

FIELD INVESTIGATION OF RUBUS SPECTABILIS (SALMONBERRY),
A SENSITIVE SPECIES ON THE IDAHO PANHANDLE
NATIONAL FORESTS

by

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ABSTRACT

Rubus spectabilis (salmonberry) was rediscovered in 1991 on the Priest Lake Ranger District in northern Idaho after going undetected since its original documentation in the Priest Lake region by Piper in 1901. During the summers of 1991 and 1992 the Conservation Data Center (CDC) of the Idaho Department of Fish and Game conducted field surveys to find and document the extent of salmonberry populations on the Priest Lake Ranger District and to offer management strategies that will assure the long-term viability of its populations. Funding for this project was provided by Idaho Fish and Game and the Idaho Panhandle National Forests.

Based on 1991 field surveys, I recognized five populations of salmonberry in three drainages on the northwest side of Priest Lake (Bursik 1992). Since then I have lumped three of the populations into one large population on Beaver Creek 001. One additional population was discovered in Tepee Creek RNA 002 in 1992, making a total of four known populations of salmonberry in Idaho (Tepee Creek 005 and Tango Creek 003 are the other two). Numerous additional streams on the northwest side of Priest Lake and to the north of Upper Priest Lake were surveyed during 1991 and 1992 without finding additional salmonberry populations. Consequently it appears that salmonberry is indeed quite rare in Idaho and should be managed as such.

Management strategies that will assure the preservation of habitat supporting salmonberry are recommended for the three drainages currently harboring populations. The protocol for a long-term monitoring program to ascertain the effects of road building and timber harvesting on portions of Beaver Creek 001 affected by these activities is also outlined.

TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF TABLESiii

LIST OF APPENDICES iv

INTRODUCTION 1

CURRENT STATUS 2

TAXONOMY

 Family 2

 Common Name 2

 Citation 2

 Technical Description 2

 Nontechnical Description 2

 Distinguishing Features and Similar Species 2

DISTRIBUTION

 Range 3

 Additional Areas Surveyed 5

 Habitat and Associated Species 6

 Other Sensitive Species 6

 Ecology 6

CONSERVATION STATUS

 Conservation Status - Idaho 7

 Threats 8

 Management Implications 8

 Long-term Monitoring Potential 9

ASSESSMENTS AND RECOMMENDATIONS

 Summary 9

 Recommendations to the Regional Forester 10

 Recommendations to the Idaho Panhandle National Forests 10

LITERATURE CITED 12

LIST OF TABLES

Table 1	Morphological comparisons of <u>Rubus spectabilis</u> 3 with closely related species in the genus <u>Rubus</u> .
Table 2	Creeks likely to support salmonberry in the 5 northwest Priest Lake area that were surveyed unsuccessfully for salmonberry in 1991 and 1992.

LIST OF APPENDICES

- APPENDIX 1 Line drawing of Rubus spectabilis and comparison of line drawings of R. leucodermis and R. idaeus.
- APPENDIX 2 Maps of Rubus spectabilis populations on the Priest Lake Ranger District.
- APPENDIX 3 Occurrence records for Rubus spectabilis on the Priest Lake Ranger District.

INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service Sensitive Species list.

This report constitutes a summary of findings for a Challenge Cost-share project on the Priest Lake Ranger District of the Idaho Panhandle National Forests. This project is a cooperative effort between the Idaho Department of Fish and Game's Conservation Data Center and the Idaho Panhandle National Forests through the Challenge Cost-share Program.

The primary objectives of this investigation were to:

- 1) Survey habitat on the Priest Lake RD for salmonberry to ascertain the full extent of known populations and to locate additional populations.
- 2) To ascertain habitat requirements, population levels and potential threats to populations of salmonberry.
- 3) To offer management strategies for personnel on the Idaho Panhandle National Forests to assure the long-term viability of known populations of salmonberry on the Priest Lake Ranger District.

Rubus spectabilis Pursh

CURRENT STATUS USFS R1 - Watch
 USFWS - None
 Idaho Native Plant Society - Priority 2
 Idaho CDC - G5 S1

TAXONOMY

Family: Rosaceae (Rose)

Common Name(s): salmonberry

Citation: Fl. Am. Sept. 348, pl. 16. 1814.

Technical Description: Strongly rhizomatous thicket-forming perennial usually 1-3(5) m tall, the stems erect to arching, usually strongly bristly below, less so (or even unarmed) above, the prickles acicular, the brownish bark eventually shredding; leaves pinnately 3(5)-foliate; leaflets ovate, acute to acuminate, glabrous or very sparsely appressed-pubescent above, usually pubescent along the veins beneath, the terminal one (3)4-9(11) cm long, the lateral pair(s) smaller, often unequally lobed or divided; flowers 1-2 on short leafy branches; calyx pubescent, the lobes spreading, 9-15(20) mm long; petals red to reddish-purple, showy, obovate-elliptic, up to half again as long as the sepals; stamens 75-100; pistils numerous; style glabrous, about 2 mm long. Drupelets separating from the semi-fleshy receptacle and forming somewhat raspberry-like, yellow to salmon to reddish-colored, insipid fruit (Hitchcock 1961).

Nontechnical Description: Strongly rhizomatous, thicket-forming perennial shrub 1-3 m tall, the stems erect to arching, usually bristly below, unarmed above, brownish bark shredding; leaves compound, 3- or 5-foliate, leaflets ovate, acute to acuminate, mostly glabrous with pubescence only along the vein on the underside of the leaf. Terminal leaflet 3-11 cm long, lateral pair(s) smaller, often unequally lobed or divided; flowers one to two on short, leafy branches; sepals pubescent, spreading 9-15(20) mm long; petals red to reddish-purple, showy, up to 1.5 times as long as the sepals; stamens 75-100; pistils numerous; style glabrous, about 2 mm long. Drupelets separating from the semi-fleshy receptacle and forming a yellow to salmon to reddish-colored, tart fruit. See Appendix 1 for a line drawing of salmonberry.

Distinguishing Features and Similar Species: Superficially, salmonberry resembles its close relatives the red raspberry (Rubus idaeus) and black raspberry (Rubus leucodermis). See Appendix 1 for line drawings of these three species. Table 1 compares key features of each species that would allow one to separate the three easily in the field.

Table 1. Morphological comparison of Rubus spectabilis with closely related species in the genus Rubus.

Species	Stem Prickles	Leaf Prickles	Flower Color	Fruit Color
<u>R. spectabilis</u>	few, only near base	absent	pink to reddish	yellow to salmon
<u>R. idaeus</u>	many, all over	present, weak straight	white	red
<u>R. leucodermis</u>	many, all over	present, many	white	black

DISTRIBUTION

Range: Salmonberry occurs from near sea level to medium elevations on mountain slopes from Alaska southward to northwestern California from the coast to the Cascades and only rarely east of the Cascades. Two areas have documented sightings of salmonberry east of the Cascades: Priest Lake, Bonner Co., Idaho and the Smithers area from Hudson Bay Mountain at Glacier Gulch in north-central British Columbia (Lorain 1988).

Previous to 1991, salmonberry was known from the Priest Lake area only by a historic collection by Piper in 1901. This collection was accompanied by the vague location of "Priest Lake".

In 1991 and 1992, four populations of salmonberry were located in three drainages on the northwest end of Priest Lake on the Priest Lake RD, Idaho Panhandle National Forests (IPNFs). I reported five populations of salmonberry as a result of field work in 1991 (Bursik 1992). Three of these populations have been lumped into one large Beaver Creek 001 population which extends from near the mouth at Priest Lake, more than three miles upstream on the main branch, and on all major tributaries to the north and south (see Appendix 2, Maps 1-4 showing the full extent of Beaver Creek 001). Because this population is more or less continuous, with no major disjunctions, it is most appropriate to consider this one large population and to manage it as such, rather than to break it down into subpopulations.

Beaver Creek 001 is by far the largest population of salmonberry. It consists of at least 5,000 genetically distinct individuals (genets) and well in excess of 10,000 clonal stems (ramets). Beaver Creek 001 covers several hundred acres of habitat in the narrow to broad riparian zones of Beaver Creek and its tributaries to the north and south.

The area of Beaver Creek shown on Map 1 (Appendix 2) was entirely surveyed and appears to support salmonberry from near the mouth, upstream to the edge of this map. Map 2 displays the middle

reaches of Beaver Creek and its southern tributaries. Most of this stretch on the main branch of Beaver Creek was surveyed and was found to contain salmonberry. Only the lower portion of the southern tributaries was surveyed for salmonberry. The entire surveyed portion supported salmonberry (shaded on the map). Salmonberry likely also occurs well up these southern tributaries of Beaver Creek, but only further survey work will elicit the full extent of this portion of the population.

Map 3 (Appendix 2) shows the upper reaches of Beaver Creek 001. Nearly this entire stretch of Beaver Creek was surveyed and the extent of the salmonberry population is indicated by shading on this map. Beaver Creek 001 extends up to the large clearcut in the upper reaches of Beaver Creek. No individuals were observed in the clearcut or in the forested portion of Beaver Creek above the clearcut.

Map 4 displays the two main northern tributaries of Beaver Creek. Nearly the entire length of the northwestern tributary (in section 2) supports salmonberry. The northeastern tributary (mostly in section 1) was not fully surveyed. The entire portion of the lower reaches of this tributary that was surveyed harbored salmonberry. It is likely that salmonberry ranges at least one-half mile further upstream in this drainage.

Two small populations of salmonberry are located on Tepee Creek (see Appendix 2). Because the two groups of salmonberry on Tepee Creek are widely separated with no scattered individuals between, it seems prudent to recognize them as two separate populations.

Tepee Creek 005 was located in 1991, approximately one-quarter mile from the mouth on Priest Lake, in the narrow riparian zone along the creek. This population is approximately 150 meters east of FS road 2512. It consists of approximately 20 individuals. Several nearly mature fruits were observed in this population in July, 1991, however, most of the stems were sterile.

Tepee Creek RNA 002 was located in the Tepee Creek Research Natural Area, approximately one-half mile west of FS road 2512, in 1992. This group of 35 genetically distinct individuals is nearly one-half mile upstream from Tepee Creek 005. It occurs in broad, semi-open area in the riparian zone of Tepee Creek. More than 200 individual stems were counted and numerous immature fruits were observed in June, 1992.

Tango Creek 003 is located to the west of FS road 2512 in the relatively narrow riparian zone of Tango Creek. This population extends nearly one-half mile along the creek from approximately one-quarter mile west of road 2512 to just east of the first logging road to the north off of FS road 638. This old logging road goes north toward Bottle Lake after crossing Tango Creek (see Appendix 2). Tango Creek 003 consists of more than 200

genetically distinct individuals and numerous clonal stems.

Additional Areas Surveyed: In addition to the three drainages that support salmonberry, many other drainages in the northern Priest Lake area were surveyed with varying degrees of intensity in 1991 and 1992. The drainages immediately adjacent to Beaver, Tepee, and Tango Creeks were surveyed most intensively. Table 2 contains the list of creeks surveyed on the northwest end of Priest Lake and to the north of Upper Priest Lake that were thought likely to support salmonberry and the degree of intensity of the surveys. It should be noted that salmonberry could occur in the riparian zones of these streams. Even the most intense surveys are somewhat cursory in streams with very broad riparian zones where only a fraction of the habitat can be observed. Therefore, careful surveys of riparian zones of the creeks in Table 2 should be performed if management activities are slated in or near them that might impact salmonberry or other sensitive species found there.

Table 2. Creeks likely to support salmonberry in the northwest Priest Lake area that were surveyed unsuccessfully for salmonberry in 1991 and 1992. The intensity of the survey and the portion of the creek surveyed is also given.

<u>Creek or River</u>	<u>Notes Concerning Survey</u>
Boulder Creek	Entire length surveyed in 1992 by H. Dorman and D. Jenny, Priest Lake RD.
Bottle Creek	Entire length surveyed in 1992.
Distillery Bay	Surveyed in 1991 ephemeral drainages.
Granite Creek	Surveyed from the mouth upstream ca. 2 mi. in 1991, also cursory surveys made upstream to the Washington border.
Reeder Creek	Cursory surveys made from the mouth to one mile upstream from Bismark Meadows.
Hughes Fork	Cursory surveys made from Hughes Meadows to the junction with Upper Priest River.
Upper Priest River	Cursory surveys made from Upper Priest Falls to near the mouth on Priest Lake.
Gold Creek	Cursory surveys made near the WA/ID border Packer Creek. Rather extensive surveys made from near the mouth on Granite Creek up the West Fork into Packer Meadows and up most of the East Fork.

A cursory survey of several creeks on the northeast side of Priest Lake (Idaho State Department of Lands) was also done to determine their potential for supporting salmonberry. Portions of Floss, Caribou, and Lion Creeks were surveyed without success, as was Indian Creek in 1991. The substrate and associated riparian understory vegetation on the northeast side of the lake seemed quite different than on the northwest side of the lake. It did not appear likely that these streams would support salmonberry.

Habitat and Associated Species: On the Priest Lake RD, salmonberry is a species of riparian zones in mature to old-growth cedar/hemlock forests, often of the Thuja plicata/Oplopanax horridum habitat type (Cooper et al. 1987). It is commonly associated with understory species of well-developed riparian zones, including Oplopanax horridum, Athyrium felix-femina, Alnus incana, Cornus stolonifera, Acer glabrum, Streptopus amplexifolius, Vaccinium globulare, Viburnum edule, Tiarella trifoliata, Gymnocarpium dryopteris, Circaea alpina, and Rubus parviflorus. Salmonberry is most common on moist to wet (seasonally) soils with deep organic layers but it was also observed on river cobble bars growing within the streambed.

Other Sensitive Species: Salmonberry occurs sympatrically with several other species considered sensitive on the IPNFs (USDA Forest Service 1991). These include Botrychium sp. on Beaver and Tepee Creeks, several small populations of Tellima grandiflora on Beaver Creek, several small populations of Thelypteris phegopteris on Beaver Creek, and a small population of Blechnum spicant on Beaver Creek.

Ecology: Salmonberry appears to be suited to a wide range of conditions within very narrow habitat requirements. Throughout its range of occurrence in northern Idaho, salmonberry seems to be restricted to three different habitat types: Thuja plicata/Oplopanax horridum, Thuja plicata/Athyrium felix-femina, and Tsuga heterophylla/Gymnocarpium dryopteris (Cooper et al. 1987). These three habitat types occur in a mosaic within the riparian zones of many streams in this part of northern Idaho. In some areas these habitats are densely vegetated, particularly in broad, open riparian zones while in narrower riparian zones the vegetation appears less dense and robust. Salmonberry appeared to do equally well in each of these habitat types, in broad, open riparian zones as well as narrow, well-shaded riparian zones. The most robust individuals of salmonberry occurred in the broader riparian areas with high light penetration.

Salmonberry occurred on substrates ranging from moist to mucky soils with deep duff and organic horizons, on terraces above the creek, and occasionally on cobbly soils on slightly raised bars within the streambed. Occasionally, individuals were observed in upland stands, directly adjacent to the riparian zones, with more mesic soils and on tip-up mounds well-isolated from the water

table.

The response of salmonberry to fire is unknown. Although much of the drainages in which salmonberry occurs in northern Idaho were burned during the last century, the lower terraces above the creeks remained unburned and are dominated by mature or old-growth stands of cedar and hemlock.

The response of salmonberry to human related disturbances may be inferred from demographic data gathered during field surveys. The building of the Beaver Creek Road (FS 1341) impacted portions of Beaver Creek 001 where the road crosses the major northern tributaries. Small openings such as road cuts appear to benefit individuals of salmonberry, likely by increasing available light while impacting a small enough canopy area that frost protection and climatic amelioration, provided by adjacent trees, is not reduced. Some very robust and sexually reproducing individuals were observed in these road cuts (see Map 4, Appendix 2). It should be remembered that road cuts in mature forested areas open up very isolated patches of forest.

The affect of more continuous canopy removal, including clearcutting, is likely to negatively impact populations of salmonberry. Beaver Creek 001 extends up the main branch up to the border of a large clearcut on the north and south sides of the drainage in section 11 (see Map 3, Appendix 2). It does not appear likely that the range of salmonberry up the main branch happened to, by chance, end at the clearcut border. The elevation of Beaver Creek at the eastern edge of the clearcut is 3560 feet. In the northwestern tributary of Beaver Creek, less than one mile to the north (see map 4, Appendix 2), salmonberry occurs as high as 4150 feet, and the habitat is identical to the habitat in the undisturbed riparian zone just east of the clearcut. Consequently, it appears likely that tree harvesting activity, in particular clearcutting, has wiped out a portion of Beaver Creek 001. At elevations this high, canopy removal leaves marginally adapted species susceptible to early and late frosts which do not affect understory species if a canopy is in place. It is reasonable to infer that a coastal disjunct species like salmonberry would die out at high elevations when the ameliorating effect of the canopy was removed.

Salmonberry does not occur above the clearcut, however, the riparian habitat is quite different and the stream has a much steeper gradient above the clearcut (see map 5, Appendix 2). The riparian zone above the clearcut was also highgraded at some time during the last 30 years, opening portions of the canopy.

CONSERVATION STATUS

Conservation Status - Idaho: In his review of salmonberry for the Idaho rare plant project of the Idaho Natural Areas Council, Johnson (1981) recommended that it be placed on the State Watch List, noting that it was only known from one historical collection from 1901 in Idaho. He also noted that salmonberry may have been extirpated by logging, fire, or development around the lake as attempts to relocate it, which included putting up "wanted" posters had all failed.

Salmonberry is currently listed as a Watch Species for the Northern Region of the Forest Service in Idaho (USDA Forest Service 1991). Bursik (1992) recommended that it be upgraded to a sensitive species because it was located on USFS lands in 1991.

The Idaho Native Plant Society currently lists salmonberry as a Priority 2 species (Idaho Native Plant Society 1992). The Priority 2 category refers to taxa that are most likely to be classified as Priority 1 in the foreseeable future in Idaho, if factors contributing to their decline or habitat degradation or loss continue.

The Idaho CDC considers salmonberry G5 S1 [G5 = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery, S1 = taxon critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction (Moseley and Groves 1992)].

Threats: No threats are apparent to Tepee Creek 005, Tepee Creek RNA 002, and Tango Creek 003. Tepee Creek RNA 002 is protected within a Research Natural Area. As long as no timber harvesting, road building, or trail construction occurs within, or immediately adjacent to Tango Creek 003 or Tepee Creek 005, no threats exist to the viability of these populations, either.

Threats exist to portions of Beaver Creek 001. Recent construction of the group campsite adjacent to Beaver Creek 001 in the Beaver Creek Campground has resulted in tree removal and some minor ground disturbance in parts of this population. Also, recent upgrading and paving of the road through the Beaver Creek Campground to the Navigator Trailhead has impacted several individuals of salmonberry in this area. The portions of Beaver Creek 001 next to the FS road 1341 are threatened by road maintenance and improvement activities such as blading, brushing, and herbicide spraying. Large-scale timber harvesting in the Beaver Creek drainage near salmonberry could negatively impact portions of the population.

Management Implications: Current management of populations of salmonberry on the Priest Lake RD appears compatible with their long-term viability. The portions of Beaver Creek 001 that occur along FS road 1341 and in the Beaver Creek Campground should be considered if management activities such as road construction, road maintenance, campground construction, or herbicide spraying is to occur in these areas. Timber harvesting in drainages supporting salmonberry should be restricted to areas well-buffered from salmonberry-supporting habitat.

Because salmonberry is clearly restricted to old growth and mature riparian forests, it seems apparent that to insure the long-term viability of the four known populations, the habitat currently supporting salmonberry should be very carefully preserved.

Also, land managers should assume that no additional populations of salmonberry exist in Idaho beyond the four populations on the northwest end of Priest Lake. Although seemingly much suitable habitat exists for salmonberry in extreme northern Idaho, no additional populations have been located despite extensive surveys (see Table 2).

Long-term Monitoring Potential: The effects of management activities on the survival and/or recolonization of salmonberry on a given site could be monitored on the Priest Lake RD. The vegetative and reproductive vigor of portions of Beaver Creek 001 affected by road building could be monitored to ascertain the effects of small-scale canopy removal on salmonberry. Assuming that the habitat requirements are appropriate to support salmonberry in the clearcut in the upper reaches of Beaver Creek, permanent plots could be positioned in this portion of the riparian zone to monitor recolonization by salmonberry. Or, more simply, careful visual reconnaissance could be conducted by Priest Lake RD biologists every five years to note potential recolonization and habitat recovery.

ASSESSMENTS AND RECOMMENDATIONS

Summary: Salmonberry was rediscovered in 1991 in three drainages on the northwest end of Priest Lake on the Priest Lake RD. Further surveys in 1992 revealed a total of four populations on Tango, Tepee, and Beaver Creeks. Two of the populations consist of more than 200 individuals and occur over a minimum of 0.5 mile along these creeks and their tributaries (Beaver Creek 001 and Tango Creek 003). The two populations on Tepee Creek are very small (less than 50 individuals) and are restricted to a very short stretch of the stream. All occur in mature cedar/hemlock forests in well-developed riparian zones. Portions of Beaver Creek 001 could be threatened by road or campground construction or by herbicide spraying. This population should be considered when such activities are planned. Measures should be taken to

preserve the habitat supporting Tepee Creek 005 and Tango Creek 003 from any potentially damaging management activities. Tepee Creek RNA 002 is currently protected within a Research Natural Area.

The potential exists to establish a long-term monitoring program to ascertain the effects of management activities on the persistence and recolonization potential of salmonberry. At least three separate portions of Beaver Creek 001 are located in disturbed areas along road cuts or adjacent to Beaver Creek Campground. Individuals are currently persisting in these areas. For management purposes it would be of interest to know if and for how long these individuals can persist and or spread within the disturbed habitat. Also, a large clearcut area in the upper reaches of Beaver Creek in all likelihood supported salmonberry prior to being cut. Monitoring of recolonization of this stretch of stream by salmonberry could help land managers better understand its biology in northern Idaho.

Recommendations to the Regional Forester: Salmonberry is a coastal disjunct species rediscovered in northern Idaho on the Priest Lake RD in 1991. Surveys in 1991 and 1992 revealed that salmonberry has a limited distribution in Idaho, having been found in three drainages on the northwest end of Priest Lake in four populations, two of which consist of fewer than 50 individuals. Based on this information, I recommend that salmonberry be moved from the Northern Region Watch List for species suspected to occur on the IPNFs, to the Northern Region List of Sensitive Species for species known to occur on the IPNFs, and for which population viability is a concern.

Land management activities in drainages supporting salmonberry should be undertaken in a manner that does not impact these populations in any way. Rather extensive surveys of adjacent drainages for salmonberry in 1991 and 1992 indicate that it may indeed be restricted to these three drainages in Idaho. Therefore, care must be taken to insure the long-term viability of these populations. There is potential for monitoring the effects of management activities on the long-term viability of portions of Beaver Creek 001 where (1) clearcutting has likely wiped out part of this population in the upper stretches of the main branch of Beaver Creek and (2) in areas along FS road 1341 where the canopy has been removed along the creek and where individuals of salmonberry are persisting and apparently thriving in these small canopy openings. A protocol for such long-term monitoring is outlined in this document.

Recommendations to the Idaho Panhandle National Forests: Current management of the four known populations of salmonberry on the Priest Lake RD appears to be compatible with the long-term viability of these populations. The population on Beaver Creek and its tributaries warrant special consideration when potentially

destructive management activities such as road construction, road maintenance, campground construction, or herbicide spraying are undertaken in this area, particularly within the Beaver Creek Campground and along FS road 1341.

Because much potential habitat for salmonberry was surveyed during 1991 and 1992 and only four populations in three drainages were found, it should be assumed that salmonberry is an extremely rare species in Idaho. The potential exists for long-term monitoring of management activities on salmonberry survival and recolonization in habitats altered by clearcutting and road building. The monitoring program could be implemented at little cost and could provide valuable information about the biology and ecology of salmonberry and the compatibility of the long-term viability of salmonberry populations on the Priest Lake RD with forest management activities.

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APPENDIX 1

Line drawings of Rubus spectabilis and closely related species on the Priest Lake Ranger District. *

1. Rubus spectabilis
2. Rubus leucodermis
3. Rubus idaeus

*All drawings from: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. 1959-1969. Vascular Plants of the Pacific Northwest: Parts 1-4. University of Washington Press, Seattle.

APPENDIX 2

Mapped locations of salmonberry populations on the Priest Lake Ranger District.

- Map 1. Beaver Creek 001. Portion of 1967 Priest Lake NE 7.5' quadrangle
- Map 2. Beaver Creek 001. Portion of 1966 Priest Lake NW 7.5' quadrangle
- Map 3. Beaver Creek 001. Portion of 1966 Priest Lake NW 7.5' quadrangle
- Map 4. Beaver Creek 001. Portion of 1966 Upper Priest Lake 7.5' quadrangle
- Map 5. Tepee Creek RNA 002. Portion of 1967 Priest Lake NE 7.5' quadrangle
- Map 6. Tango Creek 003. Portion of 1966 Priest Lake NW 7.5' quadrangle
- Map 7. Tepee Creek 005. Portion of 1967 Priest Lake NE 7.5' quadrangle

APPENDIX 3

Occurrence records for salmonberry on the Priest Lake Ranger District.

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