north-facing slopes. These stands have ponderosa pine overstories with bluebunch wheatgrass and Idaho fescue in the understory.

In July 1986, a lightning strike ignited a wildfire in the Little Granite Creek drainage that burned 3000 acres (1214 ha) of grasslands and shrublands (Map 5). The effects of the fire appeared devastating at first as it was a very complete burn that left few unburned refugias. The fire was not suppressed within the Little Granite drainage but backburning was used along the east side of the Granite Creek to prevent the fire from spreading further to the west. Riparian communities along Granite Creek and the grasslands to the west of the creek remained unburned. By October 1986, the bunchgrass dominated grasslands were resprouting and closer examination of the burned area revealed that the fire removed nearly all of the ponderosa pine seedlings that were invading the grasslands. The forest-grassland ecotone is now quite distinct with the larger ponderosa pines surviving the fire as it underburned most of the stands within the fire perimeter. Shrublands also resprouted, to a great extent, in the burn area. Fortunately, there had been a number of permanent vegetation plots previously established within the burn perimeter which allowed for remeasurement after the fire. Fire is a natural part of the landscape in Hells Canyon

that has thoroughly shaped the distribution and composition of vegetative communities in the region. There have been numerous, naturally-ignited wildfires within the RNA which has helped maintain the high ecological value of the area.

Mid-elevation plant associations begin where forest cover is continuous, starting around 4000 feet on south-facing slopes and down to 3300 feet on north-facing slopes. Ponderosa pine is the dominant tree species with Douglas-fir achieving co-dominant status with elevation. Understories are quite varied beginning with bunchgrasses at the ecotone and then shrubs becoming more prominent with increases in elevation. Shrub species include snowberry and ninebark in dry to mesic sites. In general, Douglas-fir is found in the slightly more mesic sites while ponderosa pine can endure drier sites. Riparian communities in these forests are often characterized by the same conifers as in the surrounding forest with oceanspray in the understory. Livestock grazing in lower elevation riparian areas and terraces ended around 1920, yet much of the understory in these areas was so altered that terraces are still dominated today by Kentucky bluegrass or cheatgrass. The mid-elevation forests transition to montane forests that are dominated by grand fir with increasingly more mesic environmental and climatic conditions.

Montane forests range from 4500 feet to 6500 feet and are comprised mainly of grand fir dominated stands or stands which may be grand fir climax forests that are currently dominated by Douglas-fir or ponderosa pine. These forests are often overlooked in the Hells Canyon region where the focus is more on ponderosa pine at lower elevations or on the subalpine forests at higher elevations. The grand fir forest communities are usually more mesic than lower elevation pine forests and often have bigleaf huckleberry or beadlily in the understory. The more xeric grand fir stands are characterized as grand fir/birchleaf spiraea plant associations while the most mesic and cool communities found on upper slopes have Rocky Mountain maple as an understory dominant. Little information has been collected about the riparian communities in the grand fir zone except that they include communities dominated by conifers with shrub understories such as the common forest type grand fir/bigleaf huckleberry. Sitka alder stands with *Ribes lacustre* and *Ribes hudsonianum* are also documented from the grand fir stands that have Engelmann spruce as a co-dominant in the overstory (Crowe 1998).

Nearly half of the Little Granite RNA lies within the subalpine zone which is the heart of the Seven Devils Mountains. The forests in the subalpine zone are diverse and include both closed canopy types as well as open parklands. Subalpine fir is the most common forest tree present in the zone and it is often found growing in stands with Engelmann spruce and/or whitebark pine. Common understory species include *Clintonia uniflora*, *Menziesia ferruginea*, and *Vaccinium scoparium*. Engelmann spruce is prominent in the lakes basin and in riparian areas as it can tolerate having its roots in seasonally saturated soils. Whitebark pine is noted for its ability to withstand severe conditions as found on scree slopes and ridges; such conditions include frost burn, dessication, high winds, shallow and rocky soils, and intense solar radiation. Whitebark pine can be found growing singly or in small groups on exposed slopes. It can also be found in pure stands where it is climax.

An early successional tree species that occurs after fire in both montane and subalpine zones is lodgepole pine. Lodgepole often occurs in mixed stands with Douglas-fir at lower elevations or with subalpine fir and Engelmann spruce at higher elevations. The pine is relatively short lived with stands often becoming overtopped by other conifers and declining in vigor before they reach 100 years of age.

The subalpine zone also contains a number of lakes, ponds and wetlands that are located within glacially carved cirques. The lakes are varied with some totally surrounded by closed canopy forests while others are better characterized as glacial tarns or shallow ponds scoured out of bedrock. Most of the lakes have a diversity of plant communities surrounding their shorelines including wet meadows as well as some emergent vegetation in the shallows. Submerged within the lake shallows is at least one species of pillwort (*Isoetes bolanderi*). The lakes contain both resident and introduced trout which apparently thrive in the favorable environment. The wet meadows of the subalpine zone are sedge dominated with *Carex scopulorum* and *C. utriculata* are the most common sedges in these habitats. Showy wildflowers are common in these meadows including *Senecio triangularis*, *Erigeron peregrinus*, and *Potentilla flabellifolia* among others.

The high mountain peaks and ridges that rise above the cirques have distinctive floras that are as close to alpine conditions as can be found in the Hells Canyon region. Plants found on the exposed ridges and talus slopes are submitted to a host of challenging climatic and environmental conditions that are almost universal of mountain environments worldwide. Not surprisingly many of the species are widespread with occurrences in the Rocky Mountains to the Sierras and the Cascades and north to the Alaska. Some of the interesting species in these high mountain environments include *Chionophila tweedyi*, *Eriogonum caespitosum*, *Lewisia columbiana* var. *wallowensis*, *Astragalus whitneyi*, *Hulsea nana*, and *Oxyria digyna*.

Fauna

Faunal species have not been systematically studied or inventoried in Little Granite RNA. Observations of animal species noted during surveys conducted at the site as well as from surveys on nearby areas are included below. In addition, terrestrial vertebrate species having the potential to be encountered in the RNA as determined by the presence of suitable habitat at the site are also included in the list (Burt and Grossenbieder 1976; National Geographic Society 1987; Nussbaum et al 1983). A list of documented and suspected species from Hells Canyon National Recreation Area was also used in developing the following list (Mennell 1994). Specific inventories for butterflies and birds at the RNA were made during the 1997 field season and are included below (Conley 1998).

<u>Scientific name</u>	<u>Common name</u>
Anguidae	
<i>Elgaria coerulea</i>	Northern alligator lizard
Iguanidae	
<i>Phrynosoma douglasii</i>	Short-horned lizard
<i>Phrynosoma playrhinos</i>	Desert horned lizard
<i>Sceloporus occidentalis</i>	Western fence lizard
<i>Sceloporus graciosus</i>	Sagebrush lizard
<i>Uta stansburiana</i>	Side-blotched lizard
Scincidae	
<i>Eumeces skiltonianus</i>	Western skink
Teiidae	
<i>Cnemidophorus tigris</i>	Western whiptail snake
Boidae	
<i>Charina bottae</i>	Rubber boa
Colubridae	
<i>Coluuber constrictor mormon</i>	Western yellowbelly racer
<i>Diadophis punctatus</i>	Ringneck snake
<i>Hypsiglena torquata</i>	Night snake
<i>Masticophis taeniatus</i>	Striped whipsnake
<i>Pituophis melanoleucus</i>	Gopher snake
<i>Sonnora semianulata</i>	Western ground snake
<i>Thamnophis elegans</i>	Western terrestrial garter snake
<i>Thamnophis sirtalis</i>	Common garter snake
Viperidae	
<i>Crotalus viridus</i>	Western rattlesnake
Ambystomatidae	
<i>Ambystoma macrodactylum</i>	Long-toed salamander
<i>Ambystoma tigrinum</i>	Tiger salamander
Bufonidae	
<i>Bufo boreas</i>	Western toad
<i>Bufo woodhousei</i>	Woodhouse toad

Hylidae*Hyla regilla*

Pacific treefrog

Pelobatidae*Speo intermontana*

Great Basin spadefoot toad

Ranidae*Rana pipiens*

leopard frog

Rana pretiosa

Spotted frog

Anatidae*Aix sponsa*

wood duck

Anas acuta

pintail

Anas crecca

green-winged teal

Anas cyanoptera

cinnamon teal

Anas platyrhynchos

mallard

Anas strepera

gadwall

Bucephala albeola

bufflehead

Bucephala clangula

common goldeneye

Bucephala islandica

Barrow's goldeneye

Mergus merganser

common merganser

Branta canadensis

Canada goose

Charadriidae*Charadrius vociferus*

killdeer

Scolopacidae*Actitis macularia*

Spotted sandpiper

Cathartidae*Cathartes aura*

Turkey vulture

Accipitridae*Accipiter cooperii*

Cooper's hawk

Accipiter striatus

Sharp-shinned hawk

Accipiter gentilis

Northern goshawk

Aquila chrysaetos

Golden eagle

Buteo americanus

rough-legged hawk

Buteo jamaicensis

Red-tailed hawk

Buteo regalis

Ferruginous hawk

Buteo swainsonii

Swainson's hawk

Circus cyaneus

Northern harrier

Haliaetus leucocephalus
Pandion haliaetus

Bald eagle
osprey

Falconidae

Falco sparverius
Falco columbarius
Falco mexicanus
Falco peregrinus

American kestrel
merlin
Prairie falcon
Peregrin falcon

Phasianidae

Alecto chukar
Bonasa umbellus
Callipepla californica
Dendragapus obscurus
Dendragapus canadensis
Oreortyx picta
Perdix perdix
Meleagris gallopavo

Chukar
Ruffed grouse
California quail
Blue grouse
Spruce grouse
mountain quail
Gray partridge
Wild turkey

Columbidae

Columba fasciata
Columba livia
Zenaida macroura

band-tailed pigeon
Rock dove
Mourning dove

Strigidae

Aegolius acadicus
Asio flammeus
Asio otus
Bubo virginianus
Glaucidium gnoma
Otus flammeolus
Otus kennicottii
Strix varia
Strix nebulosa
Tyto alba

Northern saw-whet owl
Short-eared owl
Long-eared owl
Great horned owl
Northern pygmy owl
Flammulated owl
Western screech-owl
Barred owl
Great gray owl
Barn owl

Caprimulgidae

Chordeiles minor
Phalaenoptilus nuttalli

Common nighthawk
Common poorwill

Apodidae

Chaetura vauxi

Vaux's swift

Cypseloides niger
Aeronautes saxatilis

Black swift
white-collared swift

Trochilidae

Archilochus alexandri
Selasphorus platycercus
Selasphorus rufus
Stellula calliope

Black-chinned hummingbird
Broad-tailed hummingbird
Rufous hummingbird
Calliope hummingbird

Alcedinidae

Ceryle alcyon

Belted kingfisher

Picidae

Melanerpes lewis
Picoides arcticus
Picoides pubescens
Picoides tridactylus
Picoides villosus
Picoides albolarvatus
Colaptes auratus
Dryocopus pileatus
Sphyrapicus nuchalis
Sphyrapicus thyroideus
Sphyrapicus varius

Lewis woodpecker
Black-backed woodpecker
Downy woodpecker
Three-toed woodpecker
Hairy woodpecker
White-headed woodpecker
Northern flicker
Pileated woodpecker
Red-naped sapsucker
Williamson's sapsucker
Yellow-bellied sapsucker

Tyrannidae

Contopus borealis
Contopus sordidulus
Empidonax hammondi
Empidonax minimus
Empidonax oberholseri
Empidonax occidentalis
Empidonax trailii
Empidonax wrightii
Myiarchus cinerascens
Sayornis saya
Tyrannus tyrannus
Tyrannus verticalis

Olive-sided flycatcher
Western wood-pewee
Hammond's flycatcher
Least flycatcher
Dusky flycatcher
Cordilleran flycatcher
Willow flycatcher
Gray flycatcher
Ash-throated flycatcher
Say's phoebe
Eastern kingbird
Western kingbird

Alaudidae

Eremphila alpestris

Horned lark

Hirundinidae

Hirundo pyrrhonota
Hirundo rustica
Riparia riparia
Stelgidopteryx serripennis
Tachycineta bicolor
Tachycineta thalassina

Cliff swallow
Barn swallow
Bank swallow
Northern rough-winged swallow
Tree swallow
Violet-green swallow

Corvidae

Perisoreus canadensis
Cyanocitta stelleri
Corvus brachyrhynchos
Corvus corax
Gymnorhinus cyanocephalus
Nucifraga columbiana
Pica pica

Gray jay
Steller's jay
American crow
Common raven
Pinyon jay
Clark's nutcracker
Black-billed magpie

Paridae

Parus atricapillus
Parus gambeli

Black-capped chickadee
Mountain chickadee

Certhiidae

Certhia americana

Brown creeper

Sittidae

Sitta carolinensis
Sitta canadensis
Sitta pygmaeus

White-breasted nuthatch
Red-breasted nuthatch
Pygmy nuthatch

Troglodytidae

Catherpes mexicanus
Salpinctes obsoletus
Troglodytes aedon
Troglodytes troglodytes

Canyon wren
Rock wren
House wren
Winter wren

Muscicapidae

Catharus fuscenscens
Catharus guttatus
Catharus ustulatus
Ixoreus naevius
Myadestes townsendi
Regulus calendula

veery
Hermit thrush
Swainson's thrush
Varied thrush
Townsend's solitaire
Ruby-crowned kinglet

Regulus satrapa
Sialia currucoides
Sialia mexicana
Turdus migratorius

Laniidae

Lanius excubitor
Lanius ludovicianus

Motacillidae

Anthus spinoletta

Cinclidae

Cinclus mexicanus

Bombycillidae

Bombycilla cedrorum
Bombycilla garrulus

Sturnidae

Sturnus vulgaris

Vireonidae

Vireo solitarius
Vireo olivaceus
Vireo gilvus

Emberizidae

Vermivora celata
Vermivora ruidapilla
Amphispiza belli
Dendroica coronata
Dendroica townsendi
Dendroica petechia
Oporornis agilis
Seiurus noveboracensis
Geothlypis trichas
Icteria virens
Setophaga ruticilla
Piranga ludoviciana
Spizella passerina
Dolichonyx oryzivorus

Golden-crowned kinglet
Mountain bluebird
Western bluebird
American robin

northern shrike
loggerhead shrike

Water pipit

American dipper

Cedar waxwing
Bohemian waxwing

European starling

Solitary vireo
Red-eyed vireo
Warbling vireo

Orange-crowned warbler
Nashville warbler
Sage sparrow
Yellow-rumped warbler
Townsend's warbler
Yellow warbler
MacGillivray's warbler
Northern waterthrush
Common yellowthroat
Yellow-breasted chat
American redstart
Western tanager
Chipping sparrow
Bobolink

Sternella neglecta
Passerina amoena
Pipilo erythrophthalmus
Passerculus sandwichensis
Ammodramus savannarum
Pheucticus melanocephalus
Chondestes grammacus
Spizella breweri
Junco hyemalis
Melospiza melodia
Euphagus cyanocephalus
Molothrus ater
Icterus galbula

Fringillidae

Carpodacus cassinii
Carpodacus mexicanus
Carpodacus purpureus
Loxia curvirostra
Carduelis pinus
Carduelis tristis
Coccothraustes vespertinus
Pinicola enucleator
Leucosticte arctica

Passeridae

Passer domesticus

Soricidae

Sorex monticolus
Sorex obscurus
Sorex palustris
Sorex preblei
Sorex vagrans

Vespertilionidae

Myotis lucifugus
Myotis yumanensis
Myotis evotis
Myotis subulatus
Myotis thysanodes
Myotis cilolabrum

Western meadowlark
 Lazuli bunting
 Ruffous-sided towhee
 Savannah sparrow
 Grasshopper sparrow
 Black-headed grosbeak
 Lark sparrow
 Brewer's sparrow
 Dark-eyed junco
 Song sparrow
 Brewer's blackbird
 Brown-headed cowbird
 Northern oriole

Cassin's finch
 House finch
 Purple finch
 Red crossbill
 Pine siskin
 American goldfinch
 Evening grosbeak
 Pine grosbeak
 gray-crowned rosy finch

House sparrow

Montane shrew
 Dusky shrew
 northern water shrew
 Preble's shrew
 Vagrant shrew

Little brown myotis
 Yuma myotis
 Long-eared myotis
 Western small-footed bat
 Fringed myotis
 Small-footed bat

Myotis volans
Myotis californicus
Anthrozous pallidus
Lasionycteris noctivagrans
Lasiurus cinereus
Eptesicus fuscus
Euderma maculata
Pipistrellus hesperus
Plecotus townsendii

Long-legged myotis
California myotis
Pallid bat
Silver-haired bat
Hoary bat
Big brown bat
Spotted bat
Western pipistrelle
Townsend's big-eared bat

Procyonidae

Procyon lotor

raccoon

Leporidae

Lepus americanus
Lepus townsendii
Lepus californicus

Snowshoe hare
White-tailed jackrabbit
Black-tailed jackrabbit

Sciuridae

Eutamias minimus
Eutamias amoenus
Citellus beldingi
Citellus columbianus
Spermophilus lateralis
Glaucomys sabrinus
Marmota flaviventris
Spermophilus brunneus
Tamiasciurus hudsonicus

Least chipmunk
Yellow-pine chipmunk
Belding's ground squirrel
Columbian ground squirrel
Mantled ground squirrel
Northern flying squirrel
Yellow-bellied marmot
Northern Idaho ground squirrel
Red squirrel

Geomyidae

Thomomys talpoides

Northern pocket gopher

Castoridae

Castor canadensis

beaver

Heteromyidae

Perognathus parvus

Great Basin pocket mouse

Cricetidae

Clethrionomys gapperi
Microtus longicaudus
Microtus montanus

Southern red-backed vole
Longtail vole
Mountain vole

Microtus richardsoni
Peromyscus maniculatus
Phenacomys intermedius
Reithrodontomys megalotis
Neotoma cinerea
Lagurus curtatus
Ondatra zibethica

water vole
Deer mouse
Heather vole
Western harvest mouse
Bushy-tailed woodrat
Sagebrush vole
Muskrat

Muridae

Mus musculus

House mouse

Zapodidae

Zapus princeps

Western jumping mouse

Ochotonidae

Ochotona princeps

pika

Erethizontidae

Erethizon dorsatum

Porcupine

Canidae

Canis latrans

Coyote

Vulpes fulva

Red fox

Ursidae

Ursus americanus

Black bear

Mustelidae

Gulo gulo

California wolverine

Martes americana

Marten

Martes pennanti

Fisher

Mustela erminea

Short-tailed weasel

Mustela frenata

Long-tailed weasel

Mustela vison

Mink

Lutra canadensis

River otter

Taxidea taxus

Badger

Spilogale putorius

Spotted skunk

Mephitis mephitis

Striped skunk

Felidae

Felis rufus

Bobcat

Felis concolor

Mountain lion

Felix lynx

Lynx

Cervidae

Odocoileus hemionus

Mule deer

Odocoileus virginianus idahoensis

Idaho white-tailed deer

Cervus elaphus

Rocky Mountain elk

Alces alces

Moose

Bovidae

Oreamnos americanus

Mountain goat

Ovis canadensis canadensis

Rocky Mountain bighorn sheep

Butterflies (common names only)

Western white

Blue copper

Clodius parnassian

Purplish copper

Phoebus parnassian

Atlantis fritillary

Queen Alexandra's sulfur

Callippe fritillary

Common branded skipper

Monarch

Woodland skipper

Pearly crescent

Pale tiger swallowtail

Lorquin's admiral

Western tiger swallowtail

Milbert's tortoiseshell

Zephyr anglewing

Painted lady

California hairstreak

West coast lady

Northern blue

Red admiral

Square-spotted blue or Dotted blue

Great Basin wood nymph

Orange-bordered blue

Dark wood nymph

Aquatic

There are diverse aquatic habitats represented at Little Granite RNA in the lakes and streams that are found at the site. Little Granite Creek, which is wholly contained within the RNA, is a major watershed in Hells Canyon that is mostly composed of high gradient stream reaches with few large depositional areas. The high gradient reaches consist of boulders and plunge pools intermixed with riffles that have cobble sized stones. Depositional areas consist of finer grained materials that have fallen from the bedload of the stream. No inventory work, other than fish surveys, has been done to identify organisms in the stream or its tributaries and the stream has not been mapped using traditional stream survey methods.

In the subalpine lakes basins that form the headwaters of Little Granite Creek aquatic habitats include deepwater lakes, lake shallows, permanent and seasonal ponds and wetlands. Substrates

are varied in these habitats but most are dominated by fine sediments or mucks with occasional boulders. Within the substrate there occur invertebrates and emergent and submerged plants while in the water column itself there are native and introduced trout. Shorelines of the lakes and permanent ponds often contain a significant percentage of boulders and exposed bedrock and provide habitat for amphibians and other organisms. Due to the extreme winter conditions at the higher elevations at the RNA, the lakes and ponds may freeze to considerable depths. The lakes are filled by snowmelt with depths varying depending on yearly precipitation totals.

The RNA boundaries begin above the Hells Canyon segment of the Snake Wild & Scenic River boundary but at times of high floods it is likely that flood waters would encroach upon the RNA. The Snake River is designated as a Wild river under the federal Wild & Scenic Rivers Act. There is no potential conflict in management between the designated Wild & Scenic river and the RNA.

Geology

The geology of Little Granite RNA has not been studied in detail but the area is of significant interest to geologists due to the presence of the Seven Devils Mountains, a large uplift that has mixed geologic origins. The Seven Devils Mountains are composed of metamorphosed rock dating back to the Permian and Triassic eras (275-225 million years ago) that has been uplifted and folded. This mountain range, as well as the Wallowa Mountains across Hells Canyon and to the west, had its origins as an oceanic chain of volcanic islands, reefs and seafloor. As tectonic plates pushed the island chains into the western edge of the continent or what is now Idaho, uplifting, folding and faulting created the high mountains of the Seven Devils.

The underlying bedrock at the RNA is volcanic in origin but the andesite and basalt has been considerably altered due to age and pressure to a metamorphosed greenstone in some areas. The Mesozoic Epoch (225 -65 million years ago) saw active volcanism in the region with granites and associated rocks, such as granodiorite, being formed in the Snake River Canyon during the Triassic Period. The granitic batholith of the High Wallawas dates to 100 million years ago and is associated with limestone from the Martin Bridge Formation and with slates, shales and sandstones of the Hurwal Formation. During the Cenozoic Era (65 million years ago) Columbia River Basalt flows occurred, covering the region in successive, thick layers of basalt. Faulting is thought to have begun approximately 13 million years ago and continues to today. The geologic formations which underlay the RNA are portrayed in Map 6, which was drafted from the Grangeville, Idaho Geologic Quadrangle map compiled by the Idaho Bureau of Mines (1979).

The geologic map shows four underlying formations in the RNA. Immediately along Hells Canyon lies the Wild Sheep Creek Formation (labelled as Trws on Map 6) which is composed of metamorphosed basalt and andesite formed in the Permian and Triassic Eras. Jurassic Era formations of quartzdiorite, granodiorite and quartz monzonite (labelled as Jqd on Map 6) are

found upslope from Hells Canyon and the Wild Sheep Creek Formation, underlying the canyon grasslands and extending into ponderosa pine and grand fir forests up a north-facing slope to 6000 feet near Potato Hill. Downslope from the lakes basin within the Little Granite drainage is a large deposit of glacial moraine material that is labelled as Qd on Map 6. These quartz and granite based moraine deposits were carved from the cirques of the Seven Devils Mountains during the Pleistocene Era. At the top of the watershed is a formation which is quite similar to the Wild Sheep Formation in that it is composed of metamorphosed andesite and dates from the Permian-Triassic Eras. The formation is labelled Ptrv which stands for Permian Triassic Volcanics.

Hells Canyon is a major feature in the geology of the RNA and is thought to have begun being eroded 10 million years ago when the Snake River cut through the Wallowa-Seven Devils uplift.

The river has cut through great depths of basalt formations to result in the deepest gorge in North America. At the highest elevations of the RNA another incredible force sculpted the site. During the Pleistocene (1 million years ago) a number of glaciation events occurred which carved mountain peaks, scoured lake basins, created cirques and hanging valleys and resulted in the deposition of substantial moraines and glacial outwash features.

The last significant geological event to affect the RNA was the deposition of a layer of pumice and ash 7000 years ago from the explosion of Mt. Mazama in the southern Oregon Cascades Mountains. The resulting deposits of ejecta ranged widely in depth depending upon proximity to the site of origin and colluvial action. The rapid decomposition of the pumice and ash resulted in unique soils being rapidly formed in the Blue Mountains which then fostered much of the vegetation that is present there today.

The current landscape of the RNA is dominated by the incredible 7000 foot (2134 m) elevational gradient of the site. There are a few vantage points along the Little Granite Creek trail below the lakes basin where Hells Canyon is visible far below and the mountain peaks of the Seven Devils can be seen far above. Between these extremes steep slopes dominate the main drainage as well as side drainages with occasional benches occurring randomly along the gradient.

The Little Granite Creek drainage is generally two miles wide (3 km) for most of its length and has side slopes that average 2400 feet (732 m) high from creek bottom to ridgetop. The ridges along the edges of the drainage are not dominated by rocky promintories, for the most part, but instead consist of narrow to broad tops that steadily gain elevation to the east. The steep side slopes are dotted with rock outcrops and talus fields, particularly at the lower reaches of the drainage that are dominated by grasslands. At the mid elevations slopes become more gradual, although they remain steep ranging upwards to 50%.

As noted earlier glaciation played a prominent role in the sculpting of the upper reaches of the Little Granite drainage resulting in several large cirques being formed that contain a number lakes and ponds. The lake basins are quite diverse from a geological perspective with much

surface bedrock remaining exposed as well as talus slopes reaching from mountain tops to lakeshores in someplaces. Another unique feature here is the hanging valley that contains Baldy Lake, the largest lake in the RNA. The high peaks which surround the lake basins rise nearly 2000 feet (610 m) above the lakes. Most of the peaks are topped with vertical pinnacles of rock while others are better characterized as jumbled piles of boulders and talus. Weathering of the mountain peaks continues to result in downslope movement of rocks and talus in the high mountain environment.

Soils

There are 20 soil mapping units delineated within the RNA (USDA 1987). The mapping units are portrayed in Map 7. The mapping units are organized below into 8 groups that have similar characteristics including greater soil group, underlying bedrock, and general landform.

Group A:

Soil Mapping Units-- 61E12, 61E14, 61E24, 61E38

Underlying Geology-- Wild Sheep Creek Formation (Trws) and Jurassic Quartzdiorite (Jqs)

Soil Types-- Ultic and Lithic Ultic Haploxerolls, Typic Dystrochrepts

Landforms-- rock outcrop complex, very steep dissected stream breaklands

Soil Description-- volcanic ash loess mixed with underlying material, sandy substrata, bedrock is 20-40 inches deep.

Vegetation-- bunchgrass grasslands at lower elevations and ponderosa pine forests at upper elevations. 1800-5400 feet range.

Group B:

Soil Mapping Units-- 50CUU, 31C2E

Underlying Geology-- Wild Sheep Creek Formation (Trws)

Soil Types-- Inceptisols, Mollisols, Alfisols

Landforms-- moderately steep landslides, benches

Soil Description-- soil material varied, surface layers generally 9-12 inches thick silt loam, soil depth to 60 inches.

Vegetation-- grasslands and forests, 1400-6800 feet elevation.

Group C:

Soil Mapping Units-- 32AH5, 46C6P, 32CH5

Underlying Geology-- Jurassic quartzdiorite (Jqd)

Soil Types-- Andic Cryochrepts, Dystric Cryochrepts-Typic Cryandepts

Landforms-- gently sloping convex slopes, moderately sloped moraines

Soil Description-- loamy skeletal surface soils, 6-14 inches thick with thin subsurface layers. substrata includes gravelly sands.

Vegetation-- grand fir, subalpine fir forests with mixed shrub understories. mapping unit #46C6P occupies all of the cirque lakes basins of the Seven Devils.

Group D:

Soil Mapping Units-- 61E1E, 61E2E, 61E1J, 61E2J

Underlying Geology-- Wild Sheep Creek (Trws) and Permian Triassic Volcanics (Ptrv)
Formations consisting of metamorphosed basalt and andesite

Soil Types-- Ultic Argixerolls, Lithic Ultic Argixerolls

Landforms-- rock outcrops, steep to very steep dissected stream breaklands

Soil Description-- loamy skeletal surface soils 7-20 inches thick with clay accumulations. rock accumulations cover 20% of surface. rock outcrops cover up to 40% of surface.

Vegetation-- bunchgrass grasslands with ponderosa pine in forested draws.

Group E:

Soil Mapping Units-- 61EHP, 48DHP, 31DHP

Underlying Geology-- Permian Triassic Volcanics Formation (Ptrv) and Glacial moraine (Qg)

Soil Types-- Dystric Cryochrepts

Landforms-- steep stream breaklands, steep glacial trough walls

Soil Description-- surface layers formed in volcanic ash influenced loess, subsurface layers with 60% rock fragments. bedrock is within 40-60 inches.

Vegetation-- grand fir and subalpine fir with huckleberry, beargrass, and twinflower prominent in understory. elevational range is 5100-8000 feet.

Group F:

Soil Mapping Unit-- 31D77-P

Underlying Geology-- Permian Triassic Volcanics Formation (Ptrv)

Soil Type-- Entic Cryumbrepts

Landforms-- rock outcrops, steep mountain south-facing slopes

Soil Description-- loamy skeletal soils with volcanic ash formed in loess with almost no subsoils. bedrock is within 40 inches of surface.

Vegetation-- whitebark pine-subalpine fir forests on ridges in open and closed canopy stands.

Group G:

Soil Mapping Units-- 33CA7-P, 33C77-P

Underlying Geology--Permian Triassic Volcanics Formation (Ptrv)

Soil Type-- Typic Cryandepts

Landforms-- rock outcrops, moderately steep convex ridges from 6200-8200 feet

Soil Description-- surface layers are dark colored, skeletal and derived from volcanic ash loess, 14-20 inches deep. subsurface layers are loamy and shallow. rock outcrop and rubble occupy 20% of the surface.

Vegetation-- open stands of subalpine fir, whitebark pine and lodgepole pine with sparse understories.

Group H:

Soil Mapping Unit-- 41E67

Underlying Geology-- Permian Triassic Volcanics Formation (Ptrv)

Soil Type-- Cryochrepts

Landforms-- rock outcrops, glacial cirques and surrounding ridges. 5600-8300 feet.

Soil Description-- generally shallow soils, bedrock is 10-60 inches from surface. substrata are loamy. rock outcrops cover 40 % of the map unit.

Vegetation-- mostly parkland forests of subalpine fir and whitebark pine. ridges have dwarf herbaceous vegetation and scattered whitebark pines. mapping unit includes most of the upper cirque ridges in RNA.

Lands

Little Granite RNA is bordered on all sides by lands which are managed by the Wallowa Whitman National Forest. Lands to the north, south and east of the RNA are classified as Management Areas 4, Wilderness, in the Wallowa Whitman Forest Plan (1990a). These adjacent lands are managed for the protection of wilderness values inherent in the Hells Canyon Wilderness Area. Immediately to the west of the RNA are lands classified as Management Area 8, Wild & Scenic River within Hells Canyon National Recreation Area, which emphasizes management for identified riverine resources along the designated wild river corridor. The corridor in this case refers to the Hells Canyon portion of the Snake River which is federally designated as a Wild River under the Wild & Scenic River Act. The management of adjacent lands for wilderness protection and Wild River protection are compatible and complementary to management of the RNA.

Cultural Resources

There are no known cultural resources located within the Little Granite RNA but it is likely that the area has a rich cultural history. A complete cultural resources inventory has not been conducted in the RNA.

IMPACTS AND POSSIBLE CONFLICTS

Grazing Resources

Little Granite RNA contains no active grazing allotments and receives only incidental grazing from pack and saddle stock during the summer and fall. The area was grazed in the past as is denoted by some of the site names within the Seven Devils area: Hibbs Ranch, Hibbs Cow Camp, Horse Heaven. The Hibbs Ranch, located near the confluence of Granite and Little Granite Creeks, used the high elevations for summer pasture for livestock. It is likely that there was sheep grazing occurring in the past at the site as well.

Mineral Resources

There are no active hardrock mining claims in Little Granite RNA. To the north of the RNA, in the vicinity of Dry Diggins lookout, there was substantial gold mining activity in the past; it can be assumed that exploratory mining took place to a limited extent within the RNA as well. The RNA will be proposed for withdrawal of mineral entry upon formal establishment.

Timber Values

The RNA is removed from potential timber harvest due to the wilderness designation which overlays the area.

A substantial portion of the RNA is forested with mature to old growth timber. While much of the timber occurs on steep slopes that would be difficult to harvest, the economic value of some of the stands would warrant the added expense of road-building and harvest systems if the area were in a general forest classification instead of wilderness. Ponderosa pine and Douglas-fir are commanding top stumpage prices such that the RNA could be considered to have high timber value. The higher elevation subalpine fir and the mid elevation grand fir stands are of considerably lower timber value and would not likely be economically feasible to log if the site were not restricted by wilderness, RNA, recreation and wildlife concerns.

Surrounding lands are also in designated wilderness and thus will not be subject to timber harvest. Therefore timber values and the effects of harvest have little impact or potential for conflict in the the RNA.

There has been some fire suppression in the area notwithstanding the remoteness and difficult access of the Seven Devils region. There have been some major fires in the recent past that have

played a role in the decrease of old growth as well as resulting in the decrease of understory shrubs and young conifers throughout the RNA.

Watershed Values

There are significant watershed values present at Little Granite RNA as the RNA encompasses essentially all of the Little Granite Creek drainage and approximately a mile of Granite Creek as well. Combined the creeks form one of the larger tributaries entering the Snake River in Hells Canyon, particularly from the Idaho side of the canyon. The Snake River is a designated Wild river under the Wild & Scenic Rivers Act and contains a number of populations federally threatened species protected under the Endangered Species Act. Listed fish species documented from the Snake River include: spring, summer and fall chinook salmon and sockeye salmon. Other fish of concern in the river include steelhead trout, bull trout, Pacific lamprey, and white sturgeon. Many of these fish need cool flowing water for migration and spawning. While the Snake River serves mainly as a migration corridor there is some spawning of steelhead and possibly chinook salmon taking place on Granite Creek. The riparian zones of these streams are quite narrow due to the narrow canyons of the stream courses but riparian vegetation is well developed within the stream courses, usually under a canopy of conifers. The riparian zones are important and support a diverse wildlife assemblage as well as acting to maintain cool water temperatures in the streams. At the upper end of the RNA the lakes provide abundant habitat for fish and amphibians. Historically the lakes were stocked for fishing with brook and rainbow trout but there still are native cutthroat present in some lakes. Stocking has been discontinued in the wilderness in the last several years. In addition to the lakes in the high basin there are a number of springs and seeps present as well that often have small wetlands associated with them.

Recreation Values

Little Granite RNA receives substantial recreation use in the upper lakes basin from backpackers and horsepackers during the summer months. The recreation use is concentrated around the lakes where compacted campsites are common. Designated trails within the RNA include the Seven Devils Trail and the Little Granite Trail. Most of the recreation use originates at Windy Saddle near Seven Devils Campground. The lower end of the RNA receives occasional use by river runners during the spring season. There is also some use of the upper elevations in the fall from hunters. Recreation use has impacted the RNA around the lakes basin, particularly at the lakeside campsites, but increased use is not expected to result in more deterioration of the area due to the use of more sensitive camping practices. The loss of downed woody debris to campfires and the potential of water pollution from poor sanitation practices remain as concerns to the RNA.

Wildlife and Plant Values

There is one federally listed threatened, endangered or sensitive species located within the RNA. Chinook salmon (listed Threatened) have been reported to use Granite Creek for spawning. Candidate species known from the RNA include wolverine, a secretive predator that has been confirmed from the site. Of particular interest at the RNA is the incredible diversity of plant species that are a result of the elevational and geologic diversity of the area. The near alpine conditions found on the Seven Devils peaks and in the upper lakes basin affords many species habitat that otherwise would not be found in the area. To date the diversity of known plants and animals has been restricted to higher plants and larger animals as appropriate inventories have not been conducted for bryophytes or most invertebrates.

Special Management Area Values

There are several congressionally designated, special management areas near or overlaying the RNA. The largest designation overlaying the area is Hells Canyon National Recreation Area which was established in 1975 and covers 652,488 acres (263,931 ha). Within the National Recreation Area is Hells Canyon Wilderness Area which covers approximately 211,000 acres (85,350 ha); the RNA is wholly contained within the congressionally designated wilderness area. Finally, the Snake River and its confluence with Granite Creek is a designated Wild River under the Wild & Scenic River Act; the RNA lies immediately adjacent to the designated River. As a congressionally designated area (FSM 4063.05), the management direction for the RNA must meet statutory mandates (FSM 1920).

Management for the Hells Canyon National Recreation Area and the Hells Canyon Wilderness is addressed in the Land and Resource Management Plan for the Wallowa Whitman National Forest (USDA 1990b). Standards and guidelines for the overlying National Recreation Area is detailed in Management Areas 8, 9, 10, and 11; standards and guidelines for wilderness are identified in Management Area 4 (USDA 1990b). An Environmental Assessment and Management Plan for the Snake River in Hells Canyon also has been previously prepared and identified scenery, geology, wildlife habitat, and fisheries as the outstandingly remarkable values for the river. Resource element standards are prescribed in the plan to protect these outstandingly remarkable values. Establishment and management of the RNA would not degrade the outstandingly remarkable values nor would it conflict with the standards detailed in either the National Recreation Area Plan or the Wild River plan.

Adjacent Private Lands

There are no private lands adjacent to the RNA.

MANAGEMENT PRESCRIPTION

Management and protection of Little Granite RNA will be directed towards maintaining natural ecological processes. Activities of humans that disturb or modify ecological processes will be discouraged.

Little Granite RNA is included, along with other RNAs, in the Wallowa Whitman National Forest Plan in Management Area 12, Research Natural Areas (USDA Forest Service 1990b). Standards and guidelines for management of the Management Area are described in the Forest Plan.

Vegetation Management

Standards and guidelines for RNAs, Management Area 12, address vegetation management under several different headings (USDA Forest Service 1990b). The overall management direction for all RNAs is to preserve the naturally occurring physical and biological processes at the site. No scheduled timber harvest will occur in the natural area and firewood cutting will be prohibited. Because Little Granite RNA is wholly within the Hells Canyon Wilderness Area, management for the RNA must also meet Wilderness Area management standards.

Wildfire will be suppressed in accordance with standards for the Hells Canyon Wilderness Area. Fire suppression will use methods and equipment that will minimize site disturbance to the special features of the area. Prescribed natural ignition fires will be allowed to burn in the RNA when they comply with the management prescriptions set for such fires. Prescribed management ignited fires will be used only in conjunction with approved research projects or when needed to meet RNA management goals for vegetation, natural communities and wildlife habitat. The use of prescribed fire in the RNA must also meet Wilderness Area standards as well.

The decision to treat insect and disease outbreaks will be made on a case-by-case basis. Where pest management activities are prescribed, they shall be as specific as possible against target organisms and induce minimal impact to other components of the ecosystem. Monitoring of the RNA is recommended in order to track any outbreaks that may occur.

Introduced species and weedy native species are a concern at the RNA. At this time cheatgrass (*Bromus tectorum*) is a known significant weed infestation in the RNA, occurring on the lower canyon slopes in grasslands. Monitoring in the form of periodic surveys of the RNA should be conducted to detect weedy invasions and to track the spread of cheatgrass into other natural communities in the natural area. Yellow star thistle (*Centaurea solstitialis*), a noxious weed that is being aggressively treated at other sites in Hells Canyon, has not been found within the RNA to date. If yellow star is detected within the RNA it will be attacked by all legal means.

Transportation Plan

No major roads occur in the RNA nor are any planned for this area. The RNA is located within the Hells Canyon Wilderness Area where roads are not compatible with wilderness goals. There are a number of developed foot and packstock trails in the RNA which are periodically maintained for safe travel. These trails do not appreciably impact the integrity of the RNA.

Fences and Protective Barriers

Fencing for livestock does not exist along the boundaries of the RNA. Livestock use does not occur within the RNA.

There are no signs at the site denoting the presence of the RNA. There is little need for protective barriers at the site as there are no significant roads or trails which enter the site nor is there easy vehicular access to the site due to topography.

ADMINISTRATION RECORDS AND PROTECTION

Administration and protection of Little Granite RNA will be the responsibility of the Wallowa Whitman National Forest. The Area Ranger, Hells Canyon NRA, has direct responsibility for management of the RNA.

The Director of the Pacific Northwest Research Station will be responsible for any studies or research conducted in the area, and requests to conduct research in the RNA should be referred to that office. The RNA Scientist in the Research Station is designated as the lead contact person for all such requests. The Director will evaluate research proposals and coordinate all studies and research in the area with the District Ranger. All plant and animal specimens collected in the course of research conducted in the area will be properly preserved and maintained within university or federal agency herbaria and museums, approved by the Pacific Northwest Research Station.

Records for the Little Granite RNA will be maintained in the following offices:

Forest Supervisor, Wallowa Whitman National Forest, Baker City, Oregon
Area Ranger, Hells Canyon NRA, Enterprise, Oregon
Director, Pacific Northwest Research Station, Portland, Oregon
Forest Sciences Laboratory, 3200 Jefferson Way, Corvallis, Oregon

Archiving

The Portland office of the Pacific Northwest Research Station will be responsible for maintaining the Little Granite RNA research data file and list of herbarium and species samples collected. The Forest Sciences Lab in Corvallis, Oregon is establishing a data base for maintaining research data and lists of species for all RNAs in the region. Computerized files for the RNA will be maintained at the Forest Sciences Lab.

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