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Establishment Record for the Wellner Cliffs Research Natural Area

Priest River Experimental Forest Idaho Panhandle National Forests Bonner County, Idaho

Dennis E. Ferguson and Arthur C. Zack

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Abstract

This publication is the establishment report for Wellner Cliffs Research Natural Area (RNA), located on the Priest River Experimental Forest, Idaho Panhandle National Forests. The RNA features vegetation on dry cliffs that are embedded in mid-elevation moist western hemlock/western redcedar/grand fir forests. Immediately below the cliffs is riparian habitat that supports many wetland species, including a disjunct west coast moss, *Ulota megalospora*, whose first known occurrence in Idaho is in this RNA. This establishment report documents the boundaries of the RNA, the objectives for the RNA, its features, description of values, and management prescription.

Keywords: research natural areas, natural areas, biodiversity, ecological processes, baseline monitoring, gene banks, reference streams

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Introduction

The Wellner Cliffs Research Natural Area is located along lower Canyon Creek on the Priest River Experimental Forest, Idaho Panhandle National Forests, in northern Idaho. This Research Natural Area (RNA) features dry cliffs of gneiss, schist, and mica-influenced granitic rock, embedded in a matrix of mid-elevation moist western hemlock/western redcedar/grand fir (*Tsuga heterophylla/Thuja plicata/Abies grandis)* forests. Immediately below the cliffs is riparian habitat that includes wetland species such as devil's club (*Oplopanax horridum*) and ladyfern (*Athyrium filix-femina*), several other riparian ferns such as grape fern (*Botrychium virginianum*) and woodferns (*Dryopteris* species), and numerous riparian forbs such as twisted-stalk (*Streptopus amplexifolius*), false bugbane (*Trautvettaria caroliniensis*), and crisp starwort (*Stellaria crispa*). Within the cliffs, habitats quickly change from mixed conifers on deep soils, to dry open ponderosa pine (*Pinus ponderosa*) forests, to shrub and grasslands on shallow soils, to exposed rocky cliffs with high lichen diversity.

The major use of the land and water in the vicinity of the RNA is for a variety of studies on the Priest River Experimental Forest (PREF). PREF, established in 1911, is 13 miles (21 km) north of Priest River, Idaho (fig. 1). The size of PREF is 6,400 acres (2,590 ha), ranging in elevation from 2,200 feet (670 m) along Priest River on the west to 5,900 feet (1,800 m) near Experimental Point. The objectives for PREF are research, demonstration, and education. All of these missions also require maintenance of some areas as untreated baselines of natural conditions and processes. The objectives for this RNA fit well within the objectives for PREF.

Land Management Planning

Charles A. (Chuck) Wellner (a former Forest Service researcher and former chair of the Northern Region RNA Committee) first identified this area as a potential RNA and drew preliminary boundaries (Wellner 1976). Since that time, the Rocky Mountain Research Station has reserved this as

a natural area, and active management has been excluded. In 1995, Fred Rabe (Professor Emeritus, University of Idaho) surveyed lower Canyon Creek and, based on aquatic and riparian criteria, he also nominated the area as a RNA. Russ Graham, scientist-in-charge of PREF, has encouraged the establishment of this RNA.

The 1987 Idaho Panhandle National Forests (IPNF) Forest Plan identifies both Experimental Forests and Research Natural Areas as a single Management Area (MA14) devoted to scientific research. The NEPA decision to include these lands within a Management Area for both Experimental Forests and Research Natural Area was made as part of the 1987 Forest Plan. Although this area was not specifically identified as a proposed RNA in the 1987 IPNF Forest Plan, it is included within the Forest Plan Management Area that was utilized for both RNA's and Experimental Forests, and was already being managed as an Experimental Forest Natural Area. A NEPA 18.1 Consistency Evaluation (FSH 1909.15) will be included in Forest Planning records to document consistency of RNA establishment with that Forest Plan decision. All lands within this Management Area are classified as unsuitable for timber production, and these lands are not available for disposal. All lands within the Experimental Forest are closed to mineral entry. Establishing these lands as a RNA at this time would *not* involve any change in Forest Plan Management Area, Timber Suitability, availability for mineral entry, or land availability for disposal. It involves no change in management of the Experimental Forest, because the area was already being reserved as a natural area. It involves no change in National Forest outputs of any kind, and is fully consistent with the research purpose of this Forest Plan Management Area.

Objectives

Wellner Cliffs RNA will contribute to a national network of ecological areas dedicated to research, monitoring, education, and maintenance of biological diversity. As explained below, this RNA contributes to filling identified missing gaps in the representativeness of the Idaho and Northern Region RNA network, as well as capturing some rare or unique ecological features. A major RNA objective is to maintain and preserve the various terrestrial and aquatic ecosystems in as near an undisturbed (by humans) condition as possible. The RNA will serve as a reference area for the study of ecological processes, not only as part of the overall RNA system, but also as a reference area for studies on adjacent parts of the Experimental Forest.

Justification

This RNA satisfies requirements for targets identified by the USDA Forest Service, Northern Region. The publication, *Representative Assessment of Research Natural Areas on National Forest system Lands in Idaho* (Rust 2000), uses a grid of potential natural vegetation (habitat types) stratified by Ecological Section to stratify and assess RNA needs. This approach is

consistent with the Forest Service ECOMAP ecological land classification system (McNab and Avers 1994, Nesser and others 1997), and Forest Service RNA objectives (FSM 4063). Priest River is within the Okanogan Highlands Subsection M333A. This assessment publication identifies the ponderosa pine/ninebark (*Pinus ponderosa/Physocarpus malvaceus)*, ponderosa pine/snowberry (*Pinus ponderosa/Symphoricarpos albus)*, ponderosa pine/Idaho fescue (*Pinus ponderosa/Festuca idahoensis),* Douglas-fir/snowberry (*Pseudotsuga menziesii/Symphoricarpos albus),* Douglas-fir/pinegrass (*Pseudotsuga menziesii/Calamagrostis rubescens)* and grand fir/ninebark (*Abies grandis/Physocarpus malvaceus)* habitat types as totally missing from the RNA network in the Okanogan Highlands Subsection M333A, and as Priority 1 (in a five priority system) for filling these gaps. The Douglas-fir/ninebark (*Pseudotsuga menziesii/Physocarpus malvaceus)* habitat type is lacking to seriously under-represented, and is Priority 2 for filling these gaps. The shallow soil areas on and adjacent to the cliffs form a very fine-grained mosaic that is dominated by a mix of these very habitat types, interspersed with small patches of dry grassy openings, and bare rock.

In addition to preserving pristine representatives of important vegetation and aquatic communities, RNA objectives also include preserving "…natural situations that have special or unique characteristics of scientific interest …" (FSM 4063.02). The features identified below contribute to this objective.

The main feature of the RNA is approximately 1.5 miles (2.4 km) of cliffs adjacent to and north of Canyon Creek. The cliffs, adjacent dry forest slopes, and adjacent talus slopes—with moist forest slopes immediately above the cliffs and wet riparian area immediately below—together form a diverse complex. Several features of these cliffs are unique and this complex is poorly represented elsewhere in the northern Idaho RNA network:

- Uncommonly steep environmental gradients under geological control result in extremely close proximity of very wet to very dry habitats and vegetation communities. The rate of change within a small area is remarkably swift. Habitat types change from wet western redcedar/devil's club to dry Douglas-fir/ninebark, to grass slopes and, finally, to bare rock within a few hundred feet.
- Bryophyte and lichen diversity is unusually high on the cliffs and adjacent talus slopes. Both the high level and type of diversity is not well represented within the RNA network.
- A moss found in 2001 within the RNA is the first documented occurrence in Idaho. *Ulota megalospora* is a west coast disjunct species that is an epiphyte on deciduous trees and immature conifers.
- The ruggedness and complexity of the cliffs makes them difficult to fully survey. The complexity of these habitats, combined with the steep environmental gradients create the possibility that there are addition rare vascular plants, mosses, and lichens inhabiting the rock surfaces, crevices, and overhangs. The jumbled large rocks that have fallen at the base of the cliffs may serve as dens for cougars and black bears.

- The dry slopes immediately adjacent to and interspersed with the cliffs contain scattered old-growth ponderosa pine, Douglas-fir, and western larch displaying multiple fire scars. Forest understories in these areas are dominated by low shrubs and native forbs and grasses, without excessive weed invasion. This type of high quality representation of historic dry forests has become rare, and is very poorly represented in the northern Idaho RNA network.

A secondary feature of the RNA is the stretch of Canyon Creek and its riparian area. The stretch of Canyon Creek that is included in the RNA is a good choice for a reference site that can be compared with impacted streams of similar size and flow (Rabe 1995). Bottom substrate is rated high due to excellent instream conditions consisting of ample rubble, cobble and gravel, undercut banks, and submerged logs (Rabe 1995).

Principal Distinguishing Features

The RNA primarily protects ecosystems in and adjacent to the cliffs, which run in an east-west direction just above Canyon Creek on the north side. The cliffs face south, with vertical drops as much as 200 feet (61 m). Below and immediately adjacent to the cliffs are riparian ecosystems. Above the cliffs are ecosystems representative of the drier end of western hemlock and grand fir habitat types; however, some of the springs and intermittent streams above the cliffs still support wet-site species such as devil's club and wild ginger (*Asarum caudatum*).

Location

Figures 2 and 3 show the location of Wellner Cliffs RNA. The RNA is located within PREF, Idaho Panhandle National Forests, in northern Idaho. The center of the RNA is approximately at latitude 48° 22' north and longitude 116° 45' west. It is in T58N, R3W, Sections 18, 19, and 20; and T58N, R4W, Section 24.

Area

The RNA encompasses 307 acres (124 ha).

Elevations

Elevations range from 2,460 feet (750 m) where Canyon Creek exits the RNA to 3,800 feet (1,160 m) at the northeast boundary (fig. 4).

Access

Wellner Cliffs RNA is accessible by sedan during the summer months via gravel roads. After driving to PREF, follow the 597-G road (the "G" road) 2.6 miles (4.2 km) to the point where G road crosses Canyon Creek. This is where Canyon Creek exits the RNA and a trail up Canyon Creek begins. The trail up Canyon Creek is an abandoned section of the 597-F road

(the “F” road). The G road is the northern boundary for most of the RNA. Portions of Trail 8 and Trail 12 are the southern boundary of the RNA. The trail up the abandoned section of the F road, along with portions of Trail 8 and Trail 12 that form the southern boundary, was cleared of windfall in the summer of 2001.

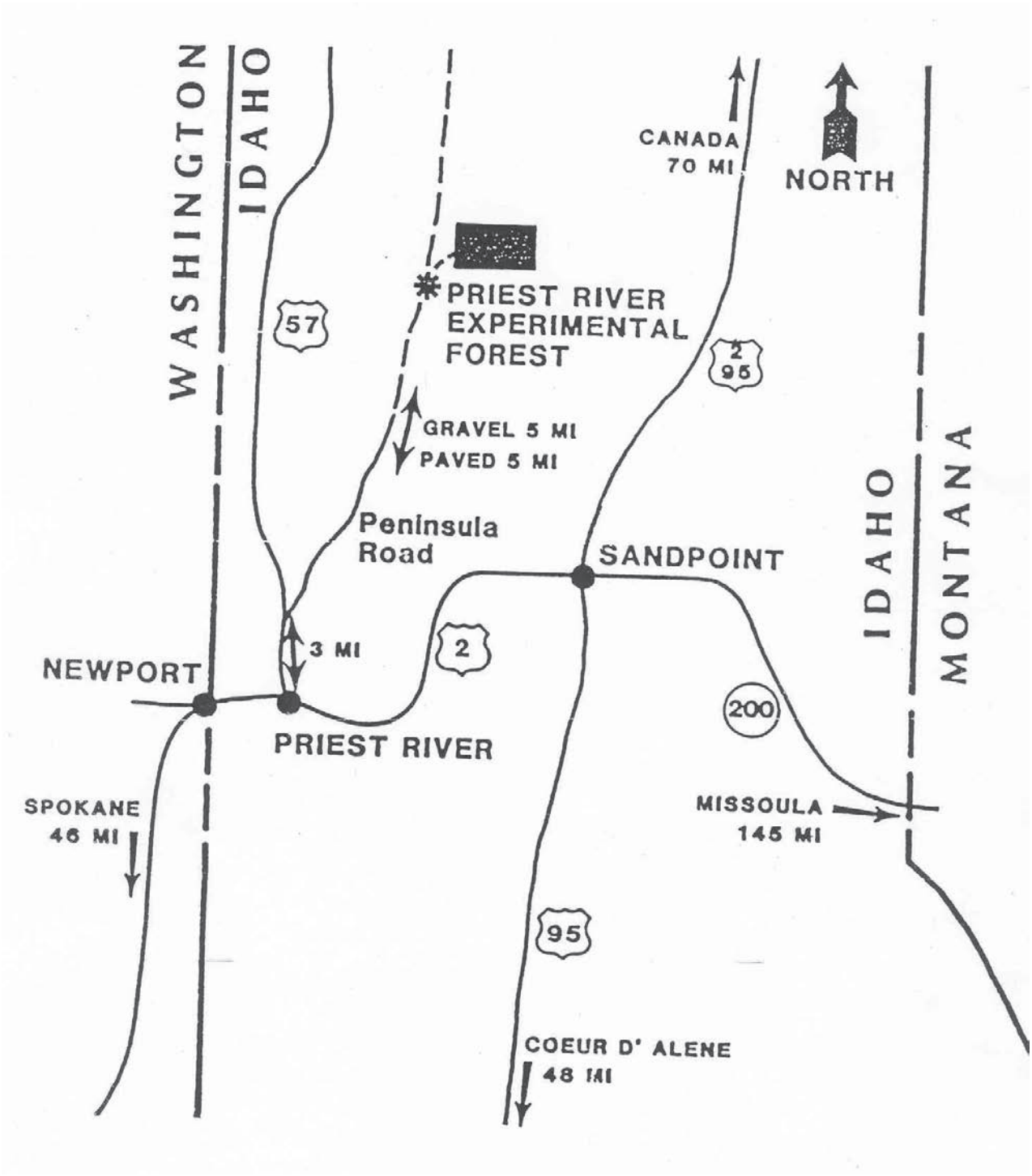

Figure 1—Location of PREF relative to the town of Priest River, Idaho.

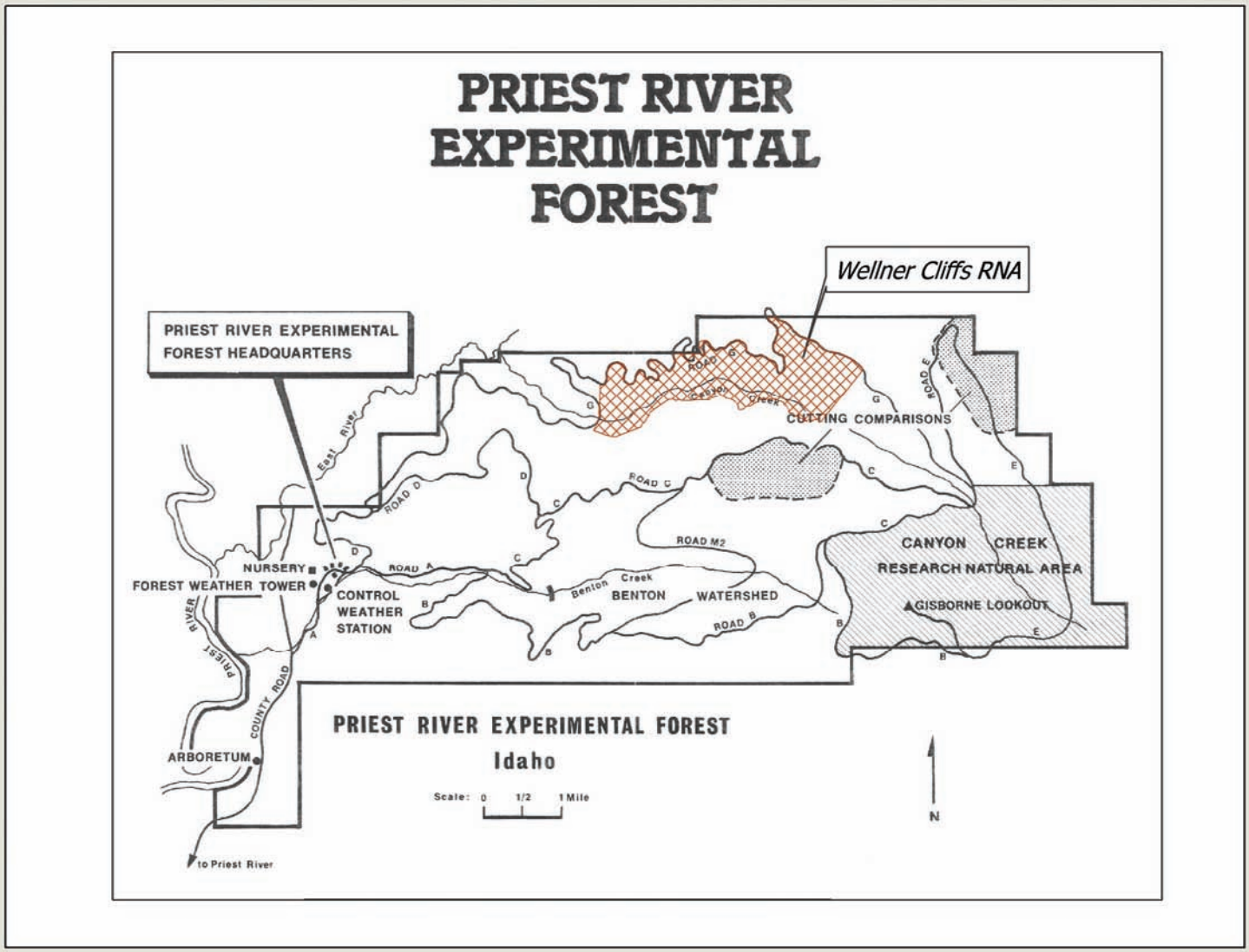

Figure 2—Map of PREF.

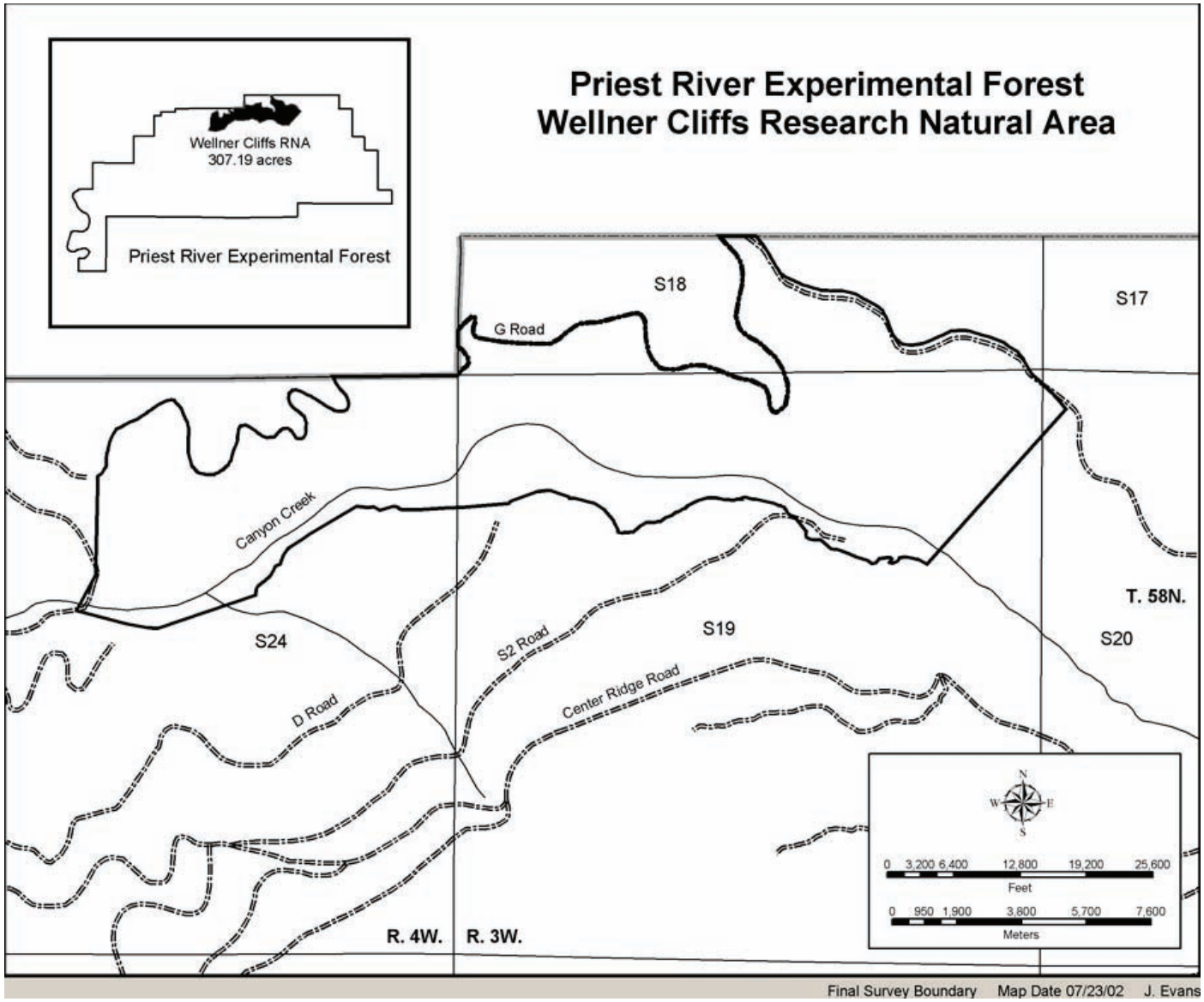

Figure 3—Location of Wellner Cliffs RNA within PREF.

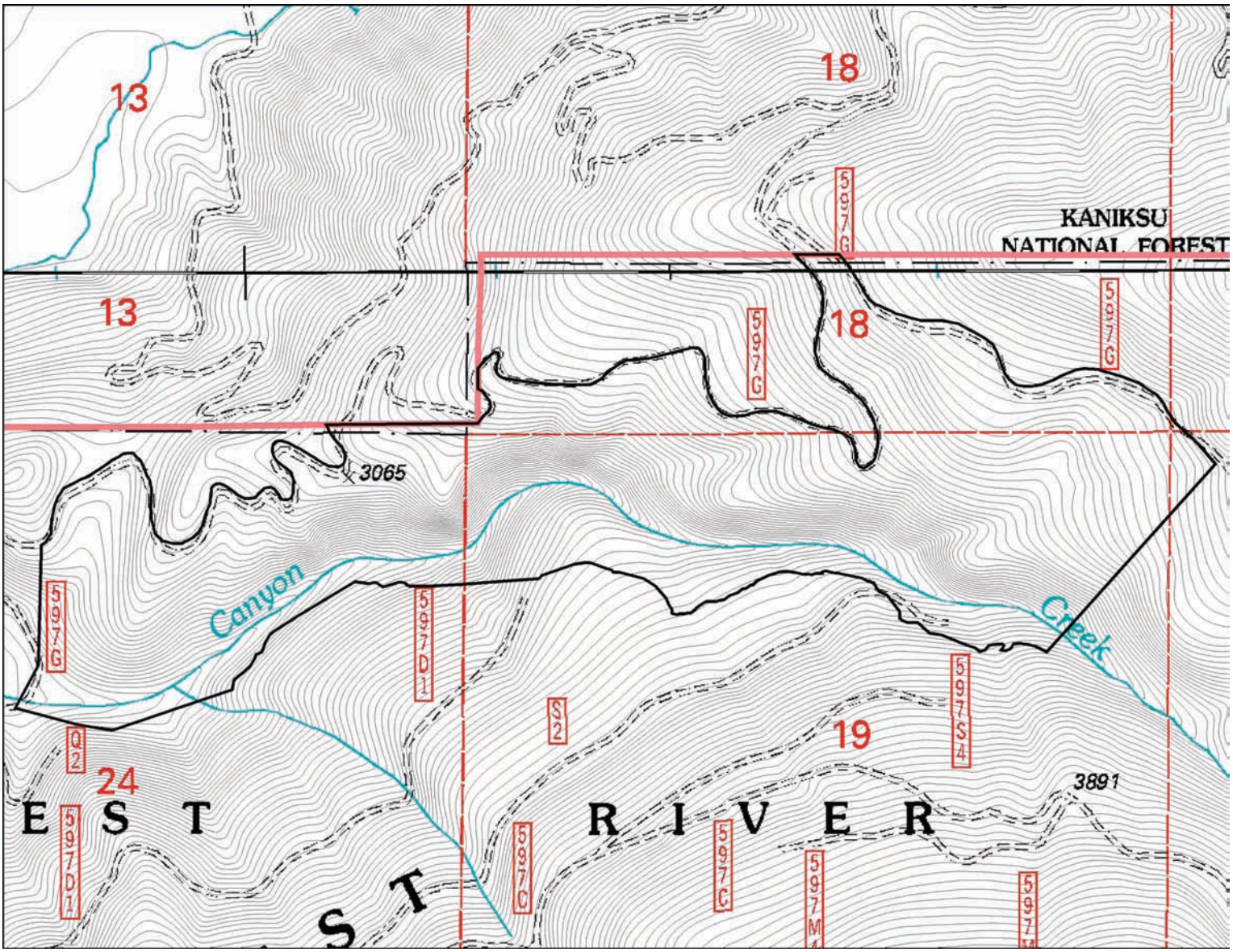

Figure 4—Elevation contour lines for Wellner Cliffs RNA. Lines show 5-meter contours generated from a 10-meter digital elevation model.

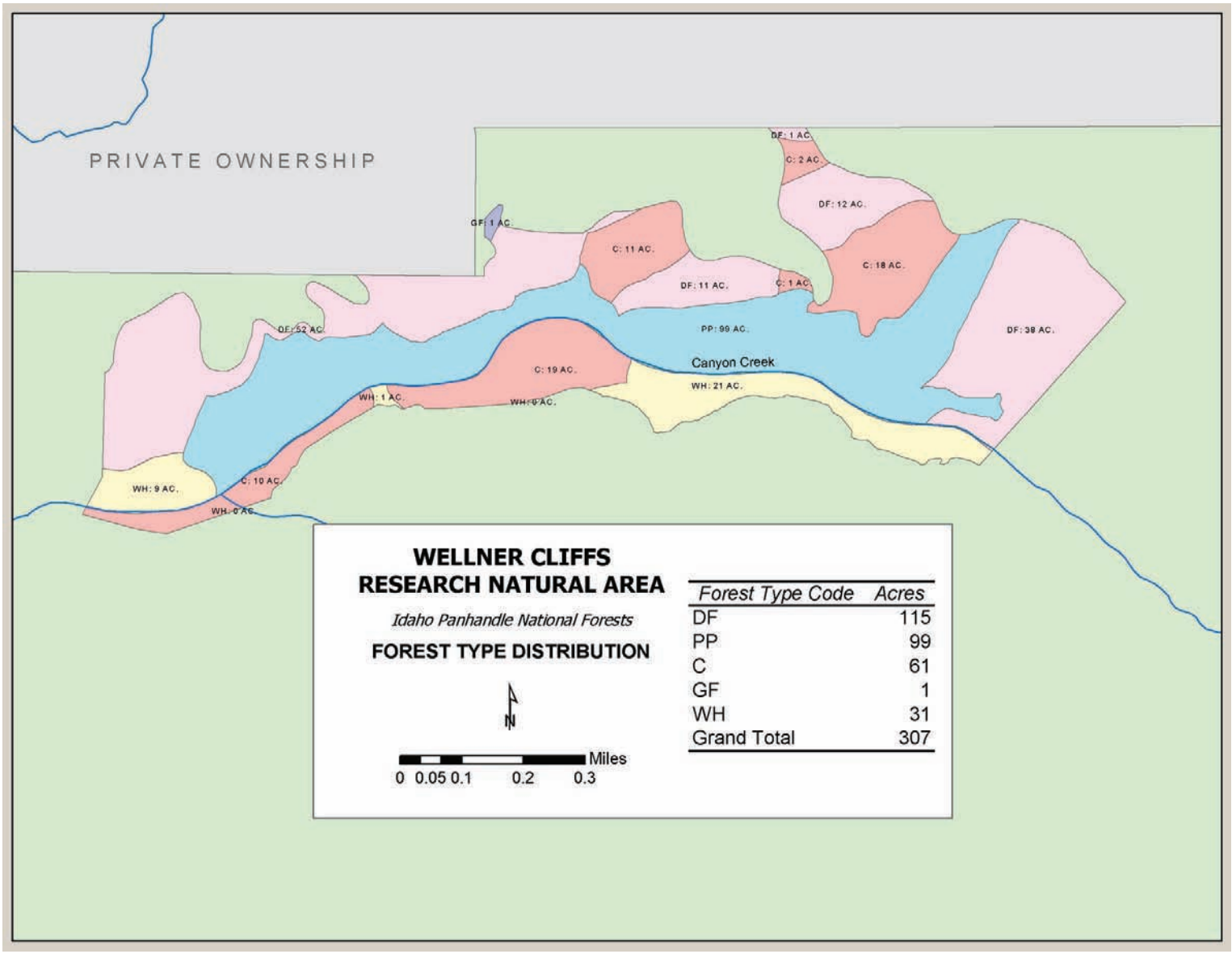

Figure 5—Forest cover type map of Wellner Cliffs RNA.

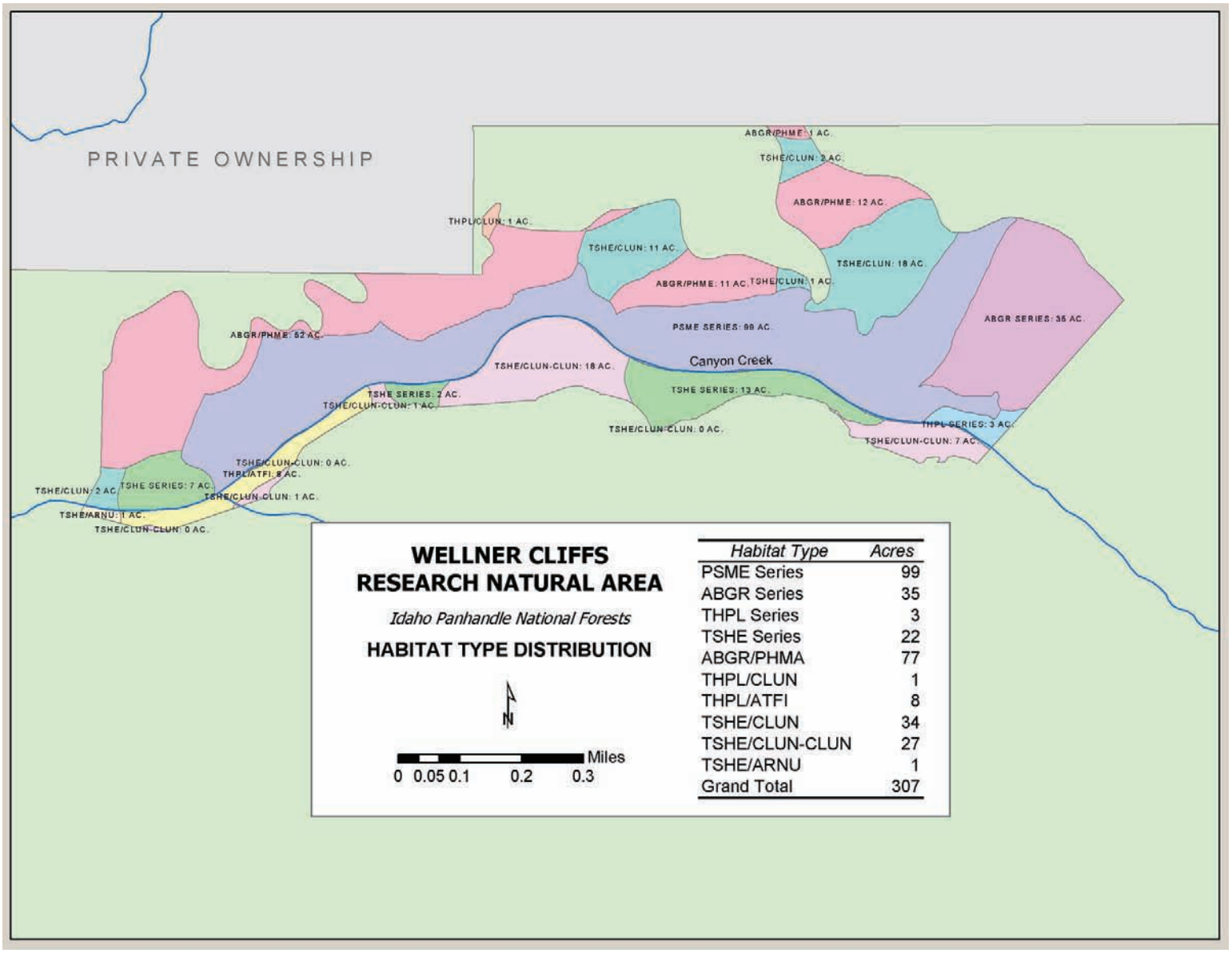

Figure 6—Habitat type map of Wellner Cliffs RNA.

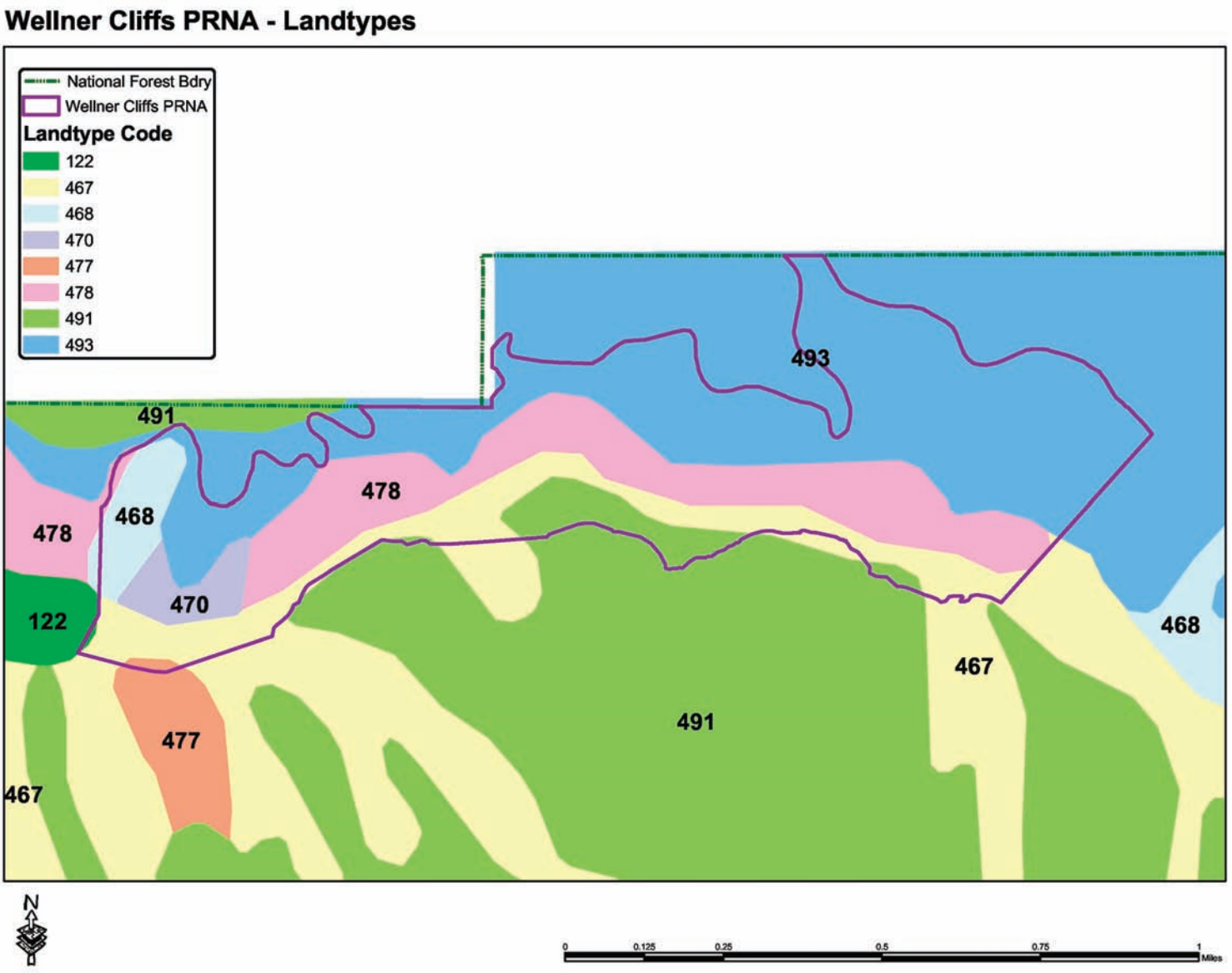

Figure 7—Landtype map of Wellner Cliffs RNA.

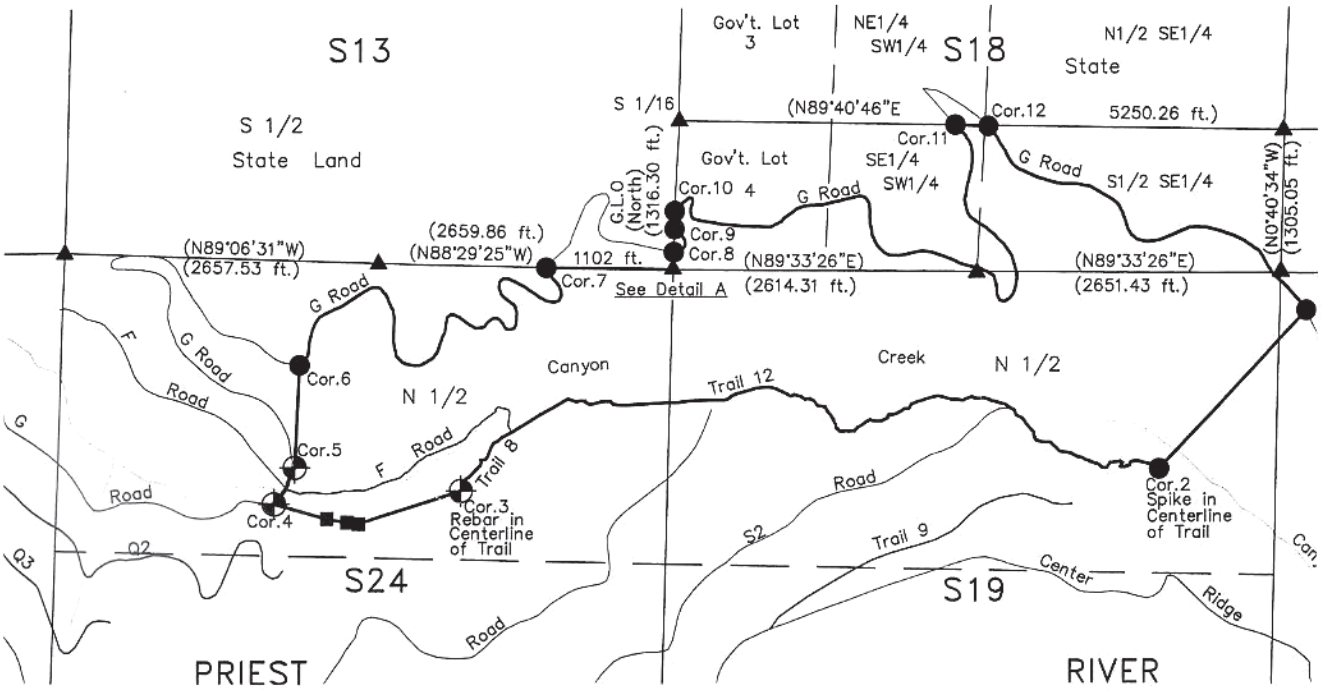

Figure 8—Map of boundary corners that correspond to the boundary description.

View from the cliffs, looking into Canyon Creek.

Aerial photograph of Wellner Cliffs RNA and surrounding area.

Panoramic photograph of the cliffs, looking east.

Riparian area near where Canyon Creek exits the RNA.

View of cliffs from below, with ponderosa pine and Douglas-fir trees on top of cliffs (photo by Connie Ferguson).

Fire scarred old-growth ponderosa pine tree, above the cliffs.

Area by Cover Types

The most detailed and intensive sampling of habitat types and cover types at PREF was reported by Daubenmire (1973) (also Wellner 1976). Unfortunately, Daubenmire did not map the northern portion of PREF that includes the RNA.

Reconnaissance surveys, stand examinations, and mapping have helped determine forest cover types (fig. 5) and habitat types (fig. 6). The following forest cover type information is from the Idaho Panhandle National Forests (IPNF) Timber Stand Management Record System (TSMRS).

Forest cover type	Acres	Hectares
ponderosa pine	99	40
Douglas-fir	115	47
grand fir	1	0.4
western redcedar	61	25
western hemlock	31	13

The mapped ponderosa pine forest cover type area is actually a very fine-grained mosaic that is dominated by ponderosa pine, but also has inclusions of Douglas-fir, low shrubs, open grass/forb, and rock outcroppings that support lichens and mosses. The forest cover types are USFS Northern Region forest types, which are a very close derivative of the Society of American Foresters (1980) Forest Cover Types.

Landtypes are shown in figure 7 and described in Appendix G. More information about landtypes on the IPNF can be found in Nesser and others (1997).

Physical and Climatic Conditions

Physical Conditions

The Wellner Cliffs RNA is mostly a southern exposure, but the riparian area also includes north-facing slopes on the south side of Canyon Creek. Several small drainages flow into Canyon Creek, which results in riparian communities following the small drainages up from Canyon Creek. For example, devil's club and wild ginger are found 1/4 mile (0.4 km) from Canyon Creek on south-facing slopes. Topography is gentle along Canyon Creek, extremely steep in the cliffs (with numerous vertical drop-offs), with moderate slopes above the cliffs.

Climatic Conditions

Long-term climatological weather data are available for PREF. The following data have been recorded:

- Weather station near the headquarters, yearlong, since 1912.
- Snow courses at Benton Meadow and Benton Spring, since 1939.
- Benton Creek stream gauge, since 1939.

In addition, several research studies have collected climate data at various locations throughout PREF. The following climatic summary of PREF is quoted from Finklin (1983):

> *The climate of the Priest River area, like that of other places, is controlled by a combination of large-scale and small-scale factors, whose effects may vary with the time of year. The large-scale factors here include latitude, relative position on the North American continent, prevailing hemispheric wind patterns, and extensive mountain barriers. Small-scale or local factors include the topographic setting and position (valley, slope, or ridge location), as well as orientation or aspect, and vegetative cover. Elevation may cover various scales.*
>
> *Broadly, the Priest River-Idaho panhandle climate is transitional between a northern Pacific coastal type and a continental type. The Pacific influence is noted particularly by the late autumn and winter maximum in cloudiness and precipitation; also in the relatively moderate average winter temperatures compared with areas east of the Rocky Mountains.*

Summer is characteristically sunny and dry, though July and August are the only distinct summer months. July and August are thus also the peak fire-danger months.

Annual precipitation (rain and melted snow) averages 32 inches (817 mm) at the Forest headquarters; about 50 inches (1,270 mm) at locations near 5,500 ft (1,675 m) elevation. Wettest months are normally November, December, and January. Close to 60 percent of the annual total occurs during the period November through March. A slight, secondary peak in precipitation normally appears in May and June, followed by a sharp decrease in July. Snowfall accounts for more than 50 percent of the total precipitation at elevations above 4,800 ft (1 460 m). Snow cover usually persists in the valley from early December through the end of March; seasonal maximum depth averages 30 inches (75 cm). High-elevation snowpack reaches a depth of 5 ft (1.5 m) or more in March and April and may linger into June.

The main season of lightning (or thunderstorm) activity extends from late May through August. Storms occur within the Priest River vicinity on an average of 3 or 4 days each in June, July, and August.

Monthly mean temperatures at headquarters range from 24 °F (–4 °C) in January to 65 °F (18 °C) in July; these are midpoint values between the average daily maximum and minimum temperatures (based on a 5 p.m. observation time). The annual mean is 44 °F (7 °C). A large diurnal range occurs in summer, with July maximum temperatures averaging 83 °F (28 °C); January maximums average 30 °F (–1 °C). Site differences in the valley, as related to coverage by timber canopy, can make a difference of close to 10 °F (6 °C) in summertime diurnal range. Extreme temperatures have been as high as 103 ° to 105 °F (about 40 °C) and as low as –36 °F (–38 °C). Temperature inversions are commonplace, particularly on a clear summer and early autumn nights. The July mean temperature at Gisborne Lookout is only 4 °F lower than at headquarters (3,200 ft [975 m] lower in elevation), due to daily minimums averaging 4 °F higher.

The frost-free season, defined as the period with minimum temperatures staying above 32 °F (0 °C), has an average length in the valley of 96 days at headquarters but only 65 days in a clearcut area (at the former fire-weather station); close to 120 days under a full timber canopy. The season is longer at adjacent slope locations, particularly in the "thermal belt" around 3,500 ft (1,070 m) but is less than 100 days again at 5,500 ft (1,675 m).

Relative humidity is usually high throughout the day in late autumn and winter, averaging 70 to 80 percent or higher in mid-afternoon. In July and August, afternoon values average near 35 percent in the valley and 45 percent at 5,500 ft. Humidity below 20 percent was observed in the clearcut on about 20 percent of the days from late July to late August. Summer nighttime humidity in the valley typically recovers to over 90 to 95 percent by dawn. On the slopes above the temperature inversion, at the same time, humidity may average only 50 to 60 percent.

Winds in this area have a prevailing (most frequent) direction from the southwest during all or most of the year. Local terrain effects modify the larger-scale wind that occurs in the adjacent free atmosphere. A nighttime

drainage effect is indicated in the headquarters area by a prevailing early morning wind direction from the northwest during the fire-weather season. Observed windspeeds are quite low throughout the year in the valley area, due in part to the sheltering by surrounding timber. Summer afternoon winds at 20 ft (6 m) above ground in the clearcut average 3 to 4 mi/h (5-6 km/h); nearby above the treetops, about 6 mi/h (10 km/h); at mountaintop locations, about 9 mi/h (15 km/h).

Two summers of continuous wind recording at Gisborne Lookout showed highest average speeds around midnight, between 10 and 11 mi/h (17 km/h); a minimum in late morning. This pattern is nearly opposite of that observed in the valley.

Sunshine duration is at a minimum in December, when it may average only 20 percent of the maximum possible, giving a monthly total of about 50 hours; this is estimated from adjacent stations. July has close to 80 percent of the maximum possible, with about 375 hours of sunshine in fully exposed locations.

Description of Values

Vegetation

Plant species diversity within Wellner Cliffs RNA is high due to the large number of different habitat types that are intimately intermixed. The very steep environmental gradients and fine-scale mosaic in and around the cliffs result in very high species diversity per unit area. Even within the cliffs there are microsites occupied by plants indicative of wet habitats—western redcedar, wild ginger, ladyfern, baneberry (*Actaea rubra*), and devil's club. These occur within a few feet of dry habitats that support species such as ponderosa pine, lodgepole pine (*Pinus contorta*), snowberry, Idaho fescue, and bluebunch wheatgrass (*Agropyron spicatum*).

Inventory of Vascular Plants

The Idaho Native Plant Society compiled a species list of vascular plants on July 26 and 27, 1997, which covered the western 1/3 of the RNA (Appendix A).

Other Plants

Mosses and lichens were inventoried along the lower section of Canyon Creek within the RNA in September of 2001. During this inventory, the moss *Ulota megalospora* was recorded for the first time in Idaho. A list of species encountered during the survey is included in Appendix D. Appendix E lists lichens observed by Mike Hays (USFS botanist) at Wellner Cliffs RNA in July 1997.

Potential Natural Community

Potential Natural Community is mapped using the Habitat Type system initially developed by Daubenmire (1952) and updated by Cooper and others (1991). Habitat types within the cliffs are best described as a "complex"

because of the extremely rapid changes from wet to dry habitat types. The Wellner Cliffs RNA contains the following habitat types obtained from inventory records in the IPNF Timber Stand Management Record System (TSMRS). See figure 6 for a map of these habitat types in the RNA.

Habitat type series	Abbreviation	Acres	Hectares
Pseudotsuga menziesii	PSME	99	40
Abies grandis	ABGR	112	45
Thuja plicata	THPL	12	5
Tsuga heterophylla	TSHE	84	34

The area classified Douglas-fir (PSME) series is actually a fine-grained mosaic of Douglas-fir/snowberry, Douglas-fir/ninebark, Douglas-fir/pine-grass, ponderosa pine/ninebark, ponderosa pine/snowberry, and ponderosa pine/Idaho fescue habitat types, plus dry grassland inclusions, and rock outcroppings that support lichens and mosses.

Fauna

Mammals and birds in the RNA have not been comprehensively inventoried. Appendix B contains a list of mammals and birds likely to be found in the RNA. These species are typically found in northern Idaho forests at these elevations.

During an October 2002 site visit, several pileated woodpeckers (*Dryocopus pileatus*) were observed using the area. Pileated woodpeckers are designated as an indicator species in the 1987 Forest Plan for the Idaho Panhandle National Forests.

Geology and Soils

(This section on Geology and Soils provided by Gerald J. Niehoff, Soil Scientist, IPNF, Dec. 2, 2002.)

The Wellner Cliffs RNA has three distinct components in relation to landtype, geology and soils:

Forest—The major component consists of forested, south-facing mountain slopes and ridges, which occur above the cliffs. Most of this area is 0 to 40 percent slope.

The geology is extremely heterogeneous, it includes mica influenced granitic rock, schist, and gneiss.

The dominant soils have volcanic ash influenced surface layers 10 to 20 inches (25 to 50 cm) thick. This layer is silt loam textured and has 10 to 40 percent rock fragments. Subsoils are weakly to moderately weathered, soil textures range from loamy sand to sandy clay loam and have 20 to 60 percent rock fragments. The substratum material is lighter textured, generally loamy sand to sandy loam and has 30 to 65 percent rock fragments.

Cliffs—The unique component of this RNA is the cliffs. The cliffs consist of a very steep, dissected, south facing stream breakland, which is a mix of non-timbered rock outcrop, shallow soil sites, and timbered or partially

timbered draws. A breakland is the steep part of a V-shaped drainage, which is the result of the down-cutting of a major stream through the surrounding geology or along a fault zone. Most of the cliff area has 60 to 100+ percent slopes.

The geology of this component also includes mica influenced granitic rock, gneiss, and schist.

This component is a complex, which consists of rock outcrop and soils ranging from shallow to deep. The surface silt loam volcanic ash layer has depths ranging from a few inches on the shallow exposed sites to 20 inches (50 cm) in the draws and concave portions of this landscape. The lower part of the surface volcanic ash layer contains 30 to 70 percent rock fragments. Sandy loam or loamy sand subsoil textures are associated with soils underlain by granite and gneiss, and these subsoils contain 40 to 75 percent rock fragments. The substratum textures are also typically sandy loam or loamy sand and the percent rock fragment content ranges from 50 to 95 percent.

Riparian—The third component of the RNA is the riparian bottom of Canyon Creek and the north-facing, forested, toeslopes and breaklands. This component has slopes ranging from 5 to 80 percent.

The geology of this component is also a mixture of granitic rock, gneiss, and schist.

The soils in the stream bottom are stratified sand, gravel, and cobble. The soils on the toeslopes and breaklands have volcanic ash influenced surface layers 12 to 24 inches (30 to 60 cm) thick. The ash is silt loam textured and has 15 to 45 percent rock fragments. Subsoils are weakly to moderately weathered, with soil textures ranging from loamy sand to sandy clay loam, and have 20 to 60 percent rock fragments. The substratum material is lighter textured, generally loamy sand to sandy loam and has 25 to 75 percent rock fragments.

The surface volcanic ash layers, which occur in all three of the RNA components, was derived from the eruption of Mt. Mazama (Crater Lake, Oregon) approximately 6,850 years ago (Bacon 1983). The ash increases the water and nutrient holding capacity of the soil, dramatically increasing the productivity of these soils. The ash deposited on the cliffs was redistributed through wind and water, with the greatest accumulation occurring in the draws and concave depressions. This variation in ash deposition helps account for the intermixing of wet and dry habitat types within the cliffs.

Lands

The RNA is entirely National Forest land; furthermore, the RNA is located within the Priest River Experimental Forest. These lands are designated for research, both by the order establishing the Experimental Forest, and by the 1987 IPNF Forest Plan (which includes experimental forests and RNA's in the same management area). These lands are already withdrawn from mineral entry, not available for disposal, and classified in the Forest Plan as unsuitable for timber production. There are no outstanding rights on the RNA.

Approximately 0.35 mile (0.56 km) along the northern border of the RNA is adjacent to land owned by the State of Idaho. The State land is managed primarily for timber production.

Cultural

Only a few cultural sites are known to exist on the RNA. An abandoned section of F road extends about 0.25 mile (0.4 km) into the RNA along Canyon Creek. This section of road has scattered windfallen timber in the roadbed. Sections of the windfalls are periodically removed to provide a trail on the abandoned roadbed.

At the end of the abandoned section of F road is a circa 1930s Civilian Conservation Corps (CCC) temporary camp. The ground was leveled in one place, probably for a tent. The flat area has naturally re-vegetated and blends in with the surrounding vegetation.

The CCC crew thinned dense stands of timber in the winter of 1938-1939 on the south side of Canyon Creek (Wellner and others 1951). About 25 acres (10 ha) were thinned in long narrow strips interspersed with unthinned strips, and 36 sample plots were installed. About four acres (1.6 ha) of these thinned stands are included within the RNA boundary. No cutting has been done for this study since 1939 and the plots have not been remeasured. The understory of the thinned areas have since filled in with natural regeneration. No further treatments are planned for this area, and nothing further is anticipated for the portion included in the RNA.

The impacts from this old thinning experiment are relatively light. The old treatments do not appear to have any impact on the functioning of Canyon Creek or its riparian area. A portion of the treated area was included within RNA boundaries because these lands contribute to the integrity of the Canyon Creek and its riparian area, which is one of the RNA features.

A small footbridge has been constructed, which crosses Canyon Creek at the end of the abandoned F road. The bridge allows access from the F road to Trail 8 without disturbing the stream. The footbridge will be periodically maintained.

The S2 road dead-ends just inside the RNA (fig. 3). The road is overgrown with conifer regeneration and is no longer drivable. The section of the S2 road within the RNA is abandoned and will not be reopened.

Aquatic

Fred Rabe conducted a survey of lower Canyon Creek in 1995 (Rabe 1995). The surveyed portion of the stream was the last 0.3 miles (0.5 km) of Canyon Creek before it exits the RNA. In this section of the stream, Canyon Creek is a 2nd order stream with v-shaped valley form and 4 to 6% gradient. Stream size is five to 15 ft (1.5 to 4.6 m), averaging 11 ft (3.4 m). Sinuosity index is 1.3 (average) with many debris dams caused by windthrown trees falling into the stream. This riffle-pool stream had a pH 7.3 and 45 °F (7.2 °C) temperature on September 25, 1995. Canopy coverage was estimated at 60 to 75% of the channel shaded by vegetation, which consisted mostly of shrubs and conifers.

A total of 40 macroinvertebrate taxa were found in the RNA (Appendix C). A low biotic index was calculated from these data, indicating the macroinvertebrate community is quite intolerant of poor water quality conditions. Thus, Canyon Creek is a very good example of an undisturbed stream with high water quality conditions.

In his summary, Rabe noted that lower Canyon Creek would be a good choice as a reference site for comparison with impacted streams of similar size and flow. Further, he recommended that "lower Canyon Creek reach be proposed as a Research Natural Area with the Forest Service."

Impacts and Possible Conflicts

Mineral Resources

Wellner Cliffs RNA has a low potential for minerals. No mining activity has occurred within the RNA and none is planned. The Experimental Forest has already been withdrawn from mineral entry, and the RNA is entirely within the Experimental Forest.

Grazing

The RNA and PREF are not open to grazing by domestic livestock. Grazing is prohibited within the RNA. Trespass by domestic livestock onto PREF is rare.

Timber

The 1987 IPNF Forest Plan classified all Experimental Forests and Research Natural Areas as unsuitable for timber production. Because both RNA's and experimental forests are in the same Forest Plan Management Area, RNA designation has no impact on this status.

About 75% of the RNA, or 230 acres (93 ha), is potentially capable of producing commercial timber products. The only evidence of timber harvest is the four acres (1.6 ha) of CCC thinnings done in 1938 and 1939 and a few hazard trees removed along the G road. Woodcutting is not allowed on PREF, but occasional trees have been illegally removed adjacent to roads. A few trees were cut a number of years ago on the flat area near the G road in the extreme northeast corner of Section 24, probably the result of illegal firewood cutting.

Conifer species in the RNA are grand fir, western larch (*Larix occidentalis*), lodgepole pine, western white pine (*Pinus monticola*), ponderosa pine, Douglas-fir, western redcedar, and western hemlock. About 1857, a large wildfire swept across much of Benton Creek and most of Canyon Creek (Wellner and others 1951). Some older/larger trees survived the fire and reseeded the area. Most of the trees are about 140 years old, with scattered remnants of the older forest still alive. Some trees within and adjacent to the cliff complex are substantially older and have multiple fire scars, indicating that they have survived numerous fires.

Watershed Values

Almost all of Canyon Creek is within PREF, so there is little chance that stream degradation will occur. The major watershed values are protection of fish habitat, protection of clean water, and maintenance of ecosystem processes in the riparian zone.

Recreation Values

There is very little recreational use of PREF in general. Hunting occurs for deer, elk, bear, cougar, moose, and grouse; however, hunters rarely camp within the boundaries of PREF. Snowmobilers use the roads during the winter.

The cliffs are the main aesthetic attraction for recreation. Access to the cliffs is easy along portions of the G road. Although the scenic views from the cliffs are good, they are not spectacular, and are not considered "tourist attractions. " There is no evidence that the cliffs have been used for rock climbing. The ruggedness of the cliffs is a deterrent to recreational hiking, and precludes mechanized access in their immediate area.

The trail up the abandoned section of F road, and its extension up Canyon Creek along Trail 12, provides hiking through old growth forests. Wellner (1976) reported that there are some scenic rapids and falls in Canyon Creek.

Wildlife and Plant Values

There are few examples of cliffs like these that occur in mid-elevation forests. Similar cliffs that may occur in northern Idaho are unlikely to be surrounded by undisturbed mid-elevation forests. It is even more unlikely that similar cliffs surrounded by undisturbed mid-elevation forests are already included in the RNA network.

The microclimate changes rapidly because of differences in soil depth, soil parent material, available water, and nutrients. The very steep environmental gradients in and adjacent to these cliffs provide for an unusually high diversity of habitats and plant species within a very small area.

The cliffs likely provide important subnivean sites (for hibernation and/or dens) to cougars, bears, bobcats, and small mammals. Birds of prey use the cliffs as hunting sites. The dry, open slopes of the cliffs also provide important habitat for other animals that cannot live within closed canopy forests.

Special Management Area Values

Wellner Cliffs RNA is not in an area recommended for wilderness designation or Wild and Scenic River designation. The 1987 IPNF Forest Plan does not recommend any special designation for this area, other than research, in a Management Area dedicated to experimental forests and RNA's.

Transportation Plans

The G road and PREF boundary delineate the northern boundary of the RNA. No additional roads are planned for this area. The G road is gravel and open

during spring, summer, and fall. Periodically the road surface is smoothed and culverts are maintained. Shrubs encroach along the roadcut and roadfill, making it necessary to cut back the roadside vegetation about every 10 years.

If funds are available, the following trails will be maintained: the trail on the abandoned section of F road, the footbridge that crosses Canyon Creek at the end of the F road, and those portions of Trail 8 and Trail 12 that are the southern boundary of the RNA. The purpose of maintaining these trails and footbridge is access for administration of the RNA and access for scientific studies. Trails will be posted with signs prohibiting mechanized vehicles.

Management Prescription

The following management prescriptions are identified to ensure that high representative quality of biological and physical elements are maintained within the RNA. Management and protection will be directed toward maintaining natural ecological processes. Human activities that disturb or modify ecological processes will not be permitted. Livestock grazing, fuelwood gathering, and timber harvesting are not permitted within the RNA.

General recreational use of the RNA will not be encouraged. Motorized and mechanized vehicle use is not permitted within the RNA.

Wildfire will be actively suppressed. The Rocky Mountain Research Station Director and Forest Supervisor may approve plans for management of prescribed fire and determine appropriate management response to natural ignition. Fire suppression will use methods and equipment that minimize disturbance of the RNA. Use of heavy equipment in suppression efforts is prohibited. Use of chemical fire retardants on the RNA is discouraged. Post-fire rehabilitation is not recommended within the RNA, except to control alien weeds.

Pest management and alien weed control will be as specific as possible against target organisms and induce minimal impact to other components of the area. No measures for control of insects or diseases will be undertaken unless forests on adjacent lands are endangered and the Rocky Mountain Research Station Director and Forest Supervisor approve plans for specific control measures. Precautions will be taken to avoid the introduction of alien plants or animals into the RNA. If invasive alien plants are discovered within the RNA, measures may be taken to control or eradicate these populations. There is currently a vigorous population of spotted knapweed (*Centaurea maculosa*) growing along the G road, with some encroachment into the RNA. All noxious weed control measures that are undertaken must be consistent with the noxious weed EIS current for this portion of the Idaho Panhandle National Forests, and give appropriate consideration to protecting the natural features and vegetation of the RNA.

Special use permits for collection and harvest of special forest products within the RNA are not allowed.

The RNA is entirely within the Experimental Forest, which has already been withdrawn from mineral entry.

Vegetation Management

Fire plays an important ecological role in maintaining the integrity of some forest communities of northern Idaho—particularly on dry sites like those within and adjacent to the cliffs. Some vegetation management may be needed to allow fire to play its historic role in maintaining the ecological integrity of forest types within the RNA. Prescribed fires are not without risk. Prior to execution of a prescribed fire or any vegetation management activity related to maintaining natural processes, a plan detailing the objectives of prescribed fire use, proposed fire prescription, operation precautions, and criteria for evaluation of attainment will be approved by the Rocky Mountain Station Director and Forest Supervisor.

Administration Records and Protection

Administration and protection of Wellner Cliffs RNA will be the responsibility of the Idaho Panhandle National Forests. The District Ranger, Priest Lake Ranger District, has direct responsibility.

Requests to conduct research in the RNA should be referred to the Director of the Rocky Mountain Research Station, who will evaluate research proposals and coordinate all studies and research in the RNA. All plant and animal specimens collected in the course of research conducted in the RNA will be properly preserved and maintained within the University of Idaho herbarium, or Federal agency herbaria and museums, approved by the Rocky Mountain Research Station Director.

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

- Regional Forester, Missoula, Montana
- Forest Supervisor, Idaho Panhandle National Forests, Coeur d'Alene, Idaho
- District Ranger, Priest Lake Ranger District, Priest River, Idaho
- Director, Rocky Mountain Research Station, Ft. Collins, Colorado
- Forestry Sciences Laboratory, Rocky Mountain Research Station, Moscow, Idaho

Archiving

The Moscow Forestry Sciences Laboratory of the Rocky Mountain Research Station will be responsible for maintaining the Wellner Cliffs RNA research data file, including studies conducted in the RNA, lists of plant and animal species and plant communities occurring in the RNA, and lists of herbarium and museum species collected. Updated lists of research studies conducted, and lists of plant and animal species and plant communities will periodically be forwarded to the Regional Forester and IPNF Forest Supervisor for inclusion in their local copies of Wellner Cliffs RNA files.

Boundary Description Certification

The boundary description is in Appendix F and a map of the legal boundaries can be found in figure 8.

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Appendix A. Vascular Plant Species Found in the RNA

Scientific Name	Riparian	Lower Slope	Cliffs	Upper Slope
Trees				
Abies grandis	x	x	x	x
Betula papyrifera	x	x		
Larix occidentalis	x	x	x	
Pinus contorta	x			
Pinus monticola	x	x	x	x
Pinus ponderosa	x	x		
Pseudotsuga menziesii	x	x	x	x
Thuja plicata	x	x	x	x
Tsuga heterophylla	x	x	x	
Shrubs				
Acer glabrum	x	x	x	x
Alnus incana	x			x
Alnus sinuata				x
Amelanchier alnifolia	x		x	x
Berberis aquifolium				x
Berberis repens			x	x
Betula papyrifera				x
Ceanothus sanguineus			x	
Ceanothus velutinus			x	x
Chimaphila umbellata		x	x	x
Cornus stolonifera	x			
Holodiscus discolor			x	x
Linnaea borealis	x	x	x	x
Lonicera ciliosa	x		x	x
Lonicera utahensis		x		x
Oplopanax horridum	x	x	x	
Pachistima myrsinites	x	x	x	x
Rhamnus purshiana	x		x	
Physocarpus malvaceus			x	x
Prunus emarginata				x
Prunus virginiana			x	
Ribes lacustre	x		x	
Rosa gymnocarpa	x	x	x	x
Rubus idaeus	x			
Rubus parviflorus	x	x		x
Salix scouleriana				x
Sorbus scopulina				x
Spiraea betulifolia	x	x	x	x
Symphoricarpos albus	x		x	x
Vaccinium membranaceum		x	x	x
Forbs				
Achillea millefolium		x	x	
Aconitum columbianum	x			
Actaea rubra	x		x	
Adenocaulon bicolor	x	x	x	x
Anaphalis margaritacea				x
Antennaria luzuloides			x	
Antennaria racemosa			x	
Apocynum androsaemifolium			x	x

Scientific Name	Riparian	Lower Slope	Cliffs	Upper Slope
Forbs				
Arabis holboellii			x	
Aralia nudicaulis	x	x	x	x
Arenaria macrophylla			x	x
Arnica cordifolia			x	
Arnica latifolia				x
Asarum caudatum	x	x	x	
Aster conspicuus			x	x
Campanula rotundifolia		x	x	
Cardamine pennsylvanica	x			
Centaurea maculosa			x	
Chrysanthemum leucanthemum			x	x
Circaea alpina	x			
Clarkia pulchella			x	
Clintonia uniflora	x	x	x	x
Collinsia parviflora			x	
Collomia grandiflora			x	
Coptis occidentalis	x			
Corallorhiza maculata			x	
Corallorhiza mertensiana			x	
Corallorhiza trifida	x			
Cornus canadensis	x	x		
Disporum hookeri	x	x		x
Disporum trachycarpum			x	x
Epilobium angustifolium			x	x
Epilobium minutum			x	
Filago arvensis			x	
Fragaria vesca	x		x	x
Fragaria virginiana			x	x
Galium triforum	x		x	x
Gayophytum nuttallii			x	
Geum macrophyllum	x			
Glyceria elata	x			
Goodyera oblongifolia	x	x	x	x
Habenaria elegans				x
Habenaria orbiculata	x			
Habenaria unalascensis			x	x
Heuchera cylindrica			x	x
Hieraceum albertinum			x	
Hieraceum albiflorum		x	x	x
Hieraceum canadense			x	x
Hieraceum pratense			x	
Hypericum perforatum			x	x
Iliamna rivularis			x	
Lactuca biennis?			x	
Lilium columbianum			x	x
Listera convallarioides	x			
Lomatium ambiguum			x	
Lomatium dissectum			x	
Lupinus polyphyllus				x
Lupinus sericeus			x	x
Lysichitum americanum	x			
Mertensia paniculata	x			
Monotropa uniflora		x	x	x
Montia cordifolia	x		x	

Scientific Name	Riparian	Lower Slope	Cliffs	Upper Slope
Forbs				
Montia perfoliata			x	
Microsteris gracilis			x	
Mitella pentandra	x			
Mitella stauropetala			x	
Osmorhiza chilensis	x		x	x
Osmorhiza purpurea	x			
Penstemon fruticosus			x	
Phacelia hastata			x	
Polypodium hesperium			x	
Potentilla glandulosa			x	
Prunella vulgaris	x			
Pterospora andromedea		x		x
Pyrola aphylla				x
Pyrola asarifolia	x	x	x	x
Pyrola chlorantha			x	
Pyrola picta		x		x
Pyrola secunda	x			x
Sedum stenopetalum			x	x
Selaginella wallacei			x	
Senecio integerrimus			x	
Silene menziesii			x	
Smilacina racemosa			x	x
Smilacina stellata	x	x		x
Solidago canadensis			x	x
Stellaria crispa	x			
Stellaria nitens?			x	
Streptopus amplexifolius	x	x		
Taraxacum officinale			x	
Tiarella trifoliata	x	x	x	x
Tragopogon dubius			x	
Trautvetteria carolinensis		x		
Trifolium agrarium			x	x
Trifolium repens				x
Trillium ovatum	x		x	x
Trisetum canescens			x	x
Urtica dioica	x			x
Veronica officinalis	x			
Viola glabella	x	x		
Viola orbiculata	x	x	x	x
Ferns and allies				
Athyrium filix-femina	x	x		x
Botrychium virginianum	x	x		x
Cryptogramma crispa		x		x
Cystopteris fragilis	x		x	x
Dryopteris austriaca	x			
Dryopteris expansa			x	x
Dryopteris filix-mas	x		x	
Dryopteris montana	x			
Dryopteris spinulosa	x			
Equisetum sp.	x	x		
Gymnocarpium dryopteris	x			
Polypodium hesperium			x	
Polystichum munitum	x			

Scientific Name	Riparian	Lower Slope	Cliffs	Upper Slope
Ferns and allies				
Pteridium aquilinum	x	x	x	x
Woodsia oregana			x	
Grasses and allies				
Agropyron spicatum			x	x
Agrostis stolonifera				x
Bromus carinatus			x	
Bromus tectorum			x	
Bromus vulgaris	x	x	x	
Calamagrostis rubescens			x	x
Carex deweyana	x			
Carex geyeri			x	
Carex laeviculmis	x			
Carex muricata	x			
Carex rossii			x	x
Cinna latifolia	x			
Elymus glaucus			x	
Festuca idahoensis			x	
Festuca occidentalis			x	x
Glyceria elata	x			
Juncus tenuis				x
Luzula campestris			x	x
Luzula divaricata?	x			
Melica subulata			x	
Poa secunda			x	
Trisetum canescens			x	
Trisetum cernuum	x			

Plant inventory conducted by the White Pine Chapter, Idaho Native Plant Society, July 26-27, 1997 (Kris Allison, Elisabeth Brackney, Greg Douhan, LeAnn Douhan, Dennis Ferguson, Mike Hays, Sonja Lewis, Juanita Lichthardt, Diane Penny, Dorothy Rechard, Ottis Rechard, Chuck Wellner).

Appendix B. Probable Mammals and Birds in the RNA

Latin Name	Common Name
Ursus americanus	black bear
Canis latrans	coyote
Mestela frenata	weasel
Mephitis mephitis	skunk
Erethizon dorsatum	porcupine
Felix concolor	mountain lion
Lynx rufus	bobcat
Odocoilius hemionus	mule deer
Odocoilius virginianus	whitetail deer
Alces alces	moose
Cervus canadensis	elk
Microtus pennsylvanicus	meadow vole
Peromyscus maniculatus	deer mouse
Thomomys talpoides	pocket gopher
Lepus americanus	showshoe hare
Bonasa umbellus	ruffed grouse
Archilochus alexandri	hummingbird
Colaptes cafer	red-shafted flicker
Dendrocopos villosus	hairy woodpecker
Dryocopus pileatus	pileated woodpecker
Contopus sordidulus	western wood pewee
Tachycineta thalassina	swallow
Iridoprocne bicolor	tree swallow
Stelgidopteryx ruficollis	rough-winged swallow
Parus atricapillus	chickadee
Sitta canadensis	red-breasted nuthatch
Turdus migratorius	robin
Hylocichla ustulata	Swainson's thrush
Regulus calendula	kinglet
Bombycilla cedrorum	cedar waxwing
Vireo solitarius	solitary vireo
Dendrocia auduboni	Audubon's warbler
Dendrocia petechia	yellow warbler
Geothylpis trichas	yellowthroat
Piranga ludoviciana	western tanager
Hesperiphona vespertina	evening grosbeak
Junco oreganus	Oregon junco
Spizella passerina	chipping sparrow
Melospiza lincolnii	Lincoln's sparrow
Melospiza melodia	song sparrow
Accipitridae family	hawks

Appendix C. Macroinvertebrate Taxa Found in the RNA (Rabe 1995)

Ephemeroptera

Paraleptophlebia sp.
Drunella spinifera
Cinygmula sp.
Baetis bicuspidatus
Baetis tricuspidatus
Seratella tibialis
Caudatella sp.
Ephemerella sp.
Ironedes sp.

Plecoptera

Amphinemura sp.
Zapada columbiana
Sweltza sp.
Isoperla sobria
Setvena sp.
Yoraperla brevis
Doronuria theodora
Despaxis sp.

Trichoptera

Micrasema sp.
Cryptochia sp.
Rhycophyla A
Rhycophyla B
Rhycophyla C
Ecclisomyia sp.
Onoscosmoecus sp.
Neothrema sp.
Glossosoma sp.
Phychoglypha sp.

Coleoptera

Lara avara
Narpus sp.
Optioservus sp.
Hydrobius sp.
Heterolimnius sp.

Diptera

Tanypodinae
Chironominae
Tipulidae
Dicronota sp.
Bezzie sp.
Orthocladinae

Turbellaira

Polycelius sp.

Appendix D. Bryophytes Found on Lower Canyon Creek, 2001

Compiled by Judith A. Harpel, Ph.D.
Based on a one week bryophyte workshop held at the Station between 23 – 28 Sept. 2001

Mosses

Amblystegium serpens (Hedw.) Schimp. in B.S.G.
Anacolia menziesii (Turn.) Par.
Antitrichia californica Sull. in Lesq.
Atrichum selwynii Aust.
Aulacomnium androgynum (Hedw.) Schwaegr.
Bartramia pomiformis Hedw.
Brachythecium albicans (Hewd.) Schimp. in B.S.G.
Brachythecium frigidum (C. Mull.) Besch.
Brachythecium hylotapetum B. Hig. & N. Hig.
Brachythecium leibergii Grout
Brachythecium velutinum (Hedw.) Schimp. in B.S.G.
Bryum capillare Hedw.
Ceratodon purpureus (Hedw.) Brid.
Claopodium bolanderi Best.
Claopodium crispifolium (Hook.) Ren. & Card.
Dicarnum fuscescens Turn.
Dicranum scoparium Hedw.
Dicranum tauricum Saeph.
Dryptodon patens (Hedw.) Brid.
Encalypta ciliata Hedw.
Eurhynchium oreganum (Sull.) Jaeg.
Eurhynchium pulchellum (Hedw.) Jenn.
Fissidens bryoides Hedw.
Fontinalis antipyretica Hedw.
Grimmia montana Bruch.
Grimmia torquata Hornsch. in Grev.
Herzogiella seligeri (Brid.) Iwats.
Heterocladium procurrens (Mitt.) Jaeg.
Homalothecium aeneum (Mitt.) Lawt.
Homalothecium nevedensis (Lesq.) Ren. & Card.
Hygrohypnum ochraceum (Turn. ex Wils.) Loeske
Hylocomium splendens (Hedw.) Schimp. in B.S.G.
Hypnum circinale Hook.
Hypnum subimponens Lesq.
Leucolepis acanthoneuron (Schwaegr.) Lindb.
Metaneckera menziesii (Hook. in Drumm.) Steere
Mnium ambiguum H. Mull.
Mnium marginatum (With.) Brid. ex P. Beauv.
Mnium spinulosum Bruch & Schimp. in B.S.G.
Orthotrichum rupestre Schleich. ex Schwaegr.
Orthotrichum speciosum Nees in Sturm.
Neckera douglasii Hook.
Plagiomnium insigne (Mitt.) T. Kop.

Plagiomnium rostratum (Schrad.) T. Kop.
Plagiomnium venustum (Mitt.) T. Kop.
Plagiothecium laetum Schimp. in B.S.G.
Pleurozium schreberi (Brid.) Mitt.
Polytrichastrum alpinum (Hedw.) G. L. Sm.
Polytrichum juniperinum Hedw.
Polytrichum piliferum Hedw.
Pterigynandrum filiforme Hedw.
Ptilium crista-castrensis (Hedw.) De. Not.
Racomitrium ericoides (Web. ex Brid.) Brid.
Rhizomnium glabrescens (Kindb.) T. Kop.
Rhizomnium magnifolium (Horik.) T. Kop.
Rhizomnium nudum (Britt. & Williams) T. Kop.
Rhytidiadelphus loreus (Hedw.) Warnst.
Rhytidiadelphus triquestrus (Hedw.) Warnst.
Rhytidiopsis robusta (Hook.) Broth.
Sanionia uncinata (Hedw.) Loeske
Sanionia uncinata (Hedw.) Loeske var. *symmetrica* (Ren. & Card.) Crum & Anderson
Schistidium apocarpum (Hedw.) Bruch & Schimp. in B.S.G.
Tetraphis pellucida Hedw.
Timmia austriaca Hedw.
Tortula ruralis (Hedw.) Garetn. et al.
Trachybryum megaptilum (Sull.) Schof.
Ulota megalospora Vent. in Roll

Hornworts

Anthoceros punctatus L.

Liverworts

Barbilophozia barbata (Schmid. ex Schreb.) Loeske
Barbilophozia lycopodies (Wallr.) Loeske
Calypogeja muelleriana (Schiffn.) K. Mull.
Cephalozia lunulifolia (Dum.) Dum.
Cephaloziella divaricata (Sm.) Schiffn.
Chiloscyphus polyanthos (L.) Corda
Jamesoniella autumnalis (DC.) Steph.
Lepidozia reptans (L.) Dum.
Lophocolea heterophylla (Schrad.) Dum.
Lophozia incisa (Schrad.) Dum.
Marchantia polymorpha L.
Plagiochila porelloides (Torrey ex Nees) Lindenb.
Porella cordaeana (Hub.) Moore
Ptilidium pulcherrimum (G. Web.) Hampe.
Radula complanata (L.) Dum.
Scapania americana K. Mull.
Scapania bolanderi Aust.
Scapania umbrosa (Schrad.) Dum.

Appendix E. Lichens Observed in the RNA, July 1997

By Mike Hays

Alectoria sarmentosa
Bryoria fremontii
B. fuscenscens
B. capillaris
Cetraria platyphylla
C. chlorophylla
Cladonia sp. (many)
C. multiformis
Hypogymnia occidentalis
H. imshaugii
H. physodes
H. tubulosa
H. enteromorpha?
Letharia vulpina
L. columbiana
Lobaria pulmonaria
Nephroma helveticum
N. parile
Parmelia hygrophila
P. sulcata
Parmeliopsis ambigua
P. hyperopta
Peltigera apthosa
P. cinnamomea
P. kristinssonii
P. membranacea
P. praetextata
P. neopolydactyla
P. venosa
Platismatia glauca

Appendix F. Boundary Description Survey[1]

A parcel of land designated as “Wellner Cliffs Research Natural Area” situated in Sections 18, 19, and 20, T.58N., R.3W., and Section 24, T.58N., R.4W., Boise Meridian, Bonner County, Idaho, described as follows;

Beginning at Corner 1, which is a 60d spike, set in the centerline of the G Road, and the true Point of Beginning;

thence S42°55’W, 1880 feet to corner 2, which is a 60d spike set in the centerline of Trail 12;

thence westerly, 7110 feet along the centerline of Trail 12 and Trail 8 to Corner 3, which is a 3/4” x 24” rebar, set in the centerline of Trail 8, with a standard Forest Service aluminum cap, marked USDA-FS WC RNA COR 3 PLS 4343 2001;

thence S72°08’W, 938 feet to a 3/8” x 24” rebar;

thence N82°46’W 99 feet to a 3/8” x 24” rebar;

thence N79°18’W, 181 feet to a 3/4” x 24” rebar;

thence N74°10’W, 470 feet to Corner 4, which is a 3/4” x 24” rebar, with a standard Forest Service aluminum cap, marked USDA-FS WC RNA COR 4 PLS 4343 2001;

thence N29°09’E, 365 feet to Corner 5, which is a 3/4” x 24” rebar, with a standard Forest Service aluminum cap, marked USDA-FS WC RNA COR 5 PLS 4343 2001;

thence N2°24’E, 895 feet to Corner 6, which is a spike in the centerline of the G Road;

thence northeasterly, 4515 feet along the centerline of the G Road to Corner 7, which is a 60d spike in the centerline of the G Road;

thence S88°29’25”E, 1102 feet along the Section line between Sections 13 and 24, to the Section Corner common to Sections 13, 18, 19, and 24, which is a standard Forest Service aluminum monument, marked USDA-FS T58N R4W S13 S18 S19 S24 WAS RLS 853 1982;

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[1] USDA Forest Service, Idaho Panhandle National Forests, Boundary Management - Cadastral Surveys. Survey by Frank Wratni and Greg Ryberg.

thence North, 151 feet along the Section line between Sections 13 and 18, to Corner 8, which is a 60d spike in the centerline of the G road;

thence northerly 260 feet along the centerline of the G road to Corner 9, which is a 60d spike in the centerline of the G road;

thence North, 351 feet along the Section line between Sections 13 and 18, to Corner 10, which is a 60d spike in the centerline fo the G road;

thence easterly and northerly, 5560 feet along the centerline of the G road to Corner 11, which is a 60d spike in the centerline of the G road;

thence N89°40’46”E, 233 feet along the S 1/16 line in Section 18, to Corner 12, which is a 60d spike in the centerline of the G Road;

thence southeasterly, 3560 feet along the centerline of the G Road to Corner 1, herebefore described, and the True Point of Beginning, containing 311 acres, more or less.

Appendix G. IPNF Landtype Mapping Unit Descriptions for the RNA

Map Unit 493 – Delineations of this map unit consist of mountain ridges and upper slopes. This map unit occurs on southerly aspects and has dominant slope gradients, which are 5 to 40 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist and gneiss geology. The dominant vegetation is moderately cool to moderately warm and moist, mixed coniferous forest.

Map Unit 478 – Delineations of this map unit consist of very steep, rocky steam breaklands associated with deeply incised V-shaped drainages. This map unit occurs on southerly aspects and has dominant slope gradients, which are 60 to 90 percent. The unit is a mosaic of rock outcrop and soils that range in depth from shallow to deep. The surface soil is dominantly volcanic ash overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is moderately warm and dry coniferous forest.

Map Unit 467 – Delineations of this map unit consist of lower sideslopes, toeslopes, and adjacent stream bottoms of incised drainages within mountain slopes. This map unit occurs on northerly aspects and has dominant slope gradients, which are 35 to 65 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is a mosaic of moderately cool, moist and wet mixed coniferous forest with an occasional inclusion of fern glades.

Map Unit 491 – Delineations of this map unit consist of mountain ridges and upper slopes. This map unit occurs on northerly aspects and has dominant slope gradients, which are 5 to 40 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is moderately cool and moist coniferous forest.

Map Unit 468 – Delineations of this map unit consist of lower sideslopes, toeslopes, and adjacent stream bottoms of incised drainages within mountain slopes. The map unit occurs on southerly aspects and has dominant slope gradients, which are 35 to 65 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is a mosaic of moderately warm to moderately cool and moderately dry to wet mixed coniferous forest with an occasional inclusion of fern glades.

Map Unit 470 – Delineations of this map unit consists of non-dissected mountain sideslopes. This map unit occurs on southerly aspects and has dominant slope gradients, which are 35 to 60 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is moderately warm and moderately cool, moist, mixed coniferous forest types.

Map Unit 477 – Delineations of this map unit consists of steep, stream breaklands associated with deeply incised V-shaped drainages. This map unit occurs on northerly aspects and has dominant slope gradients, which are 60 to 80 percent. Soils are deep and consist of volcanic ash surface horizons overlying weakly weathered subsoil and substratum material of residual, mica influenced granitic rock, schist, and gneiss geology. The dominant vegetation is moderately cool and moist coniferous forest.

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