

## **IV. Little Wenatchee LSR, Twin Lakes MLSA**

### **A. General Description of LSR**

This portion of the document describes the vegetation, wildlife, aquatic resources and human uses associated with this LSR.

#### **1. Vegetation**

This section describes the current condition of vegetation groups within the Little Wenatchee LSR and Twin Lakes MLSA. Data were derived by modeling (see Vegetative Landscape section). It should be noted that site specific information regarding vegetation structure and distribution will need to be updated as restoration projects are initiated. The idea would be to use the vegetation layer derived for this analysis as a starting point only.

Information is provided below regarding each vegetation group.

##### **a) Vegetation Group**

###### **(1) Dry Forest Group**

This forest group is not present in either the Little Wenatchee LSR or the Twin Lakes MLSA.

###### **(2) Mesic Forest Sites (Embedded within the Dry Forest Group)**

This forest group is not present in either the Little Wenatchee LSR or the Twin Lakes MLSA.

###### **(3) Moist Grand Fir Group**

Six percent (314 acres) of the Twin Lakes MLSA and one percent (319 acres) of the Little Wenatchee LSR consists of the moist grand fir group (Appendix 4 and 5). Within the Twin Lakes MLSA, moist grand fir plant associations are found on the north side of the larger of Twin Lakes. Moist grand fir plant associations occurs only in the eastern-most lobes of the Little Wenatchee LSR. No discussion of structure is warranted since the acreage of this forest group is so limited in either LSR/MLSA.

No information is currently available for a discussion of species composition in either LSR/MLSA.

###### **(4) Wet Forest Group**

The largest portion of the Little Wenatchee LSR and the Twin Lakes MLSA consists of the wet forest group (84 percent, 43,994 acres and 79 percent, 4,426 acres, respectively; Appendix 4 and 5. More than half (64 percent, 28,297 acres (Little Wenatchee) and 59 percent, 2,596 acres (Twin Lakes)) of this forest group consists of layered or mature stands in both LSR/MLSA. Created openings are largely the result of past timber harvest and are mostly located in the vicinity of the Little Wenatchee River or in Big Meadow Creek. The amount of created openings are likely less than accurately mapped because of the inability of the modeling effort to distinguish between human-caused created openings and inherent openings in vegetation. Openings in high elevations are likely the result of avalanches or are upland meadows or brush fields. Site specific data will need to be collected before projects are initiated.

The wet forest group within both the Little Wenatchee LSR and the Twin Lakes MLSA is fairly contiguous. Western hemlock and silver fir are the most common overstory dominants forming contiguous forest. Mountain hemlock becomes more important at higher elevations. Douglas-fir is

the primary seral dominant in this forest group, but both lodgepole and western white pine are present, although scattered. Understory shrubs include *Acer circinatum*, *Rhododendron albiflorum*, *Vaccinium* spp., and *Menziesia ferruginea* and herbs include *Clintonia uniflora*, *Asarum caudatum*, *Berberis nervosa*, *Pyrola* spp., and *Goodyera oblongifolia*.

Within Little Wenatchee LSR, the wet forest group includes some uncommon community types. Alaska yellow cedar (*Chamaecyparis nootkatensis*) forms the community dominant in a few locations; in Theseus and Smithbrook Creek. Noble fir (*Abies procera*) communities can be found in the Mill Creek and upper Nason Drainages.

(5) Subalpine Fir Series

The subalpine fir series constitutes 2 percent (1,216 acres) of the Little Wenatchee LSR and one percent (58 acres) of the Twin Lakes MLSA (Appendix 4 and 5). Approximately 80 percent (964 acres) of this series is mapped as layered or mature in the Little Wenatchee LSR (Appendix 4). Subalpine fir forests occur in three disjunct location within the Little Wenatchee LSR: on Wenatchee Ridge, near Rock Mountain, and at the headwaters of Henry Creek. In the Twin Lakes MLSA, subalpine fir is found on Chiwawa Ridge.

Subalpine fir is the most widespread species within the overstory (Wenatchee National Forest, Ecology Plot Database). Common seral dominants include lodgepole pine and Engelmann spruce. No site specific information regarding understory species composition is available at this time.

(6) Whitebark Pine/Subalpine Larch Group and High Elevation Nonforest Types

A small amount (147 acres) were identified as supporting whitebark pine or subalpine larch within the Little Wenatchee LSR. This vegetation type is not present within the Twin Lakes MLSA. In the Little Wenatchee LSR, whitebark pine/subalpine larch is found mostly on the Rock Mountain and Nason Ridge.

No information is presently available regarding species composition within this stand of whitebark pine/subalpine larch.

(7) Non-Forest Vegetation

There are approximately 6,483 acres (13 percent of LSR) of non-forest vegetation within the Little Wenatchee LSR. Fourteen percent (776 acres) of the Twin Lakes MLSA is of non-forest vegetation. In the Little Wenatchee LSR, non-forest vegetation includes: grassland/shrubland (32 acres), bedrock (302 acres), talus (91 acres), cliffs (138 acres), wet meadows (1,073 acres), upland meadow (222 acres), brushfield (4,931 acres), and water (58 acres). In the Twin Lakes MLSA, non-forest vegetation includes: water (298 acres), cliff (60 acres), brushfield (344 acres), and grassland/shrubland (64 acres). Since both the LSR/MLSAs were modeled wet, dry, upland meadows, and brushfields are under-estimated. In addition, grassland/shrubland is likely mapped incorrectly since this vegetation type is meant to be steppe vegetation.

Brushfields are the most common community type identified. Brushfields result from disturbances to forest vegetation, primarily avalanches or logging. Most of the acres identified may be more appropriately attributed as created openings since they are early seral communities that will eventually give way to forest vegetation. Avalanche chutes may indefinitely remain brushfields.

Brushfields are largely dominated by *Acer circinatum* and *Alnus sinuata*. Other shrubs or forbs present include *Sorbus sitchensis*, *Pachistima myrsinites*, *Lupinus* spp., and *Epilobium angustifolium*.

Green fescue (*Festuca viridula*) meadows can be found near Big Chief Mountain in upper Mill Creek. These occur on glacial till in cirque valleys and are adjacent to silver fir and mountain hemlock

layered/mature forests. Some meadow communities occur on old landslides and avalanche chutes where moisture is abundant in early spring and summer and dry out in late summer and fall. These meadows drain into Engelmann spruce and western red cedar forest.

(8) Species with Special Status

Within the Little Wenatchee LSR, there is potential habitat for a number of special status species, but few surveys have been carried out to determine presence or absence. Surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most rare species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There are ten survey and manage and/or sensitive vascular plant species known to occur within the Little Wenatchee LSR (Appendix 6). Also, there are number of other late-successional associated vascular plant species known to occur in the LSR (Appendix 6). The sensitive species include: *Botrychium montanum*, *B. pinnatum*, *B. lanceolatum*, *B. minganense*, *B. lunaria*, *Carex buxbaumii*, *C. proposita*, *C. saxatilis* var. *major*, *C. scopulorum* var. *prionophylla*, and *Cephalanthera austineae*. Information regarding the biology or ecology of these species is limited, but some information is summarized.

Habitat information regarding *Botrychium* species has been collected and summarized in a number of publications; as well as local information specific to habitats in the Little Wenatchee LSR (on file at the Lake Wenatchee Ranger District). The Little Wenatchee LSR, and the Little Wenatchee drainage in particular, contain some populations of *Botrychium* which are unusual in the number of individuals and area they cover. It is not uncommon for some populations to have hundreds of individual plants and to consist of any combination of the species listed above. One such population is located within a campground that receives a high amount of use seasonally. At least two subdrainages have been recognized to contain exemplary conditions to warrant a possible status as a Botanical Interest Area (Laura Potash, MBS NF, pers.comm.). The Twin Lakes MLSA also supports numerous populations of *B. minganense* and *B. montanum* in similar habitats as that in the Little Wenatchee LSR. In fact, this extension of similar habitats and consequent *Botrychium* populations, continues into the Chiwawa LSR to the northeast. *Carex buxbaumii* is found in sunny swamps or wet meadows in calcareous regions. It is widespread throughout North America and Eurasia, but it is very local in much of its range. Washington is its western limit, and may be why it's not common in this area (Mackenzie 1935). *Carex proposita* is found on talus slopes in alpine environments. It has a disjunct distribution in Washington, central Idaho, and the central Sierra Nevada, and is uncommon in all of these areas (Alan Yen, University of Washington, pers. comm.). *Carex scopulorum* var. *prionophylla* is found along gravelly creeks and in subalpine meadows (Standley 1985). It is a well-marked local variety of the common *C. scopulorum*. Finally, *Carex saxatilis* var. *major* has been changed to *C. saxatilis* (Ford and Ball 1992), since the original varietal name was based on a specimen that is a hybrid between *C. saxatilis* and *C. utriculata* and is no longer considered a separate taxon.

The Wet Forest Group provides habitat for a large number of bryophyte, fungi, and lichen species (see Chapter 4 of Forest-wide Assessment). *Ptilidium californicum*, a liverwort which occurs in silver fir forests above 5000' is present on Big Chief Mountain in the Little Wenatchee LSR and is the only known site on the Wenatchee National Forest. It occurs within an area that exhibits a number of unique ecological and biological characters. This area, from Big Chief Mt. to Mill Creek below, was identified in the Mill Brook Environmental Assessment and Nason Creek Watershed Assessment (on file at the Lake Wenatchee Ranger District) as a potential Research Natural Area. There are a number of other non-vascular plant species known to occur within the Little Wenatchee LSR. Seventeen survey and manage fungal species and 7 survey and manage lichen species have been

located in the Little Wenatchee LSR (Appendix 6). The fact that only two species of fungi and one species of lichen have been collected in the Twin Lakes MLSA is likely a function of the number of surveys known to have taken place. The species of fungi range from the fairly common *Cantharellus* and *Gyromitra* species listed in the Record of Decision, to the more rare *Bondarzewia montanum* and *Polyozellus multiplex*. The former species are apparent in the earlier seral communities and the latter in the more layered mature conditions. Within the upper Mill Creek drainage and along parts of Nason Ridge, noble fir communities (*Abies procera*) exist which may afford habitat for *Bridgeoporus* (*Oxyporus*) *nobilissimus* (FSEIS 1994, App. J2). This species is only known from a half dozen sites in Washington and Oregon and requires a protected area of one square mile be set up around known populations (App. J2). Surveys for this species should be undertaken within potential habitats to protect this extremely rare species.

Lichens are also abundant and diverse in the Wet Forest Group. Rare pin lichens, *Calicium* and *Chaenotheca* spp., and nitrogen fixing lichens, *Nephroma* and *Lobaria* spp., (Appendix 6), are fairly common in some parts of the Little Wenatchee LSR and Twin Lakes MLSA. Their presence reflects the existence and quality of habitat including areas of insulated microclimates, high air quality and presence of large standing snags and/or partially decorticated trees. As with the fungi, surveys are necessary to augment the incidental collections made to present to determine a more accurate ecological perspective.

**Table IV-1, Sensitive and Survey and Manage Species in the Little Wenatchee LSR and Twin Lakes MLSA.**

| Group  | Latin Name                       | Common Name | Federal | State | Forest Service |
|--------|----------------------------------|-------------|---------|-------|----------------|
| FUNGI  | <i>Bondarzewia montana</i>       |             |         |       | SM             |
| FUNGI  | <i>Cantharellus cibarius</i>     |             |         |       | SM             |
| FUNGI  | <i>Cantharellus subalbidus</i>   |             |         |       | SM             |
| FUNGI  | <i>Cantharellus tubaeformis</i>  |             |         |       | SM             |
| FUNGI  | <i>Clavariadelphus ligula</i>    |             |         |       | SM             |
| FUNGI  | <i>Clavariadelphus truncatus</i> |             |         |       | SM             |
| FUNGI  | <i>Gomphus clavatus</i>          |             |         |       | SM             |
| FUNGI  | <i>Gomphus floccosus</i>         |             |         |       | SM             |
| FUNGI  | <i>Gyromitra esculenta</i>       |             |         |       | SM             |
| FUNGI  | <i>Gyromitra infula</i>          |             |         |       | SM             |
| FUNGI  | <i>Gyromitra montana</i>         |             |         |       | SM             |
| FUNGI  | <i>Hydnum repandum</i>           |             |         |       | SM             |
| FUNGI  | <i>Mycena hudsoniana</i>         |             |         |       | SM             |
| FUNGI  | <i>Otidea onotica</i>            |             |         |       | SM             |
| FUNGI  | <i>Polyozellus multiplex</i>     |             |         |       | SM             |
| FUNGI  | <i>Sarcodon imbricatum</i>       |             |         |       | SM             |
| FUNGI  | <i>Sarcosoma mexicana</i>        |             |         |       | SM             |
| LICHEN | <i>Calicium abietinum</i>        |             |         |       | SM             |
| LICHEN | <i>Calicium viride</i>           |             |         |       | SM             |
| LICHEN | <i>Chaenotheca fufuracea</i>     |             |         |       | SM             |
| LICHEN | <i>Lobaria linita</i>            |             |         |       | SM             |

|                |  |                         |  |   |    |
|----------------|--|-------------------------|--|---|----|
| LICHEN         | <i>Lobaria pulmonaria</i>                        |                         |  |   | SM |
| LICHEN         | <i>Lobaria scrobiculata</i>                      |                         |  |   | SM |
| LICHEN         | <i>Nephroma resupinatum</i>                      |                         |  |   | SM |
| VASCULAR PLANT | <i>Allotropa virgata</i>                         | sugarstick              |  |   | SM |
| VASCULAR PLANT | <i>Botrychium lanceolatum</i>                    | lance-leaved grape-fern |  |   | S  |
| VASCULAR PLANT | <i>Botrychium lunaria</i>                        | moonwort                |  |   | S  |
| VASCULAR PLANT | <i>Botrychium minganense</i>                     | Victorin's grape-fern   |  |   | SM |
| VASCULAR PLANT | <i>Botrychium montanum</i>                       | mountain moonwort       |  | S | SM |
| VASCULAR PLANT | <i>Botrychium pinnatum</i>                       | St. John's moonwort     |  | S |    |
| VASCULAR PLANT | <i>Carex buxbaumii</i>                           | Buxbaum's sedge         |  | S |    |
| VASCULAR PLANT | <i>Carex proposita</i>                           | smoky mountain sedge    |  | S |    |
| VASCULAR PLANT | <i>Carex saxatilis</i> var. <i>major</i>         | russet sedge            |  | S |    |
| VASCULAR PLANT | <i>Carex scopulorum</i> var. <i>prionophylla</i> | saw-leaved sedge        |  | S |    |

Key to Columns: "\*" **Federal status** - "SP" = Special Protection; "+" **Washington state status** - "S" = Sensitive, "T" = Threatened, "E" = Endangered; "++" **Forest Service designations** - "SM" = Survey and Manage

#### (9) Noxious Weeds

A portion of the Little Wenatchee LSR was surveyed in 1992 for noxious weed species that occur along roadsides (McRae and Harrod unpubl. report). High densities of *Centaurea diffusa* are present along roads particularly along the main Little Wenatchee River Road, Highway 2, and Mill Creek. Other species include *Chrysanthemum leucanthemum*, *Hypericum perforatum*, *Linaria dalmatica*, *Verbascum thapsus*, *Tanacetum vulgare*, *Cytisus scoparius*, *Cirsium vulgare*, and *Cirsium arvense*. Also *Centaurea maculosa* in Little Wenatchee. No surveys have been completed for the Twin Lakes MLSA. Surveys for species presence and extent should be completed in order to develop a noxious management plan for this MLSA (refer to Harrod 1994).

## 2. Late Successional Associated Wildlife Species

### a) Introduction

In this chapter, information is presented about wildlife species that are associated with the late-successional habitats that are either present or would be managed for in the Little Wenatchee LSR and the Twin Lakes MLSA. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, unknown or suspected to occur within the LSR. The list of these species can be found in Appendix 27.

In addition to consideration for the groups of species associated with the various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, species of concern (USFWS), management indicator, protection and buffer, and survey and manage species. Collectively this group of species is referred to as species of special status. What information is available about the status of these species

within the Little Wenatchee LSR and Twin Lakes MLSA is summarized in this chapter. However, relatively little is known about a number of them.

Inventories or surveys have been conducted for only a few of the wildlife as shown in Appendix 27. The most extensive of these were for mule deer, elk and spotted owls. Northern spotted owl inventories have been conducted over about 50% of the suitable habitat within the Little Wenatchee LSR and 100% within the Twin Lakes MLSA.

b) Late Successional Species By Habitat Type

(1) Moist Grand Fir Group

The Moist Grand Fir group covers about 319 acres (1%) of the Little Wenatchee LSR and 314 (6%) of the Twin Lakes MLSA. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to the Disturbance Chapter in the Forest-wide Assessment), allowing successional advancement and complex habitat structure such as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Icicle LSR.

Currently, about 172 acres (54%) of the Moist Grand Fir group in the Little Wenatchee LSR is in a late-successional condition and 117 acres (37%) of the Moist Grand Fir in the Twin Lakes MLSA is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 301 acres (94%), and in 100 years 319 acres (100%) of this habitat would be in a late-successional condition in the Little Wenatchee LSR. In the Twin Lakes MLSA it is expected that in 50 years 267 acres (85%), and in 100 years 314 acres (100%) would be in a late-successional condition, assuming no large scale disturbance.

Wildlife species associated with the late-successional conditions of this vegetation group and of special status include the northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascade frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten and fisher.

The Moist Grand Fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability. Nine known spotted owl activity centers occur within this vegetation group and the wet forest vegetation group. One spotted owl activity center occurs within this vegetation group and the wet forest group in the Twin Lakes MLSA.

(2) Wet Forest Group

The Wet Forest Group covers about 43,994 acres (84%) of the Little Wenatchee LSR and 4,426 (79%) of the Twin Lakes MLSA. Historically fire occurred relatively infrequently (refer to the Disturbance Chapter in the Forest-wide Assessment) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently, 28,297 acres (64%) are in a late-successional condition in the Little Wenatchee LSR and 2,596 acres (59%) in the Twin Lakes MLSA are in a late-successional condition. In the absence of

any large scale disturbances in 50 years 38,241 acres (87%) would be in a late-successional condition, and in 100 years 43,990 acres (99%) would be late-successional within the Little Wenatchee LSR. In the Twin Lakes MLSA it is expected that in 50 years 3,736 acres (84%), and in 100 years 4,426 acres (100%) would be in a late-successional condition, assuming no large scale disturbances.

Wildlife species that are associated with the late-successional conditions of this vegetation group and are of special status include northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, Warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten, and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. Nine known spotted owl activity centers are located within this vegetation group and the Moist Grand Fir Group in the Little Wenatchee LSR. One spotted owl activity center is located in the wet forest and moist grand fir vegetation groups in the Twin Lakes MLSA.

### (3) Subalpine Fir/White Bark Pine

Subalpine Fir covers about 1,216 acres (2%) of the Little Wenatchee LSR and 58 acres (1%) of the Twin Lakes MLSA. Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire return interval allowed for successional advancement that resulted in complex habitat structure such as high canopy closure, high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the LSR are associated with the late-successional conditions of these forests.

Currently, about 964 acres (79%) of the Subalpine Fir forests are in a late-successional condition within the Little Wenatchee LSR and 50 acres (86%) in the Twin Lakes MLSA. In the absence of any large scale disturbances it is expected that in 50 years 1,160 acres (95%), and in 100 years 1,216 acres (100%) would be in a late-successional condition in the Little Wenatchee LSR. In the absence of any large scale disturbance within the Twin Lakes MLSA it is expected that in 50 years 54 acres (93%) and in 100 years 58 acres (100%) would be in a late-successional condition.

Wildlife species that are associated with the late-successional forest in this vegetation group and have special status include the tailed frog, Cascade frog, Larch Mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat

### c) Species Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix 27 as species of special status. Information is provided on a species by species basis whenever it is available.

#### (1) Endangered Or Threatened Wildlife Species

There are five wildlife species that are federally listed as Threatened or Endangered and could occur within the Little Wenatchee LSR and Twin Lakes MLSA. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*) and portions of Critical Habitat Units WA-7 and WA-8 for spotted owls.

(a) Bald Eagle and Peregrine Falcon

The bald eagle is known to occur within the Little Wenatchee LSR and the Twin Lakes MLSA, surveys have been conducted on 10% of the Little Wenatchee LSR and 50% of the Twin Lakes LSR. There is an active bald eagle nest, 5 miles downstream from the Little Wenatchee LSR. The Twin Lakes area is a potential nest site noted in the Pacific States Bald Eagle Recovery Plan.

Peregrine falcons are suspected to occur within the LSR and MLSA. Cliff habitat in the LSR/MLSA is along Rock Mountain, Mount Howard, Wenatchee Ridge, Dirtyface Ridge and Chiwawa Mountains. None of the habitat has been surveyed.

(b) Northern Spotted Owls

A total of 9 spotted owl pairs occur within the Little Wenatchee LSR. There is an additional spotted owl, SO601, adjacent to the LSR, within the Glacier Peak Wilderness. The Twin Lakes MLSA has one spotted owl pair utilizing a home range within the MLSA. The Twin Lakes spotted owl pair SO611 is within the Glacier Peak Wilderness. The MLSA is unique on the Forest, in that it surrounds this wilderness pair. The Wilderness habitat is very important to the function of the Twin Lakes MLSA, as well as connectivity between the Little Wenatchee and Chiwawa LSRs. The Little Wenatchee/Twin Lakes areas are in the wetter portion of the Forest. The Little Wenatchee LSR and Twin Lakes MLSA were established to maintain connectivity across the Cascade crest for inter-provincial owl movement. They also provide essential linkage between LSRs and wilderness areas in the eastern Cascades.

Spotted owl habitat for nesting, roosting and foraging within the two LSR/MLSAs totals 32,304 acres (56% of the combined LSR/MLSA). The Little Wenatchee LSR has 29,534 acres (56%) of spotted owl habitat. The Twin Lake MLSA has 2,770 acres (50%) of spotted owl habitat. There is potential for spotted owl habitat to reach 45,470 acres (87%) in Little Wenatchee and 4,794 acres (86 %) in Twin Lakes. Dispersal habitat (which may grow into foraging, roosting and nesting), covers 10,259 acres (20%) of Little Wenatchee LSR and 1,294 acres (23%) of the Twin Lakes MLSA. All spotted owl habitat, and potential habitat is within the wetter forest groups, and is sustainable over time.

Within the Little Wenatchee LSR, 50% of the spotted owl habitat has been inventoried. The Twin Lakes MLSA has had 100% inventoried

The estimated amount of habitat within a 1.8 mile radius of the 10 activity centers is shown in the following table. Also, see "Spotted Owl Activity Centers, Reproductive Status and Habitat Availability" in the Appendices of the Forest-wide Assessment. One activity center, SO602 Little Wenatchee Ford, is below threshold habitat levels within it's 500 acre core. All other spotted owl home ranges in the Little Wenatchee LSR are above threshold acreage of 2,663 acres within 1.8 miles radius. Three are above target acres of 3,994 acres. The Twin Lakes MLSA spotted owl SO-611, is below threshold for it's 500 acre core, but above threshold for it's home range. The two spotted owl sites below threshold need to be monitored for habitat verification.

**Table IV-2, Spotted owl Information for the Little Wenatchee LSR and Twin Lakes MLSA**

| Spotted Owl            | Repro Status <sup>3</sup> | Ownership <sup>4</sup> | Dry or Wetter Owl <sup>5</sup> | Threshold <sup>6</sup> | Critical Habitat Unit (CHU) | Forest Interior? <sup>8</sup> | Existing SSOH 1.8 mi Radius & 0.7 mi R <sup>10</sup> | Activity Center 100 Ac <sup>11</sup> | Total Dispersal Habitat <sup>9</sup> |
|------------------------|---------------------------|------------------------|--------------------------------|------------------------|-----------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|
| <b>Little Wen. LSR</b> |                           |                        |                                |                        |                             |                               |  |                                      |                                      |
| SO601 <sup>1</sup>     | P                         | FS wildness            | Wet                            | At Threshold           | WA-7 <sup>7</sup>           | Inside                        | 3,931 ac in 1.8<br>734 ac in 0.7                     | 163 ac<br>w/n 0.33                   | 716                                  |
| SO602                  | P                         | FS                     | Wet                            | Below Threshold        | WA-7                        | Inside                        | 3,288 ac in 1.8<br>347 ac in 0.7                     | 59 ac<br>w/n 0.33                    | 1,526                                |
| SO603                  | PY                        | FS                     | Wet                            | At Threshold           | WA-7                        | Inside                        | 3,598 ac in 1.8<br>692 ac in 0.7                     | 185 ac<br>w/n 0.33                   | 1,438                                |
| SO614                  | P                         | FS                     | Wet                            | At Threshold           | WA-7                        | Inside                        | 3,873 ac in 1.8<br>714 ac in 0.7                     | 153 ac<br>w/n 0.33                   | 1,016                                |
| SO624                  | PY                        | FS                     | Wet                            | At Threshold           | WA-8                        | Near                          | 3,540 ac in 1.8<br>779 ac in 0.7                     | 199 ac<br>w/n 0.33                   | 644                                  |
| SO631                  | PY                        | FS                     | Wet                            | Optimum                | WA-7                        | Inside                        | 4,037 ac in 1.8<br>755 ac in 0.7                     | 185 ac<br>w/n 0.33                   | 1,179                                |
| SO632                  | PY                        | FS                     | Wet                            | At Threshold           | WA-8                        | Inside                        | 3,342 ac in 1.8<br>647 ac in 0.7                     | 139 ac<br>w/n 0.33                   | 1,523                                |
| SO648                  | P                         | FS                     | Wet                            | Optimum                | WA-7                        | Inside                        | 4,253 ac in 1.8<br>603 ac in 0.7                     | 135 ac<br>w/n 0.33                   | 1,496                                |
| SO653                  | PY                        | FS                     | Wet                            | Optimum                | WA-7                        | Near                          | 4,353 ac in 1.8<br>594 ac in 0.7                     | 108 ac<br>w/n 0.33                   | 1,138                                |
| SO654                  | P                         | FS                     | Wet                            | At Threshold           | WA-8                        | Inside                        | 3,538 ac in 1.8<br>753 ac in 0.7                     | 189 ac<br>w/n 0.33                   | 1,061                                |
| <b>Historic owls</b>   |                           |                        |                                |                        |                             |                               |  |                                      |                                      |
| SO626                  | HS                        | FS                     | Wet                            | NA                     | None                        | Inside                        | NA   | -                                    | -                                    |
| SO647                  | HS                        | FS                     | Wet                            | NA                     | WA-7                        | Near                          | NA   | -                                    | -                                    |
| SO655                  | HS                        | FS                     | Wet                            | NA                     | None                        | Inside                        | NA   | -                                    | -                                    |
| <b>Twin Lakes MLSA</b> |                           |                        |                                |                        |                             |                               |  |                                      |                                      |
| SO611                  | PY                        | FS                     | Wet                            | Below Threshold        |                             | Inside                        | 3,260 ac in 1.8<br>466 ac in 0.7                     | 109 ac<br>w/n 0.33                   | 1,277                                |

<sup>1</sup> Activity Center is Near the LSR or MLSA, but not inside the LSR or MLSA map boundary (< 1/4 mile).

<sup>3</sup> RS = Residential Single; P = Pair; PY = Pair with Young, based on highest Reproductive occupancy. (HS = Historical Single)

<sup>4</sup> FS = Forest Service; PVT = Private Ownership (ownership at activity center).

<sup>5</sup> If the majority of suitable spotted owl habitat in 0.7 mile circle is dry or mesic forest groups, then it is a "dry" spotted owl. If the majority is wetter forest groups, then it is a "wetter" spotted owl.

<sup>6</sup> **Below Threshold:** < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle **OR** < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum/Target:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>7</sup> The activity center is within 1/2 mile of the CHU.

<sup>8</sup> **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

**Near** = activity center is inside late successional habitat that creates a forest interior.

<sup>9</sup> **Dispersal Habitat** within 1.8 mile circle around activity center. **Dry** dispersal habitat includes vegetation codes 11, 13, and 52; **mesic** dispersal includes code 21; and **wet** dispersal includes codes 31, 35, 61, and 41.

<sup>10</sup> **SSOH Habitat** within 1.8 mile radius (home range) and 0.7 mile radius (Core Area). **Dry suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH; **mesic** Suitable includes code 22; and **wetter** Suitable includes codes 32, 36, 62, 64, and 42 (see appendix 2 GIS Veg Model & appendix 3 Veg Photo Mapping Key). Use the highest quality habitat available.

<sup>11</sup> A larger circle than 1/3 mile radius will be used to develop **100 Acre Activity Center**, if there is less than 100 acres of suitable habitat.

(c) Critical Habitat Unit for Northern Spotted Owls

There are two CHUs within the Little Wenatchee LSR and no CHUs within the Twin Lakes MLSA. The Little Wenatchee LSR includes CHU WA-7 (Little Wenatchee to White River) and CHU WA-8 (Mill Creek to Whitepine Creek). These CHUs overlap into 55% of the Little Wenatchee LSR (34,211 acres of CHU). The Little Wenatchee CHU WA-7 should support 5+ spotted owl pairs. The Whitepine CHU WA-8 should support 2 pairs. See Appendix 13 for LSR/MLSA Spotted Owl Acreages, and Appendix 34 for CHU Maps of the Wenatchee National Forest. (USFWS Memorandum, 1991)

The Little Wenatchee CHU WA-7 provides essential breeding habitat connectivity between the Chiwawa, Icicle, Deadhorse, and CHUs on the Mount Baker Snoqualmie National Forest (Sauk and Rapid River). The Glacier Peak and Henry M. Jackson Wilderness areas are an important part of this connection, specifically Cady Pass, Fish Creek, Lake Creek and Rapid River.

The Whitepine CHU WA-8 provides connectivity across the Cascade crest for inter-provincial owl movement, specifically through the lower elevations of Stevens Pass, Tunnel Creek, Union Gap, and Rapid River. The critical habitat unit provides essential breeding habitat connectivity between Deadhorse, Boundary Butte, Icicle, Teanaway, Little Wenatchee/White River, Chiwawa and CHUs on the west side (Rapid River). The forested habitats of the Alpine Lakes and Henry M. Jackson Wilderness areas are important for the functioning of this connectivity. These CHUs are important for the range-wide distribution of owl habitat.

The Twin Lakes MLSA is outside of a CHU, but adjoins the Chiwawa CHU WA-6, in the Meadow Creek area (which is outside of any LSR/MLSA).

In all LSR/MLSAs, except the Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). They will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSAs meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

(d) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within either of these areas (Almack et al. 1993). Grizzly bears are suspected to occur and about 20% of their available habitat has been surveyed in the Little Wenatchee LSR and 50% in the Twin Lakes MLSA. Gray wolves are known to occur within the Little Wenatchee LSR and about 20% of their habitat has been surveyed. Gray wolves are suspected to occur in the Twin Lakes MLSA and no surveys have been completed.

(e) Marbled Murrelet

The Little Wenatchee LSR has habitat within the 55 mile marine foraging zone for marbled murrelets. This zone includes Stevens Pass, Smithbrook, upper Rainy Creek, Theseus Creek, Lake Creek, Fish Creek, Cady Creek, Eleven Mile Creek, upper Little Wenatchee River, upper Indian Creek and upper White River (see Appendix 40 "Marbled Murrelet Habitat Chart and Habitat Map").

One marbled murrelet detection has been recorded on the east side of the Crest near Snoqualmie Pass, in a portion of the Wenatchee National Forest administered by the Mount Baker-Snoqualmie National Forest. The best connectivity for marbled murrelet is in areas of high quality contiguous habitat. In the Little Wenatchee LSR, this would include the Henry M. Jackson Wilderness. There are possible connections, through low elevation passes that might provide nest structure for these marine birds. These include: Cady Pass, Fish Creek, Lake Creek/Rapid River, upper Nason Creek. There have been no surveys of suitable marbled murrelet habitat in the Little Wenatchee LSR. Within the marine foraging zone, surveys will be conducted 2 years prior to projects. If any breeding sites are located, activities will be restricted within 1/2 mile of the site (NWFP C-10).

Twin Lakes MLSA is outside the marbled murrelet foraging zone.

(2) Sensitive Wildlife Species and Species of Concern

There are 15 wildlife species that are on the R6 Sensitive Species list or are USFWS species of concern that could occur within the Little Wenatchee LSR and Twin Lakes MLSA. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed frog (*Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascade frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(a) Birds

The goshawk is known to occur in both areas. No surveys have been completed in the Twin Lakes MLSA and about 10% of their habitat has been surveyed in the Little Wenatchee LSR. It is unknown if the little willow flycatcher occurs and known that the olive-sided flycatcher occurs in these areas. Surveys have been completed on about 10% of the available habitat.

(b) Amphibians

Surveys for amphibians have been completed on about 30% of the habitat within the Little Wenatchee LSR and 20% in the Twin Lakes MLSA. It is known that the tailed frog, Cascades frog, and spotted frog occurs in both areas. Additional surveys were completed in some ponds that are located within the Little Wenatchee LSR, however the results of these surveys were not available at the time of this assessment.

(c) Mollusks

No surveys for the Columbia pebblesnail have been conducted and it is unknown if they are present.

(d) Mammals

Surveys for bat species have not been completed. It is unknown or suspected that the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in these areas.

Surveys for lynx, fisher and wolverine have not been conducted. Lynx are known to occur in the Little Wenatchee LSR and it is unknown if they occur in the Twin Lakes MLSA. Fisher are known to occur in the Little Wenatchee LSR and suspected in the Twin Lakes MLSA. Wolverine are known to occur in both areas.

(3) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Little Wenatchee LSR or the Twin Lakes MLSA. These species include the pileated woodpecker (*Dryocopus pileatus*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), three-toed woodpecker (*Picoides tridactylus*), red-breasted sapsucker (*Sphyrapicus ruber*), Williamson's sapsucker (*Sphyrapicus thyroideus*), northern flicker (*Colaptes auratus*), ruffed grouse (*Bonasa umbellus*), mule deer (*Odocoileus hemionus*), elk (*Cervus elephus*), beaver (*Castor canadensis*), and marten (*Martes americana*).

(4) Primary Cavity Excavators

No surveys for primary cavity excavators have been completed in either area. The three-toed woodpecker is suspected to occur, red-breasted sapsucker unknown, and the remaining primary cavity excavators known to occur in the Twin Lakes MLSA. It is unknown if the three-toed woodpecker occurs, suspected that the red-breasted and Williamson's sapsuckers occur, and known that the remaining primary cavity excavators occur in the Little Wenatchee LSR.

(a) Ruffed Grouse and Beaver

Surveys for the ruffed grouse have been completed on about 5% of the available habitat within the Little Wenatchee LSR and none in the Twin Lakes MLSA. They are known to occur in both areas. Surveys for beavers have been completed on 100% of the available habitat in the Twin Lakes MLSA and none of the Little Wenatchee LSR and they are known to occur in both areas.

(b) Mule Deer, Elk, Mountain Goats

Surveys for mule deer and elk have covered about 100% of the available habitat and they are known to occur within both areas. Mountain goats are known to winter in the Little Wenatchee LSR.

(c) Marten

It is unknown if marten occur in the Twin Lakes MLSA and they are known to occur in the Little Wenatchee LSR. No surveys have been conducted in the Twin Lakes MLSA and about 20% of their available habitat has been surveyed in the Little Wenatchee LSR.

(5) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Little Wenatchee LSR or the Twin Lakes MLSA and are identified as survey and manage, or protection and buffer species. These include the great gray owl (*Strix nebulosa*), flammulated owl (*Otis flammeolus*), White-headed woodpecker (*Picoides albolarvatus*), black-backed woodpecker (*Picoides arcticus*), pygmy nuthatch (*Sitta pygmaea*), warty jumping slug (*Hemphillia glandulosa*), blue-gray tail-dropper (*Prophyaon coeruleum*), and papillose tail-dropper (*Prophyaon dubium*).

(a) Birds

The great gray owl is suspected to occur within both areas and surveys have not been completed. No surveys have been completed for the flammulated owl and it is unknown if they occur. Surveys for the white-headed woodpecker, black-backed woodpecker, and pygmy nuthatch have not been completed. It is unknown if these species occur in the Little Wenatchee LSR. In the Twin Lakes MLSA it is unknown if the white-headed woodpecker or pygmy nuthatch occur and the black-backed woodpecker is known to occur.

(b) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the Little Wenatchee LSR. Surveys for the warty jumping slug and blue-gray taildropper have been

completed on about 5% of their available habitat within the Little Wenatchee LSR. In the Twin Lakes MLSA the warty jumping slug is suspected to occur and the blue-gray tailedropper and papillose tailedropper are unknown. No surveys have been conducted.

(c) Habitat Effectiveness

Habitat effectiveness was measured using the current open road density and the amount of security habitat. The current open road density within the Little Wenatchee LSR is 1.8 mi./sq. mi. and the amount of area in security habitat is 46%. This information shows that habitat effectiveness is considered to be "moderate" (1-2 mi./sq. mi.) relative to roads and "low" relative to security habitat (<50%). In the Twin Lakes MLSA the current open road density is 0.3 and the area within security habitat is 82%. This information shows that the habitat effectiveness relative to road density is "high" (<1 mi./sq.mi.) and relative to security habitat is "high" (>70%). The long term management objective for LSR/MLSAs is to manage towards a "high" level of habitat effectiveness defined as >1mi./sq.mi. open road density and >70% security habitat.

**3. Human Uses**

a) Overview

The Twin Lakes MLSA and the Little Wenatchee LSR are located on the Lake Wentchee Ranger District. The Little Wenatchee LSR encompasses four drainages, a portion of the White River, the Little Wenatchee River, Rainy Creek and Nason Creek that provide many recreation opportunities and important travelway corridors including U.S. Highway 2.

b) Prehistoric and Historic Summary

There is not much known of the prehistoric and historic use of the Twin Lakes MLSA due to the lack of surveys of this area.

There is not much known about American Indian use of the Little Wenatchee LSR. This LSRs high elevation probably limited use to seasonal periods for hunting and plant gathering activities.

The Little Wenatchee LSR has a number of heritage resources, many related to the construction and operation of the railroad and automobile highway across Stevens Pass. This LSR encompasses the Stevens Pass Historic District, a formally established area commemorating the engineering and construction feats associated with the construction of the Great Northern Railroad across Stevens Pass. These features include snow sheds, switchbacks, townsites, and tunnels.

c) Recreation

(1) Campgrounds

The Twin Lakes MLSA is located largely within the Glacier Peak Wilderness, as such the only developed recreation facilities within this MLSA are related to trailheads and trails.

The Little Wenatchee LSR includes the Napeequa (5 units), Grasshopper Meadows (5 units) and White River Falls (5 units) campgrounds in the White River drainage. Soda Creek (5 units), Lake Creek (8 units), Theseus Creek (3 units) and Little Wenatchee Ford (3 units) campgrounds in the Little Wenatchee drainage. Riverside Campground in the Little Wenatchee drainage was destroyed by the 1990 floods. A proposed project would reconstruct this campground at another location just upstream of its original location. These campgrounds are all small, with rustic facilities that are popular with recreationists looking for these less accessible, places with fewer people. These campgrounds are moderately used.

(2) Other Developed Recreation Facilities

The Little Wenatchee LSR also includes some other developed recreation facilities. These facilities are listed below.

Stevens Pass Ski Area, this ski area is an important ski area destination for the Seattle metro population and other areas throughout the state. Improvements are continuing and additional proposals to add more runs and ski lifts have been presented. This ski area is operated partly on private land but the facilities and operations on national forest lands are under special use permit.

Stevens Pass Nordic Ski Area, this area operated by the Stevens Pass Ski Area provided groomed cross country ski trails up the Mill Creek drainage. This facility has just been developed in recent years and proposals to add facilities and more trails have been made.

The Totem Girl Scout Organization Camp is operated under special use permit on national forest land. This is a fairly small facility that receives low to moderate amount of use.

Bygone Byways Interpretive Trail, this facility interprets the railroad and highway construction and operation across Stevens Pass.

(3) Dispersed Camping

The Twin Lakes MLSA is accessible via the trailhead near the Napeequa Campground and another trail southeast of the MLSA off the Big Meadow Creek road. Very little camping occurs at the lake as the terrain is too steep to accommodate many sites.

The Little Wenatchee LSR does have a number of dispersed campsites near roadways, located throughout the area.

(4) Trails

There are two trails which enter the Twin Lakes MLSA, one starts near the Napeequa Crossing Campground and the other off of Big Meadow Creek. Most use occurs from the Napeequa Crossing trailhead. The Twin Lakes are a popular day hike (via Napeequa Trailhead) for many hikers, particularly users of the Tall Timber facility. The Big Meadow Creek trail is lesser used as it accesses only the southern end of Twin Lakes (no trails border the lake providing access to the northern end of the lake).

The Little Wenatchee LSR borders the Glacier Peak, Henry M. Jackson and Alpine Lakes Wilderness areas. A number of trailheads and trails within this LSR access wilderness and non-wilderness destinations. Trail use within this LSR is an important recreation activity.

(5) Winter Use

The only winter use of the Twin Lakes MLSA is suspected trespass into the wilderness by snowmobilers via the Big Meadow Creek road and associated ice fishing on the lake.

During the winter the Little Wenatchee is used by snowmobilers, cross country skiers and snow shoers. Some of this use occurs on snow covered roads within the LSR. The Mill Creek Nordic Ski Area offers groomed cross country tracks and a small facility near Highway 2 and Mill Creek. Stevens Pass Ski Area is an important downhill ski facility with thousands of downhill skiers using this area annually. This facility lies mostly outside the LSR however proposals have been presented to develop more runs and lifts that would be located within the LSR.

(6) Other Recreation

Twin Lakes Creek is closed to fishing due to the use of the area for brood stock (see discussion in the "Social and Economic Considerations" section). The Napeequa River is open north of this

confluence and does receive some use from fishermen continuing about one to two miles up from the confluence. As mentioned in the trails section, the area is popular with day users.

The Little Wenatchee, White River and Rainy Creek offer excellent opportunities for travelers to enjoy the scenic qualities along the main travelways. The Rainy Creek road over Rainy Pass also provides a popular loop drive connecting with US Highway 2.

US Highway 2 which passes through the Little Wenatchee LSR, is a part of the national scenic byway program and is also the route of the Cascade Loop, a route which in the summer loops back over the Cascades in the North Cascades National Park.

d) Mining

There are no active mining operations in the Twin Lakes MLSA or Little Wenatchee LSR.

e) Social and Economic Considerations:

Washington State uses Twin Lakes to provide brood stock for its cutthroat fish stocking program throughout the state. The state maintains a small cabin at the Lake and some other facilities to raise and collect this stock. For this reason fishing in the lake and along Twin Lakes Creek is prohibited. The close proximity of this scenic area benefits the Tall Timber's operation by providing an outstanding scenic background and an easily accessible hiking opportunity for their clients.

The Stevens Pass Ski and Nordic areas hire hundreds of employees each season and thus make important contributions to the economy of communities on both sides of the Cascades.

US Highway 2 is a major east-west travelway over the Cascades. This is the northern most, year round crossing in Washington state. It provides an important link not only for traveling east and west but is critical to the tourism based economies of the Leavenworth and Lake Chelan areas. The mainline of the Burlington Northern Santa Fe Railroad crosses through this LSR. Much of the distance of this line is located underground via the Cascade tunnel.

Several privately owned parcels lie within the Little Wenatchee LSR. Part time and full time residences are being constructed in the Yodelin development area.

BPA operates and maintains a powerline transmission corridor that runs through the Little Wenatchee LSR. This LSR also has other transmission and distribution lines for the ski areas and residential development.

## **B. Analysis Between LSR/MLSAs**

### **1. Sustainability**

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in Table 19, *Vegetation Hazard and Ignition Risk Ratings* of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest". The Little Wenatchee LSR and the Twin Lakes MLSA have the least amount of at risk vegetation of all LSR/MLSAs on the Forest. Neither have any at risk vegetation, as they are comprised almost exclusively of wet forest vegetation. For this reason, these are the most sustainable LSR and MLSA on the forest.

The following table shows a comparison of the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for the Little Wenatchee LSR and the Twin Lakes MLSA and their three neighboring LSRs.

**Table IV-3, Acres at Risk and Ignition Risk, Little Wenatchee LSR and Twin Lakes MLSA.**

| LSR/MLSA         | % of LSR/MLSA at Risk |      | % of LS Forest at Risk |      | Ignition Risk |
|------------------|-----------------------|------|------------------------|------|---------------|
|                  | Acres                 | Pct. | Acres                  | Pct. |               |
| Little Wenatchee | 0ac                   | 0%   | 0ac                    | 0%   | Moderate      |
| Twin Lakes       | 0ac                   | 0%   | 0ac                    | 0%   | Moderate      |
| Icicle           | 3,568ac               | 25%  | 3,268ac                | 38%  | Moderate      |
| Chiwawa          | 29,042ac              | 27%  | 21,345ac               | 38%  | Moderate      |
| Deadhorse        | 10,805ac              | 59%  | 9,843ac                | 100% | High          |

When looking at sustainability issues between LSRs/MLSAs, the factor driving this analysis is the amount and location of at-risk vegetation between the Little Wenatchee LSR and the Twin Lakes MLSA and their three neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another. A review of at-risk vegetation maps reveals that this linkage does not exist in any of these instances because of the wet forest plant communities surrounding Little Wenatchee and Twin Lakes.

b) Implications

Both the Little Wenatchee LSR and the Twin Lakes MLSA are highly sustainable in their current condition, no opportunities were identified to improve this condition. Although stand replacement fire is the norm for this vegetation community, the potential for it occurring in the next 20 years is low in comparison to other LSRs/MLSAs on the Forest.

**2. Forest-Wide Northern Spotted Owl**

The Little Wenatchee LSR/Twin Lakes MLSA are not designated as one of the Forest's three large population cluster/source center LSRs, for the recovery of the spotted owl. The Little Wenatchee LSR/Twin Lakes MLSA is part of the smaller "local population" centers, which are linked to the metapopulations through dispersing individuals (See Figures 1 and 2 with LSR and MLSA maps in the Forest-wide Assessment). The spotted owl is a Threatened species, with the recovery dependent on the implementation of the NWFP, especially in LSR/MLSAs (FSEIS Appendix G, Biological Opinion, 1994).

**3. Connectivity (Plant, Wildlife, and Northern Spotted Owl)**

a) Plant Connectivity

Connectivity can be addressed at several spatial scales when assessing an individual LSR. Connectivity of the LSR/MLSA network on the Wenatchee National Forest has been addressed above in the section title "Species with Special Status." Connectivity specific to the Little Wenatchee LSR and Twin Lakes MLSA for vascular plants is analyzed here. Refer to the Forest-wide Assessment discussions for connectivity description for lichens, bryophytes, and fungi.

First, connectivity relative to the Little Wenatchee LSR can be viewed from how well habitat is connected to surrounding LSRs or MLSAs. Relative to species associated with the moist grand fir

vegetation group, connectivity does not exist with adjacent LSRs or MLSAs for low dispersal species. There is connectivity for moderate and high dispersal species for the Little Wenatchee LSR and the Twin Lakes MLSA. Both the LSR and MLSA are connected to the Chiwawa LSR for moderate and high dispersal species. Connectivity to Deadhorse and Natapoc MLSAs and Icicle LSR for both Little Wenatchee and Twin Lakes for high and moderate dispersal species is dependent on vegetation outside the LSR/MLSA network..

There is no connectivity for the subalpine fir series between the Little Wenatchee and Twin Lakes MLSA. This series absent from Natapoc and Deadhorse MLSAs. Connectivity in this series between the Little Wenatchee and the Chiwawa LSR is present for all dispersal classes, but is absent for the Twin Lakes MLSA. No connectivity exists for any dispersal class between the Little Wenatchee and Icicle LSRs. Species with moderate and high dispersal capabilities are dependent on vegetation outside the Twin Lakes MLSA and Icicle LSR for connectivity. There is no connectivity for low dispersal species between Twin Lakes and Icicle.

Species associated with the wet forest group in the Little Wenatchee LSR are connected to the Twin Lakes MLSA and Chiwawa LSR for any dispersal class. However, species of all dispersal classes in the Little Wenatchee and Twin Lakes are dependent on vegetation outside the network for connectivity with the Icicle LSR. This forest group is absent from the Natapoc and Deadhorse MLSAs.

No projects were identified to improve connectivity of habitat's between LSRs or MLSAs. Disconnectivity identified in this analysis results from inherent breaks in the vegetative landscape

(1) Little Wenatchee and Twin Lakes Vascular Plant Connectivity

**Table IV-4, Little Wenatchee -- Vascular Plant Connectivity**

| LSR/MLSA        | Vegetation Group |   |   |          |   |   |           |   |   |     |   |   |           |   |   |
|-----------------|------------------|---|---|----------|---|---|-----------|---|---|-----|---|---|-----------|---|---|
|                 | Dry/Mesic        |   |   | Moist GF |   |   | Subalpine |   |   | Wet |   |   | Whitebark |   |   |
| Dispersal Class | 1                | 2 | 3 | 1        | 2 | 3 | 1         | 2 | 3 | 1   | 2 | 3 | 1         | 2 | 3 |
| Twin Lakes      |                  |   |   | N        | Y | Y | N         | N | N | Y   | Y | Y | A         | A | A |
| Chiwawa         |                  |   |   | N        | Y | Y | Y         | Y | Y | Y   | Y | Y | N         | D | D |
| Deadhorse       |                  |   |   | N        | D | D | A         | A | A | A   | A | A | A         | A | A |
| Natapoc         |                  |   |   | N        | D | D | A         | A | A | A   | A | A | A         | A | A |
| Icicle          |                  |   |   | N        | D | D | N         | N | N | D   | D | D | N         | N | D |

Dispersal Codes = Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Outside Habitat) 1=Low Connectivity, 2=Moderate Connectivity and 3=High Connectivity.

**Table IV-5, Twin Lakes-- Vascular Plant Connectivity**

| LSR/MLSA        | Vegetation Group |   |   |          |   |   |           |   |   |     |   |   |           |   |   |
|-----------------|------------------|---|---|----------|---|---|-----------|---|---|-----|---|---|-----------|---|---|
|                 | Dry/Mesic        |   |   | Moist GF |   |   | Subalpine |   |   | Wet |   |   | Whitebark |   |   |
| Dispersal Class | 1                | 2 | 3 | 1        | 2 | 3 | 1         | 2 | 3 | 1   | 2 | 3 | 1         | 2 | 3 |
| Little          |                  |   |   | N        | Y | Y | N         | N | N | Y   | Y | Y |           |   |   |

| LSR/MLSA        | Vegetation Group |   |   |          |   |   |           |   |   |     |   |   |           |   |   |
|-----------------|------------------|---|---|----------|---|---|-----------|---|---|-----|---|---|-----------|---|---|
|                 | Dry/Mesic        |   |   | Moist GF |   |   | Subalpine |   |   | Wet |   |   | Whitebark |   |   |
| Dispersal Class | 1                | 2 | 3 | 1        | 2 | 3 | 1         | 2 | 3 | 1   | 2 | 3 | 1         | 2 | 3 |
| Wenatchee       |                  |   |   |          |   |   |           |   |   |     |   |   |           |   |   |
| Chiwawa         |                  |   |   | N        | Y | Y | N         | N | N | Y   | Y | Y |           |   |   |
| Deadhorse       |                  |   |   | N        | D | D | A         | A | A | A   | A | A |           |   |   |
| Natapoc         |                  |   |   | N        | D | D | A         | A | A | A   | A | A |           |   |   |
| Icicle          |                  |   |   | N        | D | D | N         | D | D | D   | D | D |           |   |   |

Dispersal Codes = Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Outside Habitat) 1=Low Connectivity, 2=Moderate Connectivity and 3=High Connectivity.

b) Wildlife Connectivity

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between Little Wenatchee LSR and adjacent LSR/MLSAs, the dispersion index was used (as described in Appendix 1). A total of four potential linkages were evaluated: Little Wenatchee to Twin Lakes MLSA, Little Wenatchee to Chiwawa, Little Wenatchee to the Icicle LSR, and Little Wenatchee to the nearest LSR on the Mount Baker-Snoqualmie National Forest. The overall dispersion index for this LSR was 1.75.

Table IV-6, Dispersion Indices for the Little Wenatchee LSR.

| Linkage        | Distance(Miles ) | High | Moderate | Low | Index       |
|----------------|------------------|------|----------|-----|-------------|
| LW-Twin Lakes  | 0                | Yes  | Yes      | Yes | 3           |
| LW-Icicle      | 10               | Yes  | No       | No  | 1           |
| LW-Chiwawa     | 5                | Yes  | Yes*     | No  | 2           |
| LW-MBSLSR      | 4                | Yes  | No       | No  | 1           |
| <b>Overall</b> |                  |      |          |     | <b>1.75</b> |

\*The connectivity between the Little Wenatchee LSR and the Chiwawa LSR is contingent upon late-successional habitat in the Twin Lakes LSR. The linkage between the Little Wenatchee LSR and the Twin Lakes MLSA is somewhat unique in that it provides for low mobility wildlife species. Only 8 (21%) of the 39 potential linkages that were evaluated for the WNF MLSA/LSR network were ranked with a value of three.

c) Northern Spotted Owl Connectivity

The Little Wenatchee LSR/Twin Lakes MLSA was established around spotted owl pairs, and cluster of pairs, for connectivity to the north and south and connectivity to the west and east. This LSR and MLSA provide intra- and inter-provincial connectivity. The Little Wenatchee LSR also includes to Critical Habitat Units, identified early in the recovery process for the northern spotted owls.

For final recovery of the northern spotted owl, smaller LSRs/MLSAs contribute to the goal of occupied home ranges (See table below) \_ “Connectivity Between LSRs: Spotted Owl Pair Goals for LSRs and MLSAs, and CHUs” below). The Little Wenatchee LSR has a goal of 7+ pairs of spotted owls. The Twin Lakes MLSA has a goal of supporting 1 pair of spotted owls in the Glacier Peak Wilderness. The adjacent wilderness habitat is crucial to continue this linkage for spotted owls.

**Table IV-7, Connectivity Between LSRs: Spotted Owl Pair Goals for LSRs and MLSAs, and CHUs**

| LSR or MLSA Status and Connectivity         | S.Owl Pairs --1994, FSEIS Appendix G, Table G-3 | Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996 |                                     | Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion. |                           |
|---|---|---|-------------------------------------|--|---------------------------|
|   |   |   |                                     |  |                           |
| Chiwawa RW 135                              | 11 Pairs + 1 Res Single                         | 16 Pairs + 3 Res Singles  | 18 + 1 <sup>1</sup> (7 Sites*)      | 21+ Pairs  | WA-6                      |
| Sauk LSR<br>Mt Baker-Snoq NF                | ?   | ?   | ?                                   | 3+ Pairs   | WA-28                     |
| Twin Lakes DMI                              | --  | 1 Pr  | 1 Pr                                | --   | NA                        |
| Little Wenatchee RW134                      | 3 Pr  | 9 Pr  | 9 Pr + 1 <sup>1</sup>               | 7+ Pr  | WA-7 (5+pr)<br>WA-8 (2pr) |
| Rapid/Martin/Beckler LSR - Mt Baker-Snoq NF | ?   | ?   | ?                                   | 12+  | WA-31                     |
| Natapoc DM2                                 | --  | 0   | 0                                   | Contribute Towards 1 RS  | WA-9                      |
| Deadhorse RW133                             | 4 Pr  | 7 Pr + 2 RS   | 7 sites + 1 <sup>1</sup> (2 Sites*) | 4+ Pr  | WA-9                      |
| Icicle RW132                                | 1 Pr  | 2 Pr  | 2 sites                             | 1 Pr   | WA-10                     |

<sup>1</sup> Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

\*S.owl activity center may have been lost, due to 1994 Chelan Forest Fires, monitoring still underway.

<sup>2</sup> Spotted owl activity center on Private Land.

Objectives in the Little Wenatchee LSR/Twin Lakes MLSA should protect and enhance conditions of late successional and old growth forest ecosystems, while serving as habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). LSRs and MLSAs are important for maintaining well distributed and well-connected spotted owl populations.

The five nearest LSR/MLSA's were evaluated to determine their potential for dispersal to occur. This analysis showed that spotted owls could likely disperse to the Chiwawa LSR, through the Glacier Peak Wilderness along the Napeequa, Twin Lakes and Raging Creek, or through matrix lands along Meadow/Brush Creeks. Connectivity to the Icicle LSR could occur through the Alpine Lakes Wilderness along the Whitepine Creek, Mill Creek and upper Icicle. Connectivity to the Deadhorse/Natapoc LSR/MLSAs could occur from Whitepine Creek to Coulter Creek to Skinney Creek and from Rainy Creek to Lost Creek to Plainview Creek and Natapoc.

Connection to the Mount Baker-Snoqualmie LSRs could occur across wilderness habitat through the Henry M. Jackson Wilderness and late successional habitat in Cady Creek, Fish Creek, Lake Creek, Upper Nason Creek and Mill Creek to Rapid River/Beckler River/Martin Creek. Also connection to the MBS could occur through the upper Little Wenatchee and upper White Rivers to the Sauk.

See Forest Interior Map and Suitable Spotted Owl Habitat Maps. These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

(1) Restoration Opportunities And Potential Projects Between LSR/MLSAs

1. Meet pair goals of LSR/MLSA for 7+ pairs in Little Wenatchee and 1 pair in Twin Lakes.
2. Protection of LSR/MLSA from fires started within the Glacier Peak Wilderness.
3. Protection of LSR/MLSA from fires originating on matrix lands in Brush Creek, Meadow Creek, Line Creek and Whitepine Creek.
4. Monitor/maintain connectivity outside the LSR, particularly in the Napeequa/Twin Lakes/Raging Creek areas, the Twin Lakes/Meadow/Brush Creek areas, Mill/Nason/Martin/Beckler Creeks areas, Coulter/Skinney Creeks areas and Rainy/Lost/Plainview/Natapoc areas.

## C. Analysis Within the LSR

### 1. Unique Habitats And Species

The following is the discussion and results of the Unique Habitat and Species module for the Little Wenatchee LSR/Twin Lakes MLSA. For more information see Unique Habitats Maps, "Forest-wide Unique Habitats and Species by LSR/MLSA" table (Appendix 27), Forest Interior Map and Tables (Appendix 19), Riparian Reserves Map, Road Density tables (Appendix 20) in the Forest-wide Assessment. For process see Unique Habitats and Species Module in Appendix 1 for order, explanations, and process of modules.

a) Forest-wide Overview of Unique Habitats and Species:

(1) Unique Ecosystems Landscape Analysis

Each LSR/MLSA is compared Forest-wide for unique habitats and species abundance, connectivity, and function (see the "Function of the Network for Unique Habitats and Species" in Chapter VII of the Forest-wide Assessment). The Little Wenatchee LSR is quite diverse and abundant in unique habitats and species. The Twin Lakes MLSA has some excellent quality habitats near Twin Lakes and the Chiwawa Mountains.

These areas are unusual because they are atypical of the eastern Cascades. They have high amounts of west-side like habitat and species. Several Survey and Manage species of fungi are in the Little Wenatchee LSR. The late successional habitat is of very high quality Pacific silver fir, western hemlock, western red cedar and Douglas-fir. These forests provide habitat for low mobility species, which are known to occur in the LSR, such as jumping slugs, shrewmole, Pacific giant salamander, tailed frog and forest deer mouse. This LSR also has the highest amount of species abundance and habitat abundance (high amounts of late-successional habitat, forest interior, wet meadows, riparian reserves, non-forest vegetation, shrub fields). There are three Wilderness areas surrounding these LSR/MLSAs, providing excellent connectivity of habitats.

Forest-wide the Little Wenatchee LSR is of the highest quality for providing unique habitats and species abundance. The Twin Lakes MLSA is moderate compared to the other LSR/MLSAs. These LSR/MLSAs provide high (Little Wenatchee) and low (Twin Lakes) amounts of connectivity for unique habitats and species. The Little Wenatchee LSR has the highest quality for functioning of unique habitats, and Twin Lakes has a moderate quality.

**Table IV-8, Unique Habitats Overview by LSR/MLSA**

| UNIQUE HABITATS                       | LITTLE WENATCHEE LSR | TWIN LAKES MLSA   |
|---------------------------------------|----------------------|-------------------|
| Non-Forest Vegetation                 | 13% (6,843 acres)    | 14% (776 acres)   |
| Forest Interior                       | 33% (17,387 acres)   | 26% (1,426 acres) |
| Late Successional/Wetter              | 56% (29,632 acres)   | 50% (2,767 acres) |
| L-S Advanced/Fire Climax              | 0% (0 acres)         | 0% (0 acres)      |
| Wildlife Species - Known L-S and PETS | 56 species           | 45 species        |
| Plant Species - Known L-S/PETS        | 71 species           | 18 species        |

The Little Wenatchee LSR/Twin Lakes MLSA are within the Spine of the Cascades distribution center of rarity and endemism for animal and plant species representing more western forest species in the high country of the eastern slopes, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft).

Within the Little Wenatchee LSR, three subdrainages support exemplary populations of *Botrychium* (information on location available at Lake Wenatchee Ranger Station or Washington Natural Heritage Program database). These sites as mentioned above, provide habitat for hundreds of individual plants and may consist of one to several distinct *Botrychium* species mixed together. In upper Mill Creek and along Nason Ridge, *Abies procera* communities exist. This type of community is not particularly common on the Wenatchee National Forest. This community may also support *Bridgeoporus (Oxyporus) nobilissimus* populations if the stands have any large diameter trees or snags (FSEIS 1994, App. J 2).

The Big Chief area first described in the Millbrook EA, is an area of unusual vegetative quality. Within the approximately 1500 acre area, there exists a diverse composition of vegetative communities which together, form an unusual landscape pattern. Old growth mountain hemlock and silver fir communities (*Tsuga mertensiana/Abies amabilis*), green fescue (*Festuca viridula*) meadows, wet *Carex* meadows, old growth western hemlock (*Tsuga heterophylla*), *Vaccinium* communities, slide alder (*Alnus sinuata*), and heath (*Phyllodoce empetrifomis*) communities all exist in close proximation to each other and thus afford a very unique landscape detail. It has been identified that green fescue meadows and old growth mountain hemlock/silver fir communities are currently under represented in the Research Natural Area system (pers. comm., Sarah Greene, PNW RNA scientist). Also, the intact forest interiors, the relatively undisturbed nature of the green fescue meadows from grazing, and accessibility of the area further promote its candidacy. In August of 1995, a survey for similar areas along the spine of the Cascades produced a very limited number of vaguely similar areas.

Identified areas of high abundance, connectivity and function for unique habitats and species within the Little Wenatchee/Twin Lakes LSR/ MLSAs are:

- **Fish Creek/Little Wenatchee Ford Old Growth Forest:** Noted in the WNF Plan for having large trees atypical of the eastern Cascades. Pacific yew, Alaska Yellow Cedar, Pacific giant

salamander, red-legged frog, fisher, Vaux's swift. Riparian Reserves, Forest Interior, PETS spp, MIS spp, Native American sites. Marbled murrelet habitat.

- **Twin Lakes:** Forest Interior, Security Habitat, Riparian Reserves, Wetlands, Shrub fields, Natural openings, Talus/Cliffs/Rocks, PETS Spp, bald eagle, loon, wolverine, amphibians, Eyeing Station for cutthroat trout.
- **White River Wetlands:** Wetlands, Significant Fish populations, Cottonwood forests, Shrub fields, Aspen stands, Flowering Dogwood, Forest Interior, PETS spp, Survey and Manage spp.
- **Little Wenatchee:** Old Growth forests, Wetlands, Significant Fish populations, Shrub fields, Pacific Yew, Alaska Yellow Cedar, very large western red cedar, Forest Interior, PETS spp, Survey and Manage spp.
- **Wenatchee Ridge:** Talus/Rock, Mountain Goats, Shrub fields, Meadows, Security Habitat, Forest Interior, Riparian Reserves/Upland Wetlands, Past burns.
- **Snowy Creek/Mount Howard:** Talus/Rock/Caves, wetlands, Shrub fields, Whitebark pine/Subalpine Larch, Meadows, Security Habitat, Forest Interior, Noble Fir, PETS Spp, Mountain Goats.
- **Skyline Ridge/Lichtenberg Mountain/Smithbrook:** Huckleberry meadows, avalanche slopes, Rock/Talus/Cliffs, Mountain goats, wetlands, riparian reserves, old growth forests, Noble Fir, PETS spp.
- **Millbrook/Big Chief possible RNA:** Forested wetlands, sedge meadows, fescue meadows, huckleberry shrub fields, avalanche shrub fields, large old growth forest, Pacific silver fir, Pacific Yew, Noble Fir, forest interior, riparian reserves, talus, rock/juniper shrubs, Mountain Goats, past burn, PETS plants and animals, Security Habitat.
- **Jim Hill Ridge to Lanham Lake:** Talus/Rock/Caves, Mountain Goats, wetlands, Shrub fields, Whitebark pine/Subalpine Larch, Meadows, Security Habitat, Forest Interior, PETS Spp.

Each LSR/MLSA can be evaluated for biodiversity, connectivity and function (see Function of Unique Habitats in the main body of the Forest-wide Assessment, Chapter VII pages 115-116). Past management activities affect the function of unique habitats and species. This includes open roads, roading of riparian reserves, grazing and past harvest activities.

(2) Little Wenatchee LSR

The total open road density is moderate with 1.75 miles per square mile; security habitat is low at 46%; roads and trails in riparian reserves is high at of 2.9 miles per square mile; and past harvest activities are moderate at 11+% in the LSR. The Little Wenatchee LSR also has an active Sheep Allotment, in the Rainy Creek area.

(3) Twin Lakes MLSA

The total open road density is low at 0.31 miles per square mile; security habitat is high at 82%; roads and trails in riparian reserves is high at 1.34 miles per square mile; and past harvest activities is moderate at 13+% in the MLSA.

(4) Abundance and Ecological Diversity

Compared to all the other LSR/MLSA's, the Little Wenatchee provides among the highest amounts of unique habitats and variety of plant communities and environments. The Twin Lakes area provides moderate amounts of unique habitat acreage and a variety of plant communities and environments. This includes acreage for unique plant and animal habitats, juxtaposition of habitats, availability of wilderness or areas of rarity, and known observations from the plant and animal species list. There is

13% (Twin) to 14% (LW) of these LSR/MLSAs in non-forest vegetation. There are 45 (Twin) to 56 (LW) wildlife species associated with Late-successional habitat or are Species of Special Status. There are 18 (Twin) to 71 (LW) plant species known that are associated with Late-successional or special status in these LSR/MLSAs. See Chapter VII pages 117-120, Forest-wide Unique Habitats and Species by LSR/MLSA.

(5) Connectivity for Unique Habitats and Species

The Little Wenatchee LSR has high quality connectivity in a landscape pattern for biological flow to sustain unique animal and plant communities. The Twin Lakes has lower quality connectivity. This includes the amount, percent, and number of patches of late successional habitat, forest interior habitat patches, and the juxtaposition of wilderness and areas of rarity.

(6) Process and Function of Unique Habitats and Species

The Little Wenatchee has the highest amount of function, with 3 wilderness areas and possible RNA, and a proposed Wild and Scenic River (White). The Twin Lakes is moderate for providing quality functioning for unique species and habitat. This includes development and maintenance of unique ecosystems, including ecological values for unique species and populations. The plant and animal species list for known observations makes up a large part of this analysis, as well as proximity to wilderness and areas of rarity, which sustain habitat function. See Chapter VII, "Forest-Wide Function of the Network for Unique Habitats and Species" and the "Forest-wide Unique Habitats and Species by LSR/MLSA" table (Appendix 37), both in the Forest-wide Assessment.

b) Unique Habitats and Species Known Within LSR/MLSA

(1) Unique Habitats and Species Site Specific Analysis

The following is a summary of the Unique Habitats and Species Module for each Little Wenatchee and Twin Lakes LSR/MLSAs. For more information see the "Forest-wide Unique Habitats and Species by LSR/MLSA" table (Appendix 37), Forest Interior Map and Tables (Appendix 19), Riparian Reserves and Roding Map and Tables (Appendix 20), Late Successional Habitat (Appendix 4 and 5) in the Forest-wide Assessment. For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

**Table IV-9, Unique Habitats and Species Site Specific Analysis**

| Habitats and Species    | Little Wenatchee LSR   | Twin Lakes MLSA  |
|-------------------------|--|--|
| Riparian Reserves       | Over-all 14% of LSR in riparian, high amounts.                                 | Over-all 22% of MLSA in riparian, the 2nd highest amount on the Forest.            |
|                         | Streams (7,312 acres), Open water (54 acres) one of highest amounts on Forest. | Streams (1,220 acres). Open water 5% (298 acres) one of highest amounts on Forest. |
|                         | Wet Meadows (1,073 acres) the highest amount on the Forest, and Seeps.         | Wet Meadows (trace acres), and Seeps.  |
| Non-Forested Vegetation | 13% (6,843 acres) LSR, one of highest on Forest.                               | 14% (776 acres) MLSA, one of highest on Forest.                                    |

| Habitats and Species  | Little Wenatchee LSR   | Twin Lakes MLSA  |
|---|--|--|
|   | Talus <1% (91 acres), Rock <1% (302 acres), Cliff <1% (138 acres),   | Talus - Trace % (9 acres), Rock - Trace % (0 acres), Cliff 1% (60 acres) - validate vegetation mapping for this area and these habitats. |
|   | Subalpine Meadows <1% (222 acres) high amounts on Forest,  | Subalpine Meadows <1% (10 acres),  |
|   | Shrub/Brush fields 9% (4,931 acres) the highest on Forest. Mostly avalanche chutes, though some may be old plantations.              | Shrub/Brush fields 6% (344 acres) high amount. Mostly avalanche chutes, though some may be old plantations.                              |
|   | Dry Meadows 0% (0 acres), Natural Openings Trace % (32 acres),   | Dry Meadows 0% (0 acres), Natural Openings - 1% (64 acres),  |
| Unique Forest Groups  | Late Successional Forest 56% (29,632 acres).   | Late Successional Forest 50% (2,767 acres).  |
|   | L-S/Fire Climax 0% (0 acres).  | L-S/Fire Climax 0% (0 acres).  |
|   | Forest Interior Patches 33% (17,387 acres) second highest amount on the Forest.  | Forest Interior Patches 26% (1,426 acres) high amount.   |
|   | Whitebark Pine/Subalpine Larch - Trace % (147 acres).  | Whitebark Pine/Subalpine Larch - 0 % (0 acres).  |
|   | Disjunct Noble Fir, Pacific Yew, Alaska Yellow Cedar, Western Red Cedar, Aspen, Black Cottonwood, Flowering Dogwood, Big Leaf Maple. | Disjunct Pacific Yew, Western Red Cedar, Black Cottonwood, Big Leaf Maple.   |
|   | Deciduous Trees - Trace % (- acres),   | Deciduous Trees - 0 % (0 acres),   |
|   | Snags/Logs - Moderate Quality from Landscape Level (can improve: late-successional; reduce roads).                                   | Snags/Logs - High Quality from Landscape Level (can improve: late-successional; reduce roads/trails in riparian).                        |
| Animal - Late Successional Associated Species and Species of Special Status | 56 Species of Special Animals  | 45 Species of Special Animals  |
| PETS - Animals  | 9 species: Spotted Owl, Bald Eagle, Gray Wolf, CHU, Bulltrout,   | 2 species: Spotted Owl, Bald Eagle.  |

| Habitats and Species                    | Little Wenatchee LSR  | Twin Lakes MLSA   |
|---|---|---|
|   | Common Loon, Spotted Frog, Lynx, Wolverine.   |   |
| Survey & Manage and Protection & Buffer | 1 species: Lynx.  | 1 species: Black-backed woodpecker.   |
| Management Indicator Species (WNF)      | 12 Species: Bald Eagle, Spotted Owl, Marten, Pileated Woodpecker, Primary Cavity Excavators, Beaver, Ruffed Grouse, Elk, Mule Deer, Mountain Goat, Cutthroat Trout, Red Band Trout.   | 10 Species: Bald Eagle, Spotted Owl, Marten, Pileated Woodpecker, Primary Cavity Excavators, Beaver, Ruffed Grouse, Elk, Mule Deer, Mountain Goat.  |
| Other Animal Species of Special Status  | 6 Species of Concern: Fisher, Harlequin Duck, Northern Goshawk, Red-legged Frog, Olive-sided Flycatcher, Moose.   | 4 Species of Concern: Northern Goshawk, Olive-sided flycatcher, spotted frog, wolverine.  |
|   | 8+ Birds: along the streams, rivers, shrub fields, meadows. Common merganser, Western Flycatcher, Winter Wren, Golden-crowned Kinglet, Hermit Thrush, Red Crossbill, Golden Eagle, Osprey.  | 9 + Birds: along the streams, rivers, shrub fields, meadows. Barrow's golden-eye, common merganser, wood duck, Western flycatcher, winter wren, Hermit thrush, Wilson's warbler, Golden eagle, Osprey.                                    |
|   | 20+ Late Successional Species: Pacific Giant Salamander, Cascade's frog, Tailed Frog, Northwest Salamander, Long-toed Salamander, Barred owl, pygmy owl, saw-whet owl, hairy woodpecker, Cooper's hawk, Sharp-shinned hawk, Vaux's Swift, Brown Creeper, Clark's Nutcracker, Little Brown Myotis, Big-brown bat, Flying Squirrel, Shrewmole, Red-backed Vole, Lynx. | 13+ Late Successional Species: Barred owl, saw-whet owl, Cooper's hawk, Sharp-shinned hawk, hairy woodpecker, Williamson's sapsucker, Vaux's Swift, tailed frog, Cascade's frog, long-toed salamander, rough-skinned newt, big brown bat. |
|   | 4 Significant Fish Populations: Sockeye in Little Wenatchee and White River; Spring Chinook in Little Wenatchee and White River; Bull Trout; Cutthroat Trout in upper Nason, Little Wenatchee and White Rivers.   | 1 Significant Fish Populations: Cutthroat trout (Eyeing Station).   |

| Habitats and Species  | Little Wenatchee LSR  | Twin Lakes MLSA   |
|---|---|---|
| Plants - Late Successional Associated Species and Species of Special Status | 71 species of Special Plants (27 PETS, S&M, Spp of Concern)   | 18 species of Special Plants  |
| PETS - Plants   | 7 species: <i>Botrychium montanum</i> , <i>B.pinnatum</i> , 4 <i>Carex</i> spp, Phantom Orchid.   | 1 species: <i>Botrychium</i> spp.   |
| Survey & Manage and Protection and Buffer Plants                            | 11 Fungi (Chantrelles 3 species, <i>Gyromitra</i> 3 species, <i>Hydnum</i> 1 spp, <i>Otidea onotica</i> , <i>Polyozellus multiplex</i> , <i>Sarcodon</i> , <i>Sarcosoma</i> ); 7 Lichens ( <i>Calicium</i> 2 spp, <i>Chaenotheca</i> 1 spp, <i>Lobaria</i> 3 spp, <i>Nephroma</i> 1 spp); Bryophytes (0 known); 3 Vascular Plants ( <i>Allotropa</i> , <i>Botrychium</i> 2 spp) | 5 S&M - Fungi (2 species), Lichens (1 spp), 0 Bryophytes, Vascular Plants (2 species) |
| Other Plant Species of Special Status                                       | 44 late-successional associated species   | 13+ late-successional associated or other species:                                    |
| American Indian Uses  | Traditional Use Sites: White River camps. White River, Little Wenatchee River and Nason Creek routes up and down valley.  | Traditional Use Sites: Not much known.  |
|   | Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.  | Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.    |
|   | Traditional Food Plants: Huckleberry picking Stevens Pass, Top Lake, and Mount David areas. Herbal medicine plants.   | Traditional Food Plants: Huckleberry on McCall Mountain                               |
|   | Food Gathering: Salmon fishing, Deer hunting. Bulb digging. Basket trees along river corridors.   | Food Gathering: Trout fishing, Deer hunting, Huckleberry burnings.                    |

c) Little Wenatchee/Twin Lakes Potential Treatments For Unique Habitats And Species:

• **MONITOR:**

1. Validate vegetation mapping of unique habitats, especially rock/cliff/talus in Twin Lakes MLSA and rock and shrub fields in Little Wenatchee LSR.
2. Consider establishment of Special Interest areas on unique habitats.

3. Monitor unique habitats in potential RNA (Millbrook/Big Chief.)
  4. Monitor viability concerns for PETS species.
  5. Monitor and maintain unique habitat concentrations;
  6. Monitor and maintain connectivity corridors.
  7. Survey & Manage prior to activities: Great Gray Owl, Larch Mt. Salamander, Lynx, Mollusks, fungi, lichen, bryophytes, vascular plants and other S&M or P&B species;
  8. Follow PETS, Species of Concern, Species of Special Status guidelines in Biological Evaluations for projects.
  9. Inventory Millbrook/Big Chief for L-S and PETS spp.
  10. Monitor and inventory areas of high amounts and complexities of unique habitats and species. Validate unique habitats assumptions, determine guild species use.
- **WEEDS** (Knapweed, St. John's Wort, Oxeye Daisy, Scotch Broom):
    11. Keep weeds from encroaching into LSR/MLSA, especially into meadows and natural openings from trailheads and road sides.
    12. Reduce noxious weed spread on roads through-out the LSR/MLSA;
  - **ROADS**
    13. Reduce roads/trails/campgrounds in Riparian Reserves and wet meadows inside of the LSR/MLSAs, especially from 14-Mile Creek to Hidden Creek;
    14. Increase Security Habitat in Little Wenatchee LSR (Lake Creek Canyon Creek, Theseus Creek, Snowy Creek, Mill Ridge, Hidden Creek and Meadow Creek areas);
    15. Reduce roads in forest interior patches (Canyon Creek, Theseus Creek, Snowy Creek);
    16. Reduce roads and trails in unique habitats: meadows, talus, wetlands.
    17. Reduce open road density from 1.75 in LSR, Twin Lakes road density good.
    18. Do road access plan to allow lynx travel/denning/foraging habitats.
  - **ACCESS**
    19. Retain American Indian access to traditional use sites;
  - **HABITAT IMPROVEMENT**
    20. Thin to accelerate late successional characteristics, especially in old plantations.
    21. Reduce encroaching trees in subalpine meadows and shrub fields; where fire historically maintained them as meadows.
    22. Reduce fragmentation of wet forest.
    23. Balance lynx denning/travel/prey in high elevation mosaic forests.
    24. Provide habitat for wide ranging species, that LSR/MLSAs are only a portion of their range, i.e. gray wolf, grizzly bear and lynx.
    25. Use Prescribed Fire for whitebark pine forests, shrub fields and subalpine meadows.
  - **PROTECT**

26. Protect riparian reserves from sheep grazing.
27. Protect and enhance riparian areas, wetlands, intermittent streams, and dispersal corridors in Riparian Reserves;
28. Protect large trees and screen near cliffs, caves, meadows;
29. Meet high end snag levels and spp;
30. Protect caves and cliff/caves for 250' around (roads/trails/cutting) to benefit bat species. (ROD, C42-44, D 10-11)
31. Protect 300' around subalpine meadows in great grey owl nest areas.

• **COORDINATE**

32. Coordinate unique habitat management with private land owners. Acquire non-Forest System lands with high degree of unique species or habitat (White River, Mill Creek, Yodelin, Soda Creek).
33. Coordinate unique habitat management on private lands outside the LSR, for habitat diversity and for connectivity.

• **INTERPRET**

34. Interpret values and protect/maintain unique habitats and species, especially along Highway corridor and within campgrounds and trailheads.

d) Snag/Log/Green Tree Recruitment Module

The following is the discussion and results of the Snag/Log/Green Tree Recruitment sub-set module of the Unique Habitats module for the Little Wenatchee LSR/Twin Lakes MLSA. Over-all, the Little Wenatchee LSR has a medium quality of available snags and future green tree recruitment snags and logs. The Twin Lakes MLSA has a high quality for snags/log/green tree recruitment. See appendix for order, explanations and process of modules. Snag quality can be judged by a continual supply of tree structure in various stages of decay, size and species. This can be best provided in the moist and wet vegetation groups, areas with large amounts of late-successional habitat, areas with little fragmentation, areas with high amounts of forest interior, and areas with high functioning riparian reserves. (See "LSR/MLSA Snag/Downed Logs/Green Tree Recruitment Analysis" in Appendix 38 of the Forest-wide Assessment)

**Table IV-10, Snag Habitat Quality/Landscape Scale, Little Wenatchee LSR**

| <u>HIGH QUALITY</u>                    | <u>***MEDIUM QUALITY</u>            | <u>LOW QUALITY</u>             |
|--|-------------------------------------|--------------------------------|
| Moist & Wet Veg Groups<br>84%          | Subalpine Fir & Mesic Veg<br>2%     | Dry & Whitebark Veg<br>Trace   |
| >60% LS (non-dry) Habitat              | 15% - 60% LS Habitat<br>56%         | <15% LS Habitat                |
| 80% - 100% LS (all) Habitat            | 40% - 80% LS/M Habitat<br>56%       | <40% LS/M Habitat              |
| > 30% Forest Interior (non-dry)<br>33% | 15% -29% Forest Int Non-dry         | <15% Forest Interior Not Dry   |
| >10% Forest Interior Dry               | 5% - 9% Forest Interior Dry         | < 5% Forest Interior Dry<br>NA |
| >16% in Riparian Reserves              | 10% to 16% Riparian Reserves<br>14% | <10% in Rip Res                |

| <u>HIGH QUALITY</u>                                    | <u>***MEDIUM QUALITY</u>                           | <u>LOW QUALITY</u>                               |
|--|--|--|
| 0 Mi/Sq Mi Any Rds in Rip Res                          | 0 to 1 Mi/Sq Mi Rds in Rip Res                     | > 1 Mi/Sq Mi Rd Rip Res<br><b>2.9 mi/sq/mi</b>   |
| < 1 Mi/Sq Mi Open Roads                                | 1 Mi to 2.5 Mi/Sq Mi Roads<br><b>1.75 mi/sq/mi</b> | > 2.5 Mi/Sq Mi Roads                             |
| >70% Security Habitat                                  | 50% to 70% Security Habitat                        | <50% Security Habitat<br><b>46%</b>              |
| >10% Past Burns Provide Snags                          |  | <10% Past Burns Provide Snags<br><b>&lt; 10%</b> |
| >50% Insect/Pathogens<br>(see Insect/Disease Write Up) | 25% - 50% Insect/Pathogens<br><b>25 to 50%</b>     | < 25% Insect/Pathogens                           |
| <10% Past CC Harvest                                   | 11% - 25% Past CC Harvest<br><b>11+%</b>           | >25% Past CC Harvest                             |
| <10% Past PC Harvest<br><b>&lt; 10%</b>                | 11% - 50% Past PC Harvest                          | >50% Past PC Harvest                             |

(Percentages in bold indicate values for LSR/MLSA)

**Table IV-11, Twin Lakes MLSA Snag Habitat Quality/Landscape Scale**

| <u>HIGH QUALITY***</u>                                 | <u>MEDIUM QUALITY</u>                     | <u>LOW QUALITY</u>                              |
|--|---|---|
| Moist & Wet Veg Groups<br><b>85%</b>                   | Subalpine Fir & Mesic Veg<br><b>1%</b>    | Dry & Whitebark Veg<br><b>52%</b>               |
| >60% LS (non-dry) Habitat                              | 15% - 60% LS Habitat<br><b>50%</b>        | <15% LS Habitat                                 |
| 80% - 100% LS (all) Habitat                            | 40% - 80% LS/M Habitat<br><b>50%</b>      | <40% LS/M Habitat                               |
| > 30% Forest Interior (non-dry)                        | 15% -29% Forest Int Non-dry<br><b>26%</b> | <15% Forest Interior Not Dry                    |
| >10% Forest Interior Dry                               | 5% - 9% Forest Interior Dry               | < 5% Forest Interior Dry<br>NA                  |
| >16% in Riparian Reserves<br><b>22%</b>                | 10% to 16% Riparian Reserves              | <10% in Rip Res                                 |
| 0 Mi/Sq Mi Any Rds in Rip Res                          | 0 to 1 Mi/Sq Mi Rds in Rip Res            | > 1 Mi/Sq Mi Rd Rip Res<br><b>1.34 mi/sq/mi</b> |
| < 1 Mi/Sq Mi Open Roads<br><b>0.31 mi/sq/mi</b>        | 1 Mi to 2.5 Mi/Sq Mi Roads                | > 2.5 Mi/Sq Mi Roads                            |
| >70% Security Habitat<br><b>82%</b>                    | 50% to 70% Security Habitat               | <50% Security Habitat                           |
| >10% in Past Burns                                     |   | <10% in Past Burns<br><b>%</b>                  |
| >50% Insect/Pathogens<br>(see Insect/Disease Write Up) | 25% - 50% Insect/Pathogens<br><b>%</b>    | < 25% Insect/Pathogens                          |
| <10% Past CC Harvest                                   | 11% - 25% Past CC Harvest<br><b>13+%</b>  | >25% Past CC Harvest                            |
| <10% Past PC Harvest<br><b>%</b>                       | 11% - 50% Past PC Harvest                 | >50% Past PC Harvest                            |

(Percentages in bold indicate values for LSR/MLSA)

(1) Restoration Opportunities And Potential Projects For Snags/Logs

1. Accelerate late successional habitat and forest interior habitat in Lake Creek, Fourteen Mi/Hidden Creeks, Canyon Creek, Rainy Creek, Mill Creek and Meadow Creek areas.

2. Monitor big-old plantations for snag/downed log availability, incorporate structure into old units to rehabilitate if needed (Rainy Creek, Little Wenatchee, Meadow Creek, Mill Ridge/Mill Creek).
3. Accelerate old plantations towards late successional conditions.
4. Reduce roads/trails/campgrounds in riparian reserves, especially from Lake Creek to 14-Mile Creek to Hidden Creek.
5. Reduce roads in Forest Interior patches: Canyon Creek, Theseus Creek, Snowy Creek.
6. Increase Security Habitat, particularly in Lake Creek, Canyon Creek, Theseus Creek, Snowy Creek, Mill Ridge, Hidden Creek, and Meadow Creek areas.
7. Monitor for snag dependent species, and snag longevity, especially in old plantations of Rainy Creek, Mill Creek, Little Wenatchee and Meadow Creek.
8. Monitor for snag dependent species in old burns of upper Mill Creek, Mill Ridge, and Wenatchee Ridge.
9. Retain snags at high end of range, adjacent to old plantations. Manage insects and disease at endemic levels.
10. Complete snag analysis on 40 acre grid prior to any reduction of forest structure habitat.

## 2. Plant Connectivity

Connectivity can be addressed by qualitatively describing the connectedness of habitats within the LSR. Most of the forest habitat types are well-connected within the Little Wenatchee and Twin Lakes MLSA largely because of the contiguous wet forest community types. In the Little Wenatchee LSR, the moist grand fir group is disjunct, but this is inherent to the landscape and no projects have been identified to improve this condition.

## 3. Wildlife Connectivity

### a) Wildlife Connectivity in the Little Wenatchee LSR

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Little Wenatchee LSR.

Table IV-12, Connectivity rankings for Little Wenatchee LSR.

| Connectivity Variable         | MGF | WET | SAF | RR | Overall |
|-------------------------------|-----|-----|-----|----|---------|
| % Late-success or Fire Climax | M   | M   | H   | M  | M       |
| Open Road Density             | L   | M   | M   | L  | M       |
| Security Habitat              | L   | L   | L   | L  | L       |
| Forest Interior Roads         | L   | L   | L   | L  | L       |
| % Forest Interior             | L   | L   | L   | L  | L       |

Currently, the availability of habitat in a late-successional condition is at a moderate level in all vegetation groups except the SAF which is at a high level. The overall open road density and level of security habitat provides for a low to moderate level of connectivity. The current level of forest interior connectivity is considered to be low. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis.

Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities, Little Wenatchee LSR

The connectivity of wildlife habitat could be improved with the restoration of roads, especially within the moist grand fir (MGF), forest interior, and riparian reserves. Road restoration could include revegetation of the road prism in order to provide habitat connectivity for low mobility species.

There may be some opportunity to promote the development of late-successional habitat characteristics in some early seral forests through the use of thinning and/or fertilizing.

b) Wildlife Connectivity, Twin Lakes MLSA

The following is a result of applying the “within LSR/MLSA connectivity assessment process” to the Twin Lakes MLSA.

**Table IV-13, Connectivity rankings for Twin Lakes MLSA.**

| Connectivity Variable         | MGF | WET | SAF | RR | Overall |
|-------------------------------|-----|-----|-----|----|---------|
| % Late-success or Fire Climax | L   | M   | H   | L  | M       |
| Open Road Density             | H   | H   | H   | L  | H       |
| Security Habitat              | H   | H   | H   | L  | H       |
| Forest Interior Roads         | H   | H   | H   | L  | H       |
| % Forest Interior             | L   | L   | L   | L  | L       |

Currently, the availability of habitat in a late-successional condition is at a low level in the moist grand fir forest group, moderate in the wet forest group, and high in the subalpine fire forest group. The overall open road density and level of security habitat provides for a high level of connectivity. The current level of forest interior connectivity is considered to be low. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities, Twin Lakes MLSA

The connectivity of wildlife habitat could be improved with the restoration of roads, especially within riparian reserves. Road restoration could include revegetation of the road prism in order to provide habitat connectivity for low mobility species.

There may be an opportunity to promote the development of late-successional forest characteristics in some of early-successional forests through the use of thinning and fertilization.

**4. Disturbance Risk Analysis**

Almost the entire area encompassed by the Little Wenatchee LSR and Twin Lakes MLSA is in the wet forest group, making it one of the more sustainable areas within the reserve system. Recreational use within the LSR is high. A major ski area (Steven's Pass) bisects the LSR. Although there is high

potential for human-ignited fires, the number of at-risk acres is low under most circumstances. Natural ignitions within these reserves result from lightning strikes that under usual conditions burn only small areas. Under extremely dry weather conditions, the potential exists for larger fires to occur. Lodgepole pine stands, especially those with high mortality from mountain pine beetle outbreaks, are especially prone to high severity fires. Under synoptic weather conditions of strong, dry, easterly winds preceded by several years of drought, very large conflagrations are possible. In such instances, vegetation patterns probably affect fire intensity and spread very little.

Historically, following severe fires, seral stands of lodgepole pine or western white pine established within the Little Wenatchee LSR and Twin Lakes MLSA. The extent of these species has been reduced through successional processes or, as in the case of western white pine, from the combined mortality from white pine blister rust, an exotic pathogen, and mountain pine beetle, which frequently attacks and kills trees infected by the pathogen. The synergistic action of disease and insect attack is responsible for a recent pulse of large, high-quality snags; however, decimation of the host species (western white pine) by white pine blister rust has virtually eliminated replacements for dead and dying western white pine. The snags currently being produced are a one-time event. Once the western white pine snags decay or fall, they will not be replaced.

As the early seral pines die, they are being replaced by more shade tolerant late-successional species. These late-successional species are host to a variety of insects and diseases that, at endemic levels, provide important wildlife habitat in the form of snags and logs. Mortality levels can increase to epidemic levels from these disturbance agents, especially during prolonged droughts. As forests within the Little Wenatchee LSR and Twin Lakes MLSA age, insects and pathogens will continue to dominate disturbance regimes. Large spruce trees within riparian reserves are currently being killed by outbreaks of the spruce beetle. Although the number of acres and trees affected is not great, there is the potential for significant reduction in the number of large spruce within critical riparian habitat. In addition, maturing spruce forests are heavily impacted by root and butt rots from tomentosus and annosus root pathogens. The balsam woolly adelgid, a non-native insect, has the potential to cause considerable mortality in forests dominated by Pacific silver fir, western and mountain hemlocks.

The following information on insect activity in the Little Wenatchee LSR and Twin Lakes MLSA is from data collected during the aerial surveys conducted by Region 6 Insect and Disease Group. The extent of outbreaks prior to 1980 are not known; activity from 1980 to 1994 is reported only if more than 100 acres or 100 trees were affected in a single area. In most instances, the reported activity since 1980 includes multiple incidences of 100 acre/100 tree events.

- Mountain pine beetle (lodgepole pine): 1950-52, 1954, 1956-57, 1959, 1992, 1995
- Mountain pine beetle (w. white pine): 1951, 1953, 1955, 1957-63, 1965, 1968-82, 1984, 1986-95
- Mountain pine beetle (whitebark pine): 1995
- Mountain pine beetle (ponderosa pine):
- Douglas-fir beetle: 1952, 1954-56, 1959-61, 1970
- Fir engraver: 1959-60, 1969, 1977-78, 1990
- Western spruce budworm: 1973-77
- Blackheaded budworm: 1958, 1985
- Balsam woolly adelgid: 1990, 1993-4

Insects and pathogens have always been important disturbance agents within the moist grand fir forests and the wet forest groups that make up much of the Little Wenatchee LSR. Severity and extent have increased in the last three decades, and are likely a result of drought stress and increased

competition from trees that established following fire exclusion within and surrounding the LSR. Insect activity in the LSR is advancing succession by selectively eliminating seral species such as ponderosa, western white and lodgepole pine. Western white pine mortality associated with white pine blister rust and subsequent attack by mountain pine beetles is moderately high in this LSR. Fir engraver activity tends to produce snags and logs in small size classes. Following a pulse of heavy mortality from fir engravers, risk for catastrophic fires increases for several years because of the vertically-connected, highly flammable fine fuels in the twigs and branches of affected trees.

Susceptibility of the Little Wenatchee LSR and Twin Lakes MLSA to fires, insects, and pathogens is shown in the table below. Mortality from biotic disturbance agents will be greatest where host continuity across the landscape is high and where there is overlapping moderate to high risk among two or more disturbance agents that act synergistically. Risk associated with biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels; this is especially true in the dry forest vegetation group and in vegetation upslope from or surrounded by dry forests.

**Table IV-14, Disturbance Matrix, Little Wenatchee LSR / Twin Lakes MLSA**

| Veg  |      | Dwarf Mistletoe | Root Disease |      |      |      |     |     |    |     |       |  |
|------|------|-----------------|--------------|------|------|------|-----|-----|----|-----|-------|--|
| Type | Fire | DF              | AROS         | HEAN | PHWE | WPBR | WSB | DFB | FE | MPB | Total |  |
| 11   | M    | M               | M            | L    | L    | -    | M   | L   | -  | -   | M     |  |
| 30   | L    | M               | M            | M    | M    | M    | L   | L   | L  | -   | L     |  |
| 31   | L    | M               | M            | M    | M    | M    | L   | L   | M  | -   | L     |  |
| 32   | M    | H               | M            | M    | M    | M    | M   | M   | M  | -   | M     |  |
| 40   | L    | L               | L            | L    | L    | M    | L   | L   | L  | -   | L     |  |
| 41   | M    | L               | L            | L    | L    | M    | L   | L   | L  | L   | M     |  |
| 42   | H    | L               | L            | L    | L    | M    | L   | M   | M  | H   | H     |  |
| 60   | L    | L               | L            | L    | M    | H    | L   | L   | L  | -   | L     |  |
| 61   | L    | L               | L            | L    | M    | H    | L   | L   | L  | -   | L     |  |
| 62   | M    | L               | L            | M    | M    | H    | L   | M   | M  | -   | M     |  |
| 63   | L    | -               | L            | L    | L    | H    | L   | L   | L  | -   | L     |  |
| 65   | L    | L               | L            | L    | M    | H    | L   | L   | L  | -   | L     |  |
| 71   | M    | -               | L            | L    | L    | H    | -   | L   | L  | M   | L     |  |

**Key to Column Headings:** PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

**Key to Letters** “-” = no risk; “L” = low risk, “M” = moderate risk, “H” = high risk

**Veg Type codes:** refer to Appendix 3, in the “Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest”.

Only a minor portion of these two reserves are at imminent risk to fire, and for the most part, insects and pathogens are currently operating at endemic levels. Aging of these forests will likely increase insect and pathogen activity, with the potential for some of these agents to achieve epidemic levels. Areas where protection activities are warranted include mature lodgepole pine stands, especially those located near owl activity centers. Opportunities may exist for commercial thinning to reduce basal areas and adjacency of potential mountain pine beetle larval brood trees. Created openings in the wet forest type can be more rapidly moved toward later successional structures by precommercial

thinning. Single-layered stands will benefit from commercial thinning and group selection harvests to accelerate succession and create structural and species diversity.

### 5. Northern Spotted Owl

The following is the discussion and results of the "Within LSR/MLSA Spotted Owl Module" for the Little Wenatchee LSR/Twin Lakes MLSA. This module reviews the home range sites for spotted owls, as well as connectivity within the LSR/MLSAs. Appendix 1, specifically the Northern Spotted Owl Module, Individual LSR/MLSA further describes the order, explanations and processes of modules. See Suitable Spotted Owl/Dispersal Habitat and Activity Center map and tables, Forest Interior Map and tables, Riparian Reserve map and tables and Security Habitat map and tables.

The recovery of the federally Threatened northern spotted owl is highlighted in management strategies within LSRs and MLSAs (See appendix 1 - Northern Spotted Owl Module, Individual LSR/MLSA). This includes:

- LSRs and MLSAs will meet the goals for the numbers of owl pairs within each LSR or MLSA (NWFP 1994 B-4; NWFP C-9; FSEIS Appendix G, Biological Opinion, 1994; USDI. 1992. Northern Spotted Owl Recovery Plan, and USFWS Memorandum, 1991);
- Each spotted owl's 100 acre Activity Center will have the best quality habitat established and retained;
- Each spotted owl's 500 acre Core Area will have the best quality habitat and habitat will be retained;
- Each spotted owl home range will meet threshold acreage's (2,663 acres) as a minimum. Wetter owl sites in LSRs will meet target or optimal habitat of 3,994 acres.;
- Sustainable, suitable spotted owl habitat outside home ranges will be maintained ;
- Dispersal habitat within and outside LSR/MLSA will be provided; (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).
- Habitat conditions for long-term (> 50 years) sustainable nesting/roosting/foraging habitat will be improved (see DEC's and DC's in Forest-wide document, Chapter III PP 87-95 ); and
- The risk of habitat loss and nest site loss will be reduced (NWFP 1994, C-12 to 16, C-26);

The Little Wenatchee LSR and Twin Lakes MLSA are the only LSR/MLSA areas on the forest that are entirely composed of wet, moist or subalpine fir forests (wetter forest habitats). They do not have any dry or mesic forest acreage. The next wettest LSR, Bumping, has a very small amount.

Given the Little Wenatchee LSR is in wet forest types, the Desired Condition for spotted owl habitat is 60% of the 1.8 mile home range radius, which is 3,994 acres. This wetter LSR will be managed for spotted owl habitat, over risk and hazard reduction. The Twin Lakes MLSA is also in wet forest habitat, but being an MLSA, the Desired Condition for spotted owls is 40% of the 1.8 mile radius, which is 2,663 acres. See description of habitat in DEC's, Chapter VII page 92-95. LSRs in general, accept more risk of hazards, than do lands outside in Matrix. MLSAs accept less risk of hazards than do LSRs.

The Little Wenatchee LSR/Twin Lakes MLSA together have 10 activity centers for spotted owls. There are four main cluster groups for these owls. One group is in the Whitepine/Lanham Lakes areas and one group is in the Heather Lake/Fish Creek/Little Wenatchee Ford areas. Two cluster areas have only 2 owl sites each, and should be monitored for additional sites in the area. One is in the White

River/Twin Lakes area, and is the weakest cluster in the LSR/MLSA. The last group is in the Rainy/Theseus Creeks area (the Lost Squaw SO615 owl may be a functioning part of this cluster, even though it is outside the LSR). Clusters of owls provide better function for LSR and species recovery, than do isolated owl sites.

Most of the Little Wenatchee LSR/Twin Lakes MLSA is on National Forest lands, there are 8 small parcels of private lands. One owl, SO654, is very close to private land. Spotted owls affected by actions on private lands include SO624/SO632/SO654, SO631/SO653, and SO614. These private lands parcels could have coordination of habitat and site management, or possible acquisition of habitat.

a) Suitable Spotted Owl Habitat

(1) Little Wenatchee LSR

The existing amount of nesting/roosting/foraging habitat within the Little Wenatchee LSR is 29,534 acres (56%) of spotted owl habitat. There are currently 9 pairs of spotted owls in this LSR. The existing habitat could support 11 pairs of spotted owls at threshold acreage (2,663 acres/pair) or 7+ pairs at target amounts (3,994 acres/pair). See table below, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs", which displays the potential number of owl pairs for the various scenarios. The LSR is predominately in the wet forest groups, with some moist forest and some multi-structure subalpine fir forests. This wetter spotted owl habitat has a higher chance of sustainability, than dry and mesic forest groups. There is no dry or mesic forest groups in this LSR.

There is potential for spotted owl habitat to reach 45,470 acres (87%) in Little Wenatchee LSR. This includes 16,000 acres, that are currently in created opening or sapling/pole which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat. All of this habitat would be sustainable over time (50+ years). The LSR currently supports 9 pairs of spotted owls, over time it could support 11+ pairs of owls with target acreage (3,994 acres/pair). The goal of this LSR is to support 7+ pairs, this is very likely. See table below, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs". The Little Wenatchee LSR and the Twin Lakes MLSA are the only LSR/MLSA areas on the Forest that is predicted to sustain all future habitat and owl pairs.

Dispersal habitat (which may grow into foraging, roosting and nesting), covers 10,259 acres (20%) of Little Wenatchee LSR. It is predominately wet forest group, with some moist and subalpine fir forests. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the LSR is from Cady Creek to Lake Creek, Theseus Creek to Snowy Creek, Whitepine Creek to Mill Creek, and Indian Creek to Canyon Creek (See Forest Interior Map and Suitable Spotted Owl Habitat Map). Dispersal habitat in these areas should be allowed to advance successional, to provide added owl habitat.

Potential disruption to spotted owl habitat from risk of fire is very low. There is some potential disruption of habitat from forest fragmentation on intermingled ownership in the Nason Creek area. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within the spotted owl core areas and home ranges.

Habitat analysis for the Little Wenatchee LSR is based on vegetation modeling, and a model of spotted owl habitat structure. The map and acreage's should be validated prior to project implementation.

(2) Twin Lakes MLSA

The Twin Lake MLSA currently has 2,770 acres (50%) of spotted owl habitat. There is 1 pair of spotted owls in this MLSA. The existing habitat could support 1 pair of spotted owls at threshold acreage (2,663 acres/pair). See table below, "Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSA's", which displays the potential number of owl pairs for the various scenarios. The MLSA is predominately in the wet forest groups, with some moist forest and some multi-structure subalpine fir forests. This wetter spotted owl habitat has a higher chance of Sustainability, than dry and mesic forest groups. There is no dry or mesic forest groups in this MLSA.

There is potential for spotted owl habitat to reach 4,794 acres (86 %) in Twin Lakes. This includes 2,000 acres, that are currently in created opening or sapling/pole which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat. The MLSA currently supports 1 pair of spotted owls, over time it could support nearly 2 pairs of owls with threshold acreage (2,663 acres/pair). The goal of this MLSA is to support 1 pair, this is very likely. The Little Wenatchee LSR and the Twin Lakes MLSA are the only LSR/MLSA areas on the Forest that is predicted to sustain all future habitat and owl pairs..

Dispersal habitat (which may grow into foraging, roosting and nesting), covers 1,294 acres (23%) of the Twin Lakes MLSA. It is predominately wet forest group, with some moist and subalpine fir forests. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the MLSA is along the north aspects of Dirtyface Ridge (See Forest Interior Map and Suitable Spotted Owl Habitat Map). Dispersal habitat in these areas should be allowed to advance successionaly, to provide added owl habitat.

Potential disruption to spotted owl habitat from risk of fire is very low. There is some potential disruption of habitat from forest fragmentation. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within the spotted owl core areas and home ranges. The matrix lands should be analyzed for fire risk to this MLSA.

Habitat analysis for the Twin Lakes MLSA is based on vegetation modeling, and a model of spotted owl habitat structure. The map and acreage's should be validated prior to project implementation.

**Table IV-15, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSA's.**

| LSR or MLSA     | 1996 Known Pairs & Singles        | CHU S.Owl Pair Goals | Existing Suitable Spotted Owl Habitat |                  |              | Potential SSOH |                  |              | Sustainable SSOH |                  |              | % Forest Interior |
|-----------------|-----------------------------------|----------------------|---------------------------------------|------------------|--------------|----------------|------------------|--------------|------------------|------------------|--------------|-------------------|
|                 |                                   |                      | Acres                                 | Thres-hold Pairs | Target Pairs | Acres          | Thres-hold Pairs | Target Pairs | Acres            | Thres-hold Pairs | Target Pairs |                   |
| Chiwawa RW 135  | 18 + 1 <sup>1</sup> (7Site*)      | 21+ Pairs            | 49489 acres                           | 18.6 Pairs       | 12.4 Pairs   | 81567 acres    | 30.6 Pairs       | 20.4 Pairs   | 65205 acres      | 24.5 Pairs       | 16.3 Pairs   | 24%               |
| Twin Lks DMI    | 1 Pr WILDERNESS                   | --                   | 2770                                  | 1.0              | X            | 4794           | 1.8              | X            | 4794             | 1.8              | X            | 26%               |
| Lil' Wen RW134  | 9 Pr +1 <sup>1</sup>              | 7+ Pr                | 29534                                 | 11.1             | 7.4          | 45470          | 17.1             | 11.4         | 45470            | 17.1             | 11.4         | 33%               |
| Deadhorse RW133 | 7 sites + 1 <sup>1</sup> (2site*) | 4+ Pr                | 6692                                  | 2.5              | X            | 11044          | 4.2              | X            | 2391             | 0.9              | X            | 2%                |
| Icicle RW132    | 2 sites                           | 1 Pr                 | 7861 acres                            | 3.0 Pairs        | 2.0 Pairs    | 10680 acres    | 4 pairs          | 2.7 pairs    | 9412 acres       | 3.5 pairs        | 2.4 pairs    | 18%               |

<sup>1</sup> Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

\*S. owl activity center may have been lost, due to 1994 Chelan Forest Fires, monitoring still underway.

<sup>2</sup> Spotted owl activity center on Private Land.

(3) Little Wenatchee LSR and Twin Lakes MLSA

These LSR/MLSAs are part of the reserves that are predicted to provide the needs for spotted owl recovery over time (50+ years). Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. The reserves function for connectivity and spotted owl home ranges. With the exception of a few LSR/MLSAs that are not sustainable, it is concluded that the LSR/MLSA reserves on the Wenatchee National Forest meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing. (See Appendix 1, "Forest-wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module")

b) Spotted Owl Home Ranges

Within the Little Wenatchee LSR/Twin Lakes MLSA, the estimated amount of habitat within a 1.8 mile radius of the 10 activity centers is shown in the table below, "Suitable Spotted Owl Habitat." Two spotted owl home ranges are below threshold acreage (2,663 acres/pair), SO602 Little Wenatchee Ford and SO611 Twin Lakes. Acceleration of late successional habitat within 0.7 miles radius of the activity center would improve habitat conditions. There are 5 sites below target acreage (3,994 acres/pair), these home ranges should have habitat improvement done to accelerate habitat. There are 3 sites above target that will need to be monitored to maintain that habitat.

There are 6 sites that in the future habitat may be reduced on private lands, these should have some coordination with the land owners. Of special notice are owl sites: SO602, SO614 that have not been located and/or had surveys conducted in the past 5 years, they need to be emphasized in the monitoring scheme. Historical owl sites should be monitored in the LSR/MLSA. In addition, there are many sites in adjacent wilderness that could be monitored. The remainder of the LSR should be inventoried for possible spotted owl sites. The importance of an owl site outside the LSR, Lost Squaw SO615 should be monitored for the cluster concept of the LoRain and Theseus owls. All spotted owl sites should be monitored and habitat verified.

The adjacent forested habitats of the Alpine Lakes, Henry M. Jackson and Glacier Peak Wildernesses are important for the functioning of this connectivity. Specifically in the Cady Creek, White River, Lake Creek, Rapid River, Icicle and Whitepine Creeks. Also of importance for LSR function is the inclusion of RNAs, such as a possible RNA in the Mill Creek/Big Chief Mountain area with very high quality old growth forest habitat near the Crest of the Cascades.

There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability. There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreage's. Over time, it is expected that higher quality and more sustainable habitat will be restored to the LSR. The drier forests in other LSR/MLSAs will eventually be managed for other late-successional species. See table below, "Suitable Spotted Owl Habitat" for restoration opportunities.

**Table IV-16, Suitable Spotted Owl Habitat, Little Wenatchee LSR / Twin Lakes MLSA**

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|                                  |    | SUITABLE SPOTTED OWL HABITAT <sup>10</sup> |       |         |       |  |       |         |       |  |       |         |       | Restore         |
|----------------------------------|----|--|-------|---------|-------|--|-------|---------|-------|--|-------|---------|-------|-----------------|
|                                  |    | 1.8 mile Circle Around Activity Center     |       |         |       | 0.7 mile Circle Around Activity Center |       |         |       | Dispersal Habitat Around Activity Center |       |         |       | Opps & Priority |
| LilWenL SR Spotted owl           |    | Dry  | Mesic | Wet-ter | Total | Dry                                    | Mesic | Wet-ter | Total | Dry                                      | Mesic | Wet-ter | Total | * & #           |
| SO601 <sup>1</sup><br>Heather Lk | P  | 0  | 0     | 3,931   | 3,931 | 0                                      | 0     | 734     | 734   | 0  | 0     | 716     | 716   | m,a             |
| SO602<br>LilWenFord              | P  | 0  | 0     | 3,288   | 3,288 | 0                                      | 0     | 347     | 347   | 0  | 0     | 1,526   | 1,526 | m1,a #1         |
| SO603<br>Fish Cr                 | PY | 0  | 0     | 3,598   | 3,598 | 0                                      | 0     | 692     | 692   | 0  | 0     | 1,438   | 1,438 | m1,a #4         |
| SO614<br>Panther Knob            | P  | 0  | 0     | 3,873   | 3,873 | 0                                      | 0     | 714     | 714   | 0  | 0     | 1,016   | 1,016 | m,a,c,p #3      |
| SO624<br>Whitepine               | PY | 0  | 0     | 3,540   | 3,540 | 0                                      | 0     | 779     | 779   | 18                                       | 0     | 645     | 664   | m,c,a,p #5      |
| SO631<br>Theseus                 | PY | 0  | 0     | 4,037   | 4,037 | 0                                      | 0     | 755     | 755   | 0  | 0     | 1,179   | 1,179 | m,c #9          |
| SO632<br>Lanham Lk               | PY | 0  | 0     | 3,342   | 3,342 | 0                                      | 0     | 647     | 647   | 18                                       | 0     | 1,505   | 1,523 | m,c,a,p #6      |
| SO648<br>Heather Tr              | P  | 0  | 0     | 4,253   | 4,253 | 0                                      | 0     | 603     | 603   | 0  | 0     | 1,496   | 1,496 | m #10           |
| SO653<br>LowRain                 | PY | 0  | 0     | 4,353   | 4,353 | 0                                      | 0     | 594     | 594   | 0  | 0     | 1,138   | 1,138 | m,c,p #8        |
| SO654<br>Henry                   | P  | 0  | 0     | 3,538   | 3,538 | 0                                      | 0     | 753     | 753   | 18                                       | 0     | 1,043   | 1,061 | m,c,a,p #7      |
| Historic s.owls                  |    |  |       |         |       |  |       |         |       |  |       |         |       |                 |
| SO626<br>Rainy Pass              | hs |  |       |         |       |  |       |         |       |  |       |         |       | m               |
| SO647<br>Irving                  | hs |  |       |         |       |  |       |         |       |  |       |         |       | m               |
| SO655                            | hs |  |       |         |       |  |       |         |       |  |       |         |       | m               |

| SUITABLE SPOTTED OWL HABITAT <sup>10</sup> |     |       |         |  |       |       |         |  |     |       |         |       |       | Restore         |
|--|-----|-------|---------|--|-------|-------|---------|--|-----|-------|---------|-------|-------|-----------------|
|  |     |       |         |  |       |       |         |  |     |       |         |       |       | Opps & Priority |
| 1.8 mile Circle Around Activity Center     |     |       |         | 0.7 mile Circle Around Activity Center |       |       |         | Dispersal Habitat Around Activity Center |     |       |         |       |       |                 |
|  | Dry | Mesic | Wet-ter | Total                                  | Dry   | Mesic | Wet-ter | Total                                    | Dry | Mesic | Wet-ter | Total |       |                 |
| LilWenL SR Spotted owl                     |     |       |         |  |       |       |         |  |     |       |         |       |       | * & #           |
| LowSmith                                   |     |       |         |  |       |       |         |  |     |       |         |       |       |                 |
| TwinLks MLSA Spotted Owl                   |     |       |         |  |       |       |         |  |     |       |         |       |       | * & #           |
| SO611 Twin Lakes                           | PY  | 0     | 0       | 3,260                                  | 3,260 | 0     | 0       | 466                                      | 466 | 0     | 0       | 1,277 | 1,277 | m,a,p #2        |

<sup>1</sup> Owl Site adjacent to LSR/MLSA. Less than 1400' from Boundary.

RS = Residential Single; P = Pair; PY = Pair with Young, based on highest Reproductive occupancy. (HS = Historical Single)

**Below Threshold:** < 2,663 ac suitable spotted owl habitat in 1.8 mi circle **OR** < 500 ac suitable spotted owl habitat in 0.7 mi circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum/Target:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>10</sup> Dry suitable spotted owl habitat includes vegetation code 12 where size/structure is multistory greater than 9" DBH;

mesic includes code 22; and

wet includes codes 32, 36, 62, 64, and 42.

\* **Restoration Opportunities:** M = Monitor Habitat & Site; M1 = Monitor Needed for sites not located >5 years ago; P = Protect Habitat From Reduction or From Risk; A = Accelerate Habitat Towards Nesting, roosting, Foraging; C = Coordinate Habitat and Site Management, or Acquire Habitat.

# **Priority Number** for LSR/MLSA Management Actions. Based on habitat acreage, juxtaposition (intra & inter, contiguous forest block, & clusters); Reproduction; and Site Quality (Late Successional Hab, Forest Interior, Security Habitat).

### c) Spotted Owl Dispersal And Connectivity

The LSR/MLSA together can sustain 13 pairs of owls over time, and provide genetic exchange within the Little Wenatchee LSR/Twin-Lakes MLSA and between other LSRs and MLSAs. Important connectivity between home ranges are habitat fragments in the Napeequa, Canyon Creek/9-Mile Creek, Theseus/Lake Creek, Rainy/Smithbrook, and Mill Ridge/Martin Creek areas.

Important connectivity corridors and patches between LSRs/MLSAs include Cady/Fish/Lake Creek to Rapid River, and Mill/Whitepine/upper Icicle (some of the largest blocks of wet forest interior habitat

on the Forest). Other connectivity corridors and patches include:

Napeequa/Twin/Meadow/Brush/Raging Creek, Rainy/Lost/Plainview/Natapoc, Whitepine/Coulter/Skinney Creek. Mill Creek/Smithbrook/Lake/Fish/Cady/Little Wenatchee are important linkages for north-south and east-west dispersal and genetic interchange.

During dispersal, nesting, roosting, and foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat includes single story stands, and smaller trees with at least 40% crown closure. Dispersal habitat within the Little Wenatchee LSR is 10,259 acres (20%) and for Twin Lakes MLSA it is 1,294 acres (23%). Dispersal habitat will grow up to be nesting/roosting/foraging habitat. Habitat providing dispersal/Connectivity corridors within the LSR/MLSA include: Meadow Creek, Twin Lakes, Little Wenatchee, Lake Creek, Rainy Creek, Nason Creek and Mill Creek. (see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. The Little Wenatchee LSR has 56% in late-successional wetter forest habitat, this could increase to 84%. The Twin Lakes MLSA has 50% in late-successional wetter forest habitat, this could increase to 79%. There is high amount of wetter forest interior habitat (Little Wenatchee LSR is 32% or 16,928 acres, Twin Lakes MLSA is 26% or 1,426 acres). Fragmentation of forest interior is a result of some natural avalanche slide areas and high elevation habitats, but is primarily a result of created openings (>10%) in wet forest groups. The moderate road densities (Little Wenatchee LSR is 1.75 miles per square mile, Twin Lakes MLSA is 0.31 miles) and moderate security habitat (Little Wenatchee is 46%, Twin Lakes is 82%) effects connectivity, in that fragmentation usually occurs along roads, and snag reductions for road maintenance cumulatively effects habitat overtime.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's, in Matrix, in AMA's, and in wilderness areas (NWFP 1994, ROD pg 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

d) Restoration Opportunities And Potential Projects - Within LSR/MLSA

• **Monitor Effectiveness**

1. Meet goals of Little Wenatchee LSR for 7+ pairs and Twin Lakes MLSA 1 pair of spotted owls. Monitor Activity Centers, Core Areas and Home Ranges.
2. The two spotted owl sites below threshold need to be monitored for habitat verification - Twin Lakes SO611, and Little Wenatchee Ford SO602.
3. Monitor sites that have not been located and/or had surveys conducted in the past 5 years, they are SO602, SO614. Several other sites will be older than 5 years after field season 1997.
4. Monitor 4 owl cluster sites for reproductive status and demography: Whitepine/Lanham, Rainy/Theseus (including Lost Squaw), Heather/Fish/Little Wenatchee Ford, and Panther Knob/Twin Lakes.
5. Monitor historical owl sites.
6. The remainder of the LSR should be inventoried for possible spotted owl sites.
7. Monitor adjacent wilderness spotted owl sites.
8. Monitor connectivity outside LSR

• **Monitor Validity**

9. Validate vegetation modeling.

10. Validate spotted owl mapping, LSR acreage's, and home range acreage's.
  11. Field verify habitat and activity center locations.
  12. Validate the long-term the assumption that the Little Wenatchee LSR sustainable habitat (moist forest groups) can support 11+ pair of owls, and Twin Lakes MLSA can support 1+ pairs of owls. The adjacent wilderness habitat is crucial to continue this linkage for spotted owls.
- **Monitor Implementation**
    13. Reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle, especially in the Twin Lakes SO611, Lanham SO632, Henry SO654, and Whitepine SO624 sites.
    14. During management proposals, use habitat quality/risk assessment analysis (Appendix 29) to help display best quality habitats and stands of highest risk to loss.
  - **Protection**
    15. Owl sites (SO614,624,632,653,654) near the eastern portion of the LSR/MLSA may need some fire risk protection, on habitat outside of LSR.
    16. Fuels reduction and hazard reduction occur outside nesting, roosting, foraging (NRF) habitat in short term, shift emphasis after 50 years. Accept more risk from fire, manage at high end of spotted owl habitat DC in wet sites. 500 Acre core area protected, 100 acre activity center protected.
    17. Protect and/or create connectivity outside LSR: Coulter Creek, Plainview Creek, Meadow Creek, Napeequa.
  - **Maintain**
    18. The Twin Lakes SO611 and Little Wenatchee Ford SO602 habitat restoration of dispersal acres is in Wilderness and should develop naturally towards late successional habitat.
    19. There are 3 sites above target should maintain habitat (SO631, SO648, SO653).
    20. Sustain spotted owl habitat inside LSR.
    21. Maintain dispersal/connectivity habitat within LSR (see unique habitats list).
    22. Maintain dispersal/connectivity habitat and connectivity towards other LSR/MLSA.
  - **Habitat Improvement**
    23. For owls below threshold acreage, accelerate habitat within 0.7 miles radius for two spotted owls, SO602 Little Wenatchee Ford, and SO611 Twin Lakes.
    24. For owls below target acreage, accelerate habitat within 1.8 miles radius for 5 sites SO602, SO603, SO614, SO624, SO632, SO654.
    25. Potential habitat includes 16,000 acres, that are currently in created opening or sapling/pole which will grow into suitable spotted owl habitat in the next 50 to 120 years. These acreage's should be accelerated towards late successional habitat.
    26. Improve and accelerate N/R/F habitat in wet forest groups, to maintain number of spotted owl pairs. Accelerate dispersal habitat and old plantations at Meadow Creek, upper Little Wenatchee, Canyon Creek, Whitepine/Mill, and Rainy Creek in order of priority.
      - Promote clear cuts in wet/moist vegetation groups to be habitat in 100 years.
      - Promote pole sized stands in wet/moist to be habitat in 50 years.
      - Promote clear cuts in mesic/dry vegetation groups to be habitat in 120 years.

- Promote pole sized stands in mesic/dry to be habitat in 70 years.
- 27. Increase habitat effectiveness and connectivity by reducing open road density and revegetating road beds, especially in Forest Interior patches.
- **Coordinate**
  - 28. Coordination of habitat management on private lands, or possible acquisition of habitat for 6 owls of three groups: SO624/SO632/SO654, SO631/SO653, and SO614.

## 6. Aquatic

The Little Wenatchee Late Successional Reserve (LSR) includes lands within the Nason, Little Wenatchee and White River watersheds. The Twin Lakes Managed Late Successional Area is located primarily within the White River Watershed with a small amount included in the Meadow-Brush subwatershed and Chiwawa watershed. All these lands are within the Wenatchee River Subbasin.

### a) Geomorphology

The watersheds in which the Little Wenatchee LSR/Twin Lakes MLSA are located lie within the Wenatchee Highlands Subsection. The predominate landtypes are Glacial Cirque Headwaters, Glacial Trough and Floodplain Response (floodplains identified at the ½ inch/mile scale). The Glacial Trough landforms are generally located below the Glacial Cirque landforms. The cirques are poorly regulated hydrologically. Unlike the cirques, the troughs, due to till material on the slopes, are well regulated hydrologically. Water rapidly runs off the cirques due to the shallow soils and near surface rock, into the till material where it moves slowly downslope into stream channels. The regulating capacity of the troughs provide relatively well regulated summer flows with relatively low summer stream temperatures. Stream temperatures during low summer flows though can approach the upper limits of the preferred temperature range for salmonids. These high temperatures though are usually of short duration.

Debris flows are an important mechanism for the transport of sediment (coarse and fine) and woody material to stream systems. As such debris flows are an important factor in shaping the streams and aquatic habitat. These landtypes have a relatively high amount of coarse sediment delivery.

The valley bottoms often are dominated by broad, well-developed floodplains. Where large floodplains dominate a portion of the landscape the Floodplain Response landtype is found. The Floodplain Response landtypes have high water tables and broad riparian zones. Bank erosion is common as streams migrate across the floodplain (Dawson and others 1996). The presence of water combined with a frequent disturbance interval due to flooding, subsequent bank erosion, and the deposit of debris flow material creates a diverse riparian habitat. When functioning properly this landtype can also produce a diverse aquatic habitat. Bank erosion is an important mechanism for delivery of coarse and fine sediment, depending on the bank material, and the delivery of organic material to streams. Streams naturally meander across these floodplains through time except where large debris fans constrain the channels (Dawson and others 1996).

#### (1) Management Concerns due to Geomorphology

Management concerns include locating roads so as to not accelerate debris flow occurrence. Roads need to be located to avoid significant capture of ground water in till material, which may alter the hydrologic regime and increase potential for road prism failure. Large organic matter needs to be maintained next to streams for the benefit of the streams and riparian habitat at the site and, when debris flows occur, to be delivered downstream. Riparian reserves may need to be relatively wide to provide woody material for future delivery downstream.

Within the large, mainstem valley bottoms management needs to recognize that the streams will tend to meander across the floodplains. Maintaining bank vegetation is important to prevent accelerated bank erosion and to provide a source of organic input to the stream. Of special concern is that management not artificially constrain these channels. Riparian reserves will be relatively large in places due to the broad floodplains and channel migration.

The Little Wenatchee LSR and Twin Lakes MLSA include lands within three fifth field HUC watersheds; Nason, White-Little Wenatchee (which will be discussed separately) and to a small portion of the Chiwawa. These watersheds support significant fish populations within the Wenatchee Subbasin (MacDonald and others 1996).

b) Nason Creek Watershed

Heading near Steven’s Pass, Nason Creek flows in a predominately easterly direction before entering the Wenatchee River at the outlet to Lake Wenatchee. All the key salmonids are found within Nason Creek. The Lower Nason subwatershed directly downstream of the LSR is a significant subwatershed for spring chinook salmon. A small number of sockeye salmon also spawn in the Lower Nason subwatershed. A bedrock gorge just upstream of the Whitepine Creek confluence defines the break between the Lower Nason and Upper Nason subwatershed. The gorge presents a barrier to spring chinook and sockeye salmon but steelhead are known to ascend the gorge.. The extent of steelhead in the watershed is unknown but they are assumed to potentially inhabit most of the system. Bull trout are assumed to ascend the gorge and are found in the upper reaches of Nason Creek. No significant subwatersheds for bull trout or steelhead have been identified. Western pearlshell mussels have been found downstream of the LSR in the Lower Nason subwatershed.

Much of the mainstem Nason Creek, is bordered by State Highway 2, a railroad right-of-way, utility corridors, and private lands. Development of the private lands has resulted in loss of future wood input and there has been wood removal by private landowners. The highway and railroad has artificially confined the channel with associated loss of stream channel-floodplain connectivity and a corresponding change in channel characteristics, aquatic and riparian habitat. Three Nason Creek subwatersheds are included within the LSR, Whitepine, Upper Nason, and Headwaters Nason.

**Table IV-17, Key Salmonid Population Status, Nason Creek Within LSR**

| subwatershed | Bull Trout | Soc | Cut | Red | Steel | SPC | SuC |
|--------------|------------|-----|-----|-----|-------|-----|-----|
| White Pine   | P          | P   | P   | P   | P     | P   | A   |
| Upper Nason  | P          | A   | Ps  | P   | P     | A   | A   |
| Head Nason   | P          | A   | Ps  | P   | P     | A   | A   |

soc = sockeye, Cut = westslope cutthroat, Red = redband trout, Steel = steelhead, SPC = spring chinook, SuC= summer chinook. P = Present, A = Absent, s = significant

(1) Whitepine subwatershed

No significant populations have been identified within Whitepine subwatershed. Genetic studies have shown the redband population has been influenced by coastal rainbow, although in a tributary, Wildhorse Creek, some “good” representatives of interior redband trout were found. Some limited hybridization with cutthroat was evident though. There is a limited amount of spring chinook rearing within the lower reaches of Whitepine. A small number of sockeye also spawn in Lower Nason and have been observed in Whitepine (Brown 1992). Bull trout are found within Whitepine but at this time are not considered a significant population. No information is currently available for amphibians in the Whitepine subwatershed.

(2) Upper Nason subwatershed

The Upper Nason subwatershed is considered significant for westslope cutthroat due to "essentially pure" westslope cutthroat in the upper reaches of Smithbrook Creek. Specimens sampled in the lower reaches of Smithbrook Creek were considered to be "good" westslope cutthroat trout but there was some evidence of possible influence of historic coastal cutthroat (*O. clarki clarki*). Bull trout, redband trout and steelhead are known to inhabit Upper Nason subwatershed. Some limited bull trout spawning has been observed in Mill Creek (Brown 1992, Barb Kelly, U.S. Fish and Wildlife Service, personnel communication) Tailed-frogs are found in the Upper Nason subwatershed.

(3) Headwaters Nason subwatershed

The Headwaters Nason subwatershed is considered to be significant for westslope cutthroat trout (MacDonald and others 1996) due to "essentially pure populations" in the upper reaches of Nason Creek. Redband/rainbow trout are also present although genetic status and population status is unknown. Steelhead are assumed to be present because there are no migration barriers and redband/rainbow are present (MacDonald and others 1996). Headwaters Nason is considered significant for tailed frogs.

(4) Nason Creek Watershed Management Concerns

A major aquatic resource concern with the Nason Creek watershed as a whole is the loss of floodplain connectivity. When opportunities exist acquisition of private lands or use of conservation easements is a priority. Potential purchases or easements should be coordinated to meet LSR objectives for terrestrial wildlife. Because of the problems on private lands and the potential for future development on private lands, habitat on National Forest Land is very important. A priority for National Forest management should be to conserve existing significant cutthroat subwatersheds and known bull trout habitat in Mill Creek; protect downstream significant spring chinook habitat in the Lower Nason subwatershed; and maintain aquatic habitat connectivity within the Nason watershed.

The Nason Creek watershed as a whole should be a priority for watershed restoration activities to improve habitat conditions for native cutthroat bull trout, steelhead and spring chinook salmon. Bull trout are not as abundant in the Nason watershed as in other adjacent Wenatchee River Subbasin watersheds so there may be potential for population recovery. Nason Creek may be targeted for spring chinook supplementation programs in the near future. If steelhead supplementation is a chosen recovery program Nason Creek may be a good candidate. Terrestrial or aquatic restoration activities which would anchor or rehabilitate habitat may be complementary to the population recovery efforts. Restoration activities with potential short term risks to aquatic habitat should occur outside significant watersheds or pose little to no risk of adversely impacting significant populations. The Forest should coordinate with Washington Department of Fish and Wildlife so that any fish stocking, such as in alpine lakes are consistent with maintaining and restoring the native species.

c) Little Wenatchee Watershed

The Little Wenatchee River heads at the Cascade Crest and flows southeasterly for approximately 24 miles before entering Lake Wenatchee. The Little Wenatchee River is designated as a Key watershed in the Northwest Forest Plan. A falls at approximately rivermile 7.0, just downstream of the mouth of Rainy Creek, is a barrier to anadromous fish. Redband/rainbow are found throughout the watershed. The Little Wenatchee below the falls is one of four primary spring chinook spawning streams in the Wenatchee River and one of two major sockeye salmon spawning streams for the Lake Wenatchee sockeye population. The Lake Wenatchee sockeye population is one of only two viable sockeye populations in the Columbia River system. The spring chinook population is currently depressed (SASSI 1992) and recent returns are have been dismal. Bull trout and steelhead are known to utilize the reach below the falls but population status is unknown. Biologists question whether the falls is a barrier to steelhead and bull trout. Other than the recent sighting of a small bull trout in

Rainy Creek, neither species has been confirmed above the falls. Brook trout are common in the watershed. With the widespread distribution of brook trout it is possible they have replaced any native bull trout populations. Summer chinook are not found within the Little Wenatchee Watershed.

The Little Wenatchee LSR includes five Little Wenatchee subwatersheds; Rainy, Lower Little Wenatchee, Upper Little Wenatchee, Lake, and a small portion of the Headwaters Little Wenatchee subwatershed.

**Table IV-18, Key Salmonid Population Status, Little Wenatchee Watershed**

| subwatershed     | Bull Trout | Sockeye             | Cutthroat           | Redband             | Steelhead | Spring. Chinook     |
|------------------|------------|---------------------|---------------------|---------------------|-----------|---------------------|
| Rainy            | Unknown    | Absent              | Present Significant | Present             | Unknown   | Absent              |
| Lower Little Wen | Present    | Present Significant | Present             | Present Significant | Present   | Present Significant |
| Upper Little Wen | Unknown    | Absent              | Present Significant | Present             | Unknown   | Absent              |
| Lake             | Unknown    | Absent              | Present Significant | Present             | Unknown   | Absent              |
| Head Little Wen  | Unknown    | Absent              | Present Significant | Present             | Unknown   | Absent              |

(1) Rainy subwatershed

Rainy Creek is a third order tributary to the Little Wenatchee. The confluence of Rainy Creek and the Little Wenatchee is just upstream of the Little Wenatchee falls. The lower portions of the watershed are inhabited by both redband/rainbow and cutthroat trout. The stream has been historically stocked with both rainbow and cutthroat trout and there is evidence of interbreeding between the redband/rainbow and cutthroat population. The upper reaches of Rainy Creek and Snowy Creek, a tributary include "pure" westslope trout hence the Rainy Creek subwatershed is considered to be significant for westslope cutthroat.

Bull trout have been suspected to inhabit Rainy Creek but not confirmed. One possible bull trout and a fish that appeared to be a bull trout/brook trout hybrid were observed during a snorkel survey training session in 1996. While it now appears bull trout may be present their numbers look to be very low. More sampling is needed to better assess the bull trout population in Rainy Creek and the rest of the Little Wenatchee watershed upstream of the falls. Brook trout are present in the lower reaches of Rainy Creek and throughout much of the Little Wenatchee. The apparent establishment of a brook trout population may have displaced any native bull trout populations.

The northwest salamander western long-toed salamander, cascade frogs and tailed-frogs are known to inhabit the Rainy Creek subwatershed.

(2) Lower Little Wenatchee subwatershed

The Lower Little Wenatchee subwatershed includes that portion of the Little Wenatchee watershed from the mouth upstream to the confluence with Rainy Creek. This watershed is considered significant for both sockeye salmon and spring chinook salmon. The Lower Little Wenatchee is one of two primary spawning tributaries for the Lake Wenatchee sockeye population and is an important spawning tributary for spring chinook salmon within the Wenatchee River subbasin. Steelhead are

known to inhabit the watershed but their population status relative to other portions of the Wenatchee is unknown. Bull trout are known to spawn and probably rear below the falls.

The Lower Little Wenatchee is considered significant for redband trout because of the existence of "good" but not necessarily pure redband trout. This population was deemed significant because of the few remaining populations with good redband characteristics within the subbasin. These few populations may be important for the conservation and restoration of the species. The redband may also be part of the native steelhead population adding to their "significance" While not considered "significant" due to the small amount of stream above the falls within the subwatershed, "essentially pure" westslope cutthroat trout are found upstream of the falls and the upstream subwatersheds are all considered significant for westslope.

The number of bull trout spawning in the Lower Little Wenatchee is not known but it could be significant. The bull trout spawn just after sockeye salmon which are preceded by spring chinook salmon. The presence of the salmon redds makes identification of bull trout redds difficult. Lake Wenatchee supports an adfluvial bull trout population which is believed to spawn in the Little Wenatchee, White and Chiwawa River systems. The population is a relatively strong one within the upper Columbia and thus may be important for conservation of the species important for conservation of the species.

Known amphibian populations include; tailed frogs, Pacific giant salamander, and western long-toed salamanders.

(3) Upper Little Wenatchee subwatershed

Little Wenatchee Falls is a migration barrier to sockeye salmon and spring chinook salmon, thus these species are absent from this subwatershed. Bull trout and steelhead have not been recently documented upstream of the falls (except for the one bull trout mentioned in Rainy Creek) but we are not confident enough to call these species absent thus the unknown designation.

Redband are found in this subwatershed but it not considered significant due to the influence of coastal rainbow as a result of a long stocking history. The subwatershed is considered significant though for westslope cutthroat trout due to the presence of "essentially pure" westslope cutthroat found above Little Wenatchee Falls and in Fish Creek, a tributary to the Little Wenatchee River.

Known amphibian populations include; Cascade frog, tailed frog, Pacific giant salamander and western long-toed salamander.

(4) Lake subwatershed

Lake Creek is a second order tributary to the Little Wenatchee. Redband trout inhabit the subwatershed but they are not considered a significant population due to the influence of coastal rainbow as a result of past stocking. Lake subwatershed is considered significant for westslope cutthroat due to a "pure" population in an unnamed tributary which enters Lake Creek from the south at approximately rivermile 0.4.

Pacific Giant salamanders inhabit the Lake subwatershed.

(5) Headwaters Little Wenatchee subwatershed

Much of this subwatershed lies within the Henry M. Jackson Wilderness. Only a small portion of the Little Wenatchee LSR includes the Headwaters Little Wenatchee. The Headwaters Little Wenatchee is considered significant for westslope cutthroat trout due to an apparently strong population in the Little Wenatchee River (although genetic integrity is unknown) and a good but not pure (evidence of minimal hybridization with rainbow trout) in Caddy Creek. No amphibian information is currently available for this subwatershed.

(6) Little Wenatchee Watershed Management Concerns

The Little Wenatchee Watershed is very important for aquatic resources. Significant fish populations are found throughout and though some cutthroat populations are somewhat isolated in tributaries there is connectivity throughout the watershed. Genetic introgression is a concern but given the number of significant populations and connectivity this is an important watershed to try and anchor the cutthroat, sockeye and chinook populations. The Lower Little Wenatchee subwatershed may also be very important for bull trout and native redband. Management should emphasize aquatic conservation and the maintenance and restoration of natural watershed processes to provide long term habitat conditions. Any management activities for terrestrial resources should present a low risk to aquatic resources due to the importance of the watershed.

d) White River Watershed

Like the Little Wenatchee, the White River flows into Lake Wenatchee. Heading at the Cascade crest, much of the watershed is contained within the Glacier Peak Wilderness. The White is a glacier fed stream thus the water is cloudy much of the summer due to glacier flour. The lower reaches of the White flows through a broad floodplain within the Floodplain Response landtype. This broad floodplain provides a diverse aquatic and riparian habitat. As with the Little Wenatchee, the White is an important spawning stream for spring chinook and sockeye salmon. The White contains more accessible anadromous fish habitat than the Little Wenatchee, as the barrier to anadromous fish, White River Falls, is about 14 miles upstream of the mouth. Steelhead also use the White. As with the Little Wenatchee, status of the steelhead population beyond that which is known for the total Wenatchee River population is unknown. Bull trout are known to ascend White River tributaries from Lake Wenatchee but the extent to which the species utilizes the mainstem is not known. It is likely substantial bull trout spawning and possibly rearing occurs in the mainstem White River based upon anecdotal reports of spawning and past harvest. The White River was designated a key watershed in the Northwest Forest Plan. Portions of two subwatersheds of the White River, Upper White River subwatershed and Napeequa are included in this LSR.

(1) Upper White River subwatershed

No significant key salmonid populations are identified for the Upper White River subwatershed, although this may need to be reevaluated. A large portion of the sockeye and spring chinook spawn in the Lower White River subwatershed but some spawning does occur within the Upper White. MacDonald and others (1996) identified the Upper White as significant in the text of the report but not on maps. Regardless the Upper White subwatershed is important for chinook spawning given the status of the species. The subwatershed is important for supplying high quality water downstream to significant habitat. Steelhead use is unknown other than they are assumed to be present up to White River Falls.

Bull trout are known to use the Upper White subwatershed. The Panther subwatershed which is tributary to the Upper White (Panther Creek flows into the White in about the middle of the subwatershed) is a significant bull trout subwatershed. The extent of bull trout use in the Upper White is unknown because the glacial flour makes observation difficult when snorkeling. Spawning surveys are difficult due to the glacial flour and overlap with chinook and sockeye spawning. At a minimum the Upper White subwatershed is important as a bull trout migration corridor and a significant amount of spawning shouldn't be ruled out. Anecdotal reports of angler harvest, when harvest of bull trout was legal, and reports of observed spawning suggest the "significance" of the Upper White subwatershed for bull trout needs to be reevaluated.

Redband and westslope cutthroat are found in the subwatershed but are not considered significant due to considerable evidence of introgression between cutthroat and redband and the influence of non-native rainbow.

No amphibian information is available for this subwatershed

(2) Napeequa subwatershed

The Napeequa River is a major tributary to the White River. Both sockeye and spring chinook salmon spawn in the lower reaches. The Napeequa was not considered significant because the majority of spring chinook and sockeye salmon use occurs within the mainstem White River. Regardless the Napeequa needs to be considered important for these species. Most of the Napeequa drainage is within the Glacier Peak Wilderness. It is also a glacial stream which makes observation of fish difficult. A falls at approximately 1.5 miles from the mouth is a likely fish migration barrier and a second series of steep drops approximately four miles from the mouth is also a likely barrier. Bull trout and steelhead are assumed to be present at least to the first falls. Distribution of redband trout and westslope cutthroat trout in the mainstem Napeequa is not known. The Napeequa is considered significant though due to the presence of a pure population westslope cutthroat trout in Twin Lakes. The Twin lakes fish could be connected to the lower Napeequa through Twin Lakes Creek. The Twin lakes population is used by the Washington Department of Fish and Wildlife as a broodstock for stocking alpine lakes throughout Washington.

Cascade Frogs and spotted frogs are found in this subwatershed.

(3) White River Drainage Late Successional Habitat Management Concerns

Much of the White River is a naturally functioning watershed within a wilderness. The primary management concern is to maintain the natural function of the watershed to provide for significant spring chinook and sockeye salmon habitat in the Lower White River subwatershed, possible significant bull trout habitat in the Upper White River subwatershed and significant cutthroat in the Napeequa. Management should consider the White river a "Core" area for at least sockeye, spring chinook salmon and bull trout on the Forest.

A major management concern is the status of lands adjacent to the White River downstream of the LSR. Much of the land within the floodplain is privately owned and subject to development. Substantial floodplain development may result in not only loss of a diverse riparian habitat but also loss of stream floodplain connectivity and a reduction of fish habitat quality.

e) Chiwawa Watershed

A very small portion of the Chiwawa watershed, within the Meadow-Brush subwatershed is included in the Twin Lakes MLSA. The Chiwawa River was designated as a key watershed within the Northwest Forest Plan and contains significant spring chinook salmon, bull trout, redband trout and westslope cutthroat subwatersheds. The Meadow-Brush subwatershed is located in the lower portion of the Chiwawa watershed. Bull trout and westslope cutthroat are unknown within this subwatershed. In October 1994 a fire within the subwatershed resulted in a nearly 100% fish kill in the reaches of Meadow Creek below the big meadow. The only salmonids observed were redband/rainbow and brook trout. There have been no reports of bull trout in the subwatershed but the upper reaches of Meadow Creek and Brush Creek have not been thoroughly investigated. Cutthroat have been reported but not documented within the big meadow, therefore we still consider westslope cutthroat status as unknown. Steelhead use is also unknown but with the presence of redband/rainbow it is possible. Spring chinook salmon often rear in small tributary streams but this species has not been found within this subwatershed to date thus status is unknown.

Amphibian species documented within the subwatershed include; rough-skinned newt (*Taricha granulosa*), tailed frog, Pacific chorus frog.

(1) Management Concerns Meadow-Brush subwatershed

Very little of the Twin Lakes MLSA lies within the Meadow-Brush subwatershed. A history of logging and roading would indicate that watershed restoration may opportunities exist. The big meadow in Meadow Creek provides important riparian habitat and a somewhat unique habitat that needs special consideration in any management activity.

## 7. Noxious Weeds

Ten noxious weed species were identified to occur within the Little Wenatchee LSR. These species are discussed in priority order as identified by the noxious weed analysis module. There are no Class A weeds presently documented from this area. Class B and B-designate weeds include: *Centaurea diffusa*, *Centaurea maculosa*, *Cytisus scoparius*, *Linaria dalmatica*, and *Chrysanthemum leucanthemum*. Class C species present include *Hypericum perforatum*, *Cirsium vulgare*, *Verbascum thapsus*, *Tanacetum vulgare*, and *Cirsium arvense*. These species are found along roadsides within the LSR, particularly the main Little Wenatchee River Road, Mill Creek Road utility corridors along Nason Creek, and Highway 2. Following through the noxious weed analysis module, *Cytisus scoparius*, *Tanacetum vulgare*, *Linaria dalmatica*, and *Cirsium arvense* are limited in extent and should be controlled or eradicated. The other species are more widespread and containment and prevention of spread should focus on areas of high recreation use such as the roadsides, particularly the lower 5 miles of the Little Wenatchee Road, developed and dispersed sites. Harrod (1994) provides a brief synopsis of control methods available and provides recommendation for noxious weed management.

## 8. Fire Management Plan

### a) Overview

This plan is intended to provide guidance for the management of fire in the Little Wenatchee LSR/Twin Lakes MLSA. It will supplement the Fire Management Plan for the Late-Successional Reserve System and will be incorporated into the Fire Management Action Plan for the Wenatchee National Forest.

The Sustainability and Disturbance modules for the vegetation groups have been described in a separate portion of this chapter. The intent of this plan is to provide adequate protection of the reserve. Management practices will be initiated to provide for the protection of the late successional associated species and associated unique habitats. These management actions are expected to include the role of fire disturbance as an important process in the reserve.

### b) Wildfire Prevention Actions

The following actions are site specific for the Little Wenatchee LSR/Twin Lakes MLSA. They are intended to supplement the actions outlined in the Fire Prevention Plan, which is intended to be implemented on a Forest-wide basis:

1. Initiate campfire restrictions, as warranted, during periods of high fire danger.
2. Implement road restrictions and closures, as warranted, during periods of high fire danger.
3. Emphasize cooperative fire prevention activities.

4. Utilize cooperative law enforcement agreements to emphasize the inspection of spark arrestor and exhaust systems.
5. Continue and improve fire prevention signing program on roads and trails included in, or adjacent to, the LSR/MLSA.
6. Emphasize contact with special interest groups (e.g., Tall Timbers Ranch, Stevens Pass Ski Area, ORV groups, summer home groups, organization camps, local user groups, grazing permittees, and other special use permittees).
7. Emphasize fire prevention education for hunters.
8. Emphasize fire prevention and wildfire risk awareness education for the public.
9. Initiate hazard reduction actions around developed and dispersed recreation sites, such as:
  - White River Falls
  - Grasshopper Meadows
  - Soda Springs Campground
  - Little Wenatchee Ford
  - Theseus Creek Campground
  - Other: trailheads and dispersed recreation sites
10. As a hazard reduction measure emphasize fuel wood collection in designated areas around recreation use sites.
11. Initiate hazard reduction actions along roads.
12. Work with Utilities on hazard reduction actions under power lines.

c) Fire Management Actions Intended to Keep Fire from Spreading into the LSR/MLSA

The following methods are proposed to protect the LSR/MLSA from fires originating outside LSR/MLSA boundaries:

1. Complete pre-attack planning process for the LSR/MLSA. Utilize natural fuel breaks when possible.
2. Maintain existing pre-attack facilities/agreements (e.g., water chances, helispots, fire camps, etc.): Seek opportunities for more.

d) Fire Detection

1. Staffing of Sugarloaf Lookout and Alpine Lookout, supplemented with aerial detection after lightning episodes, will provide the primary detection resource for this LSR/MLSA.
2. Emphasize fire reporting procedures (e.g., with local residents, Forest users, and cooperators).

e) Wildfire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following the protection of human life). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Pre-planned dispatch cards for initial attack will be prepared for the LSR/MLSA area.

3. The Fire Situation Analysis or the Escaped Fire Situation Analysis process will be used to guide extended attack and large fire-suppression. Utilize pre-attack plans and materials.
4. Consideration for private land, late-successional habitat, and riparian reserves will take place during the development of fire suppression strategies and the implementation of fire suppression tactics.
5. Emphasize the protection of improvements (e.g., historic/cultural sites).
6. Protect known threatened and endangered species habitat from wildfire (i.e., plant or animal).
7. Where appropriate, fire suppression actions will be implemented on an interagency basis.

f) Vegetation and Fuels Management

1. Manage for a mosaic of age classes and structural conditions across the landscape to support late-successional habitat.
2. Emphasize roadside fuel modification and fuel wood collection (e.g., Big Meadow Creek, White River, Little Wenatchee River, and Nason Creek drainage).
3. Suggested management tools to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction may include: pruning, commercial and pre-commercial thinning, wood gathering, mechanical treatments, and prescribed fire.
4. Prevent the spread and/or introduction of noxious weeds.

g) Prescribed Fire Opportunities

1. Recognize the use of prescribed fire as a management tool in this LSR/MLSA and in areas adjacent to this LSR/MLSA.
2. Priority outcomes throughout the LSR/MLSA are to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction.
3. Prescribed fire projects in whitebark pine/subalpine larch ecosystems are encouraged to increase amounts of whitebark pine.
4. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
5. Projects should attempt to minimize the risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity).

h) Summary

Fire prevention, fire detection, wildfire suppression, vegetation and fuels management, and prescribed fire are all appropriate, integral elements of the overall management of this LSR/MLSA.

**D. Restoration Opportunities and Potential Project Summary**

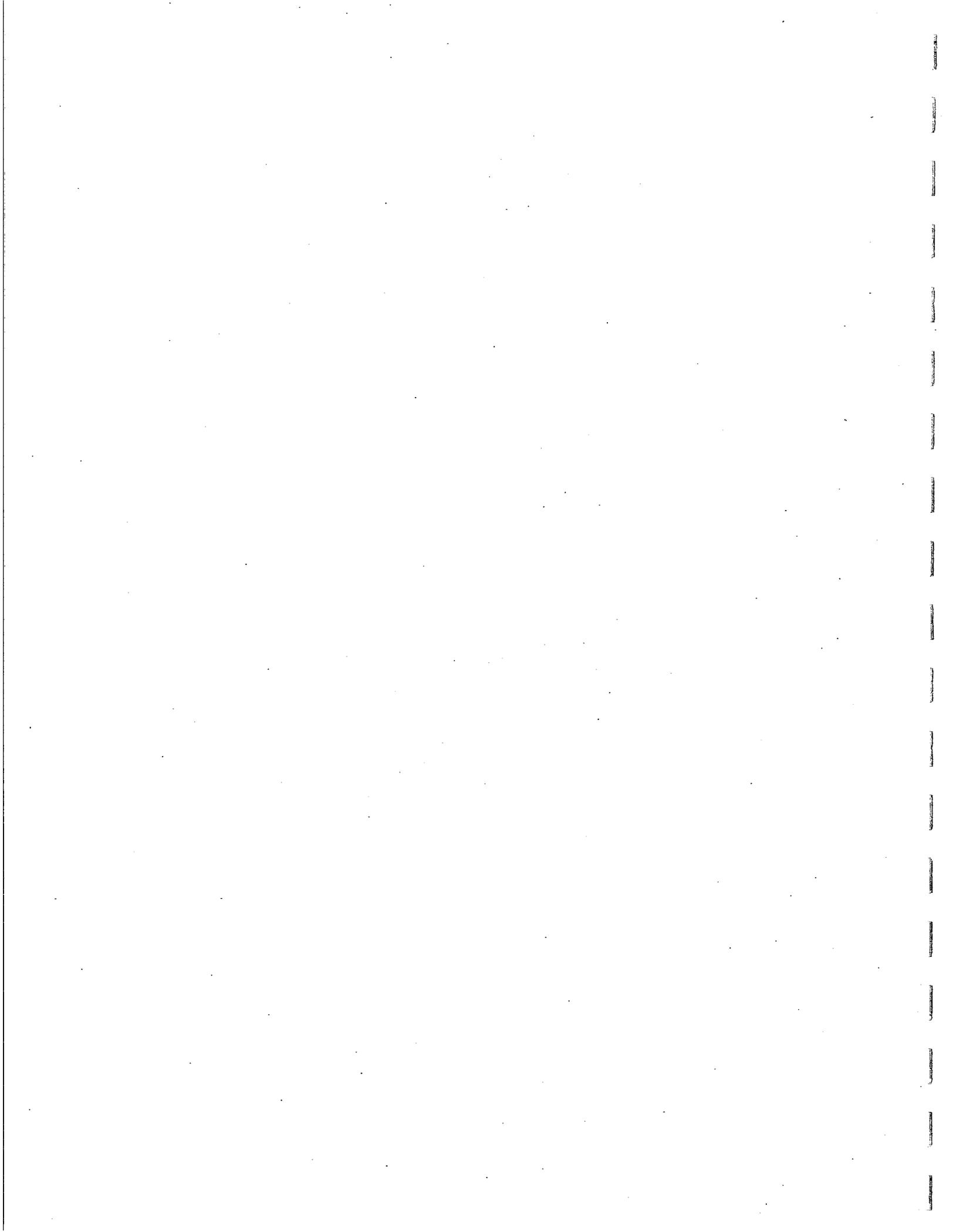
**Table IV-19, Restoration Opportunities and Potential Projects, Little Wenatchee LSR and Twin Lakes MLSA..**

| Analysis Module | Restoration Opportunity | Potential Projects | Schedule <sup>1</sup> |
|-----------------|-------------------------|--------------------|-----------------------|
|                 |                         |                    |                       |

| <b>Analysis Module</b>               | <b>Restoration Opportunity</b>  | <b>Potential Projects</b>   | <b>Schedule<sup>1</sup></b> |
|--------------------------------------|---|---|-----------------------------|
| <b>Forest-Wide Sustainability</b>    | None Identified. No at risk vegetation exists within these LSR/MLSAs                                      | None Identified.  |                             |
| <b>Forest-Wide Spotted owl</b>       | Not Applicable. (This LSR is not one of the 3 LSRs on the forest designated as a source population area.) | Not Applicable.   |                             |
| <b>Forest-Wide Connectivity</b>      | None Identified. Breaks in connectivity identified are inherent to the landscape.                         | None Identified   |                             |
| <b>Unique Habitats &amp; Species</b> | 1) Reduce road densities in riparian reserves.  | Close or relocate roads as opportunities are identified in Access and Travel Management Planning.   | A                           |
|                                      | 2) Preserve the unique vegetative quality in the area surrounding Big Chief Mt.                           | 2) Monitor this site for potential RNA establishment.   | C                           |
|                                      | 3) Retain whitebark pine forests and subalpine meadows.   | 3) Prescribed fire.   | B                           |
| <b>Connectivity Within the LSR</b>   | 1) Promote the development of late successional forests.  | 1) Pre-commercial thinning in the numerous plantations within the two LSR/MLSAs   | C                           |
|                                      | 2) Increase the amount of interior forest area within the LSR.  | 2) Close roads near interior forest an in dry forest areas as opportunities are identified through Access and Travel Management Planning. | B                           |
|                                      | 3) Improve the function of riparian reserves as connectivity corridors.                                   | 3) Close roads within riparian reserves as opportunities are identified through Access and Travel Management Planning.                    | B                           |
| <b>Disturbance</b>                   | None Identified   | None Identified.  |                             |
| <b>Spotted Owl</b>                   | 1) See Appendix 39, "Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs"                     |   | A                           |

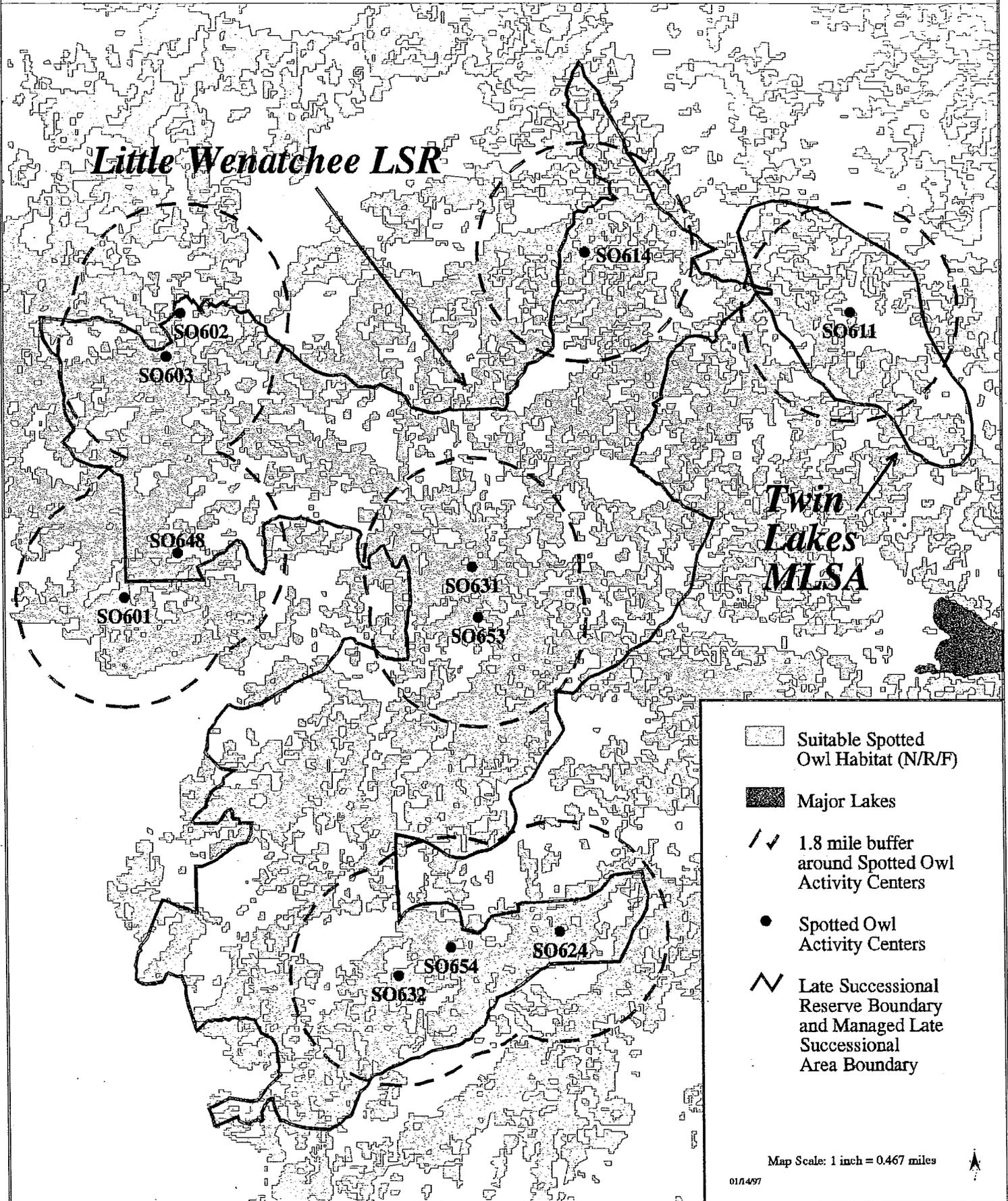
| <b>Analysis Module</b> | <b>Restoration Opportunity</b>  | <b>Potential Projects</b>  | <b>Schedule<sup>1</sup></b> |
|------------------------|---|--|-----------------------------|
|                        | 2) Obtain information on spotted owl locations.   | 2) Survey areas to 1994 spotted owl protocol.  | B                           |
|                        | 3) Accelerate the development of suitable spotted owl habitat.                                  | 3) Utilize Silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole sized stands in moist grand fir, and wet forest groups. ( <i>owl 602</i> ) | C                           |
| <b>Aquatic</b>         | 1) See late successional habitat implications in Aquatic section.                               | 1) Coordinate projects with the Chiwawa Watershed Assessment. (FY97) and the Little Wenatchee WA (probably complete in 1998.)  | B                           |
| <b>Noxious Weed</b>    | 1) Limit the extent and spread of the nine known noxious weed species within the two LSR/MLSAs. | 1) Focus on prevention techniques to limit extent and spread of noxious weeds.   | A                           |
|                        | 2) Increase knowledge regarding noxious weed presence in the Icicle LSR.                        | 2) Survey LSR for presence of noxious weeds.   | C                           |
| <b>Fire Plan</b>       | 1) Protect LS values from loss due to wildfire  | 1) See fire plan for specific actions  |                             |

<sup>1</sup> Implementation Schedule; (A) = within 3 years; (B) = within 5 years; (C) = within 10 years



# Little Wenatchee Late Successional Reserve and Twin Lakes Managed Late Successional Area

## SUITABLE SPOTTED OWL HABITAT



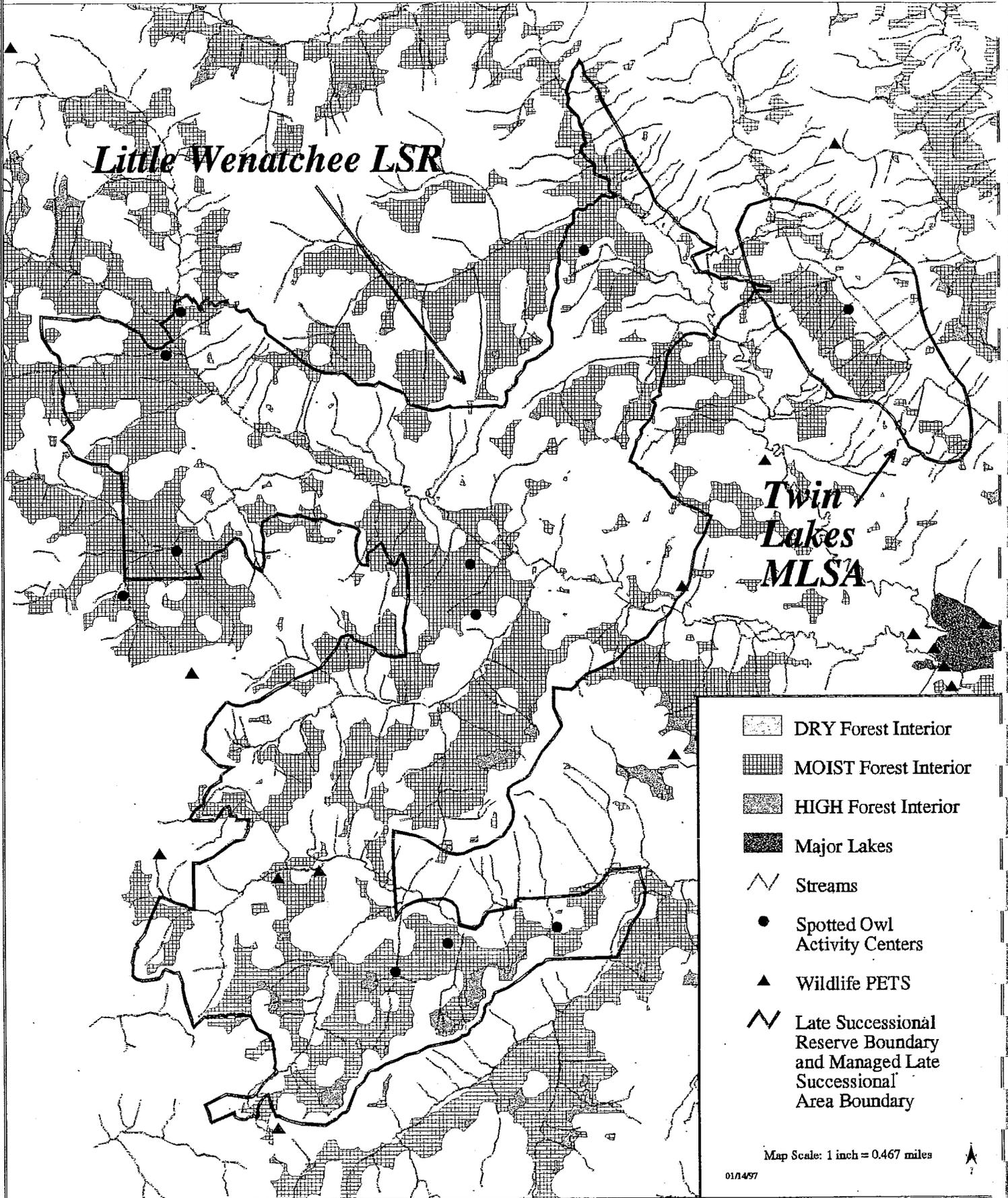
-  Suitable Spotted Owl Habitat (N/R/F)
-  Major Lakes
-  1.8 mile buffer around Spotted Owl Activity Centers
-  Spotted Owl Activity Centers
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.467 miles

01/14/97



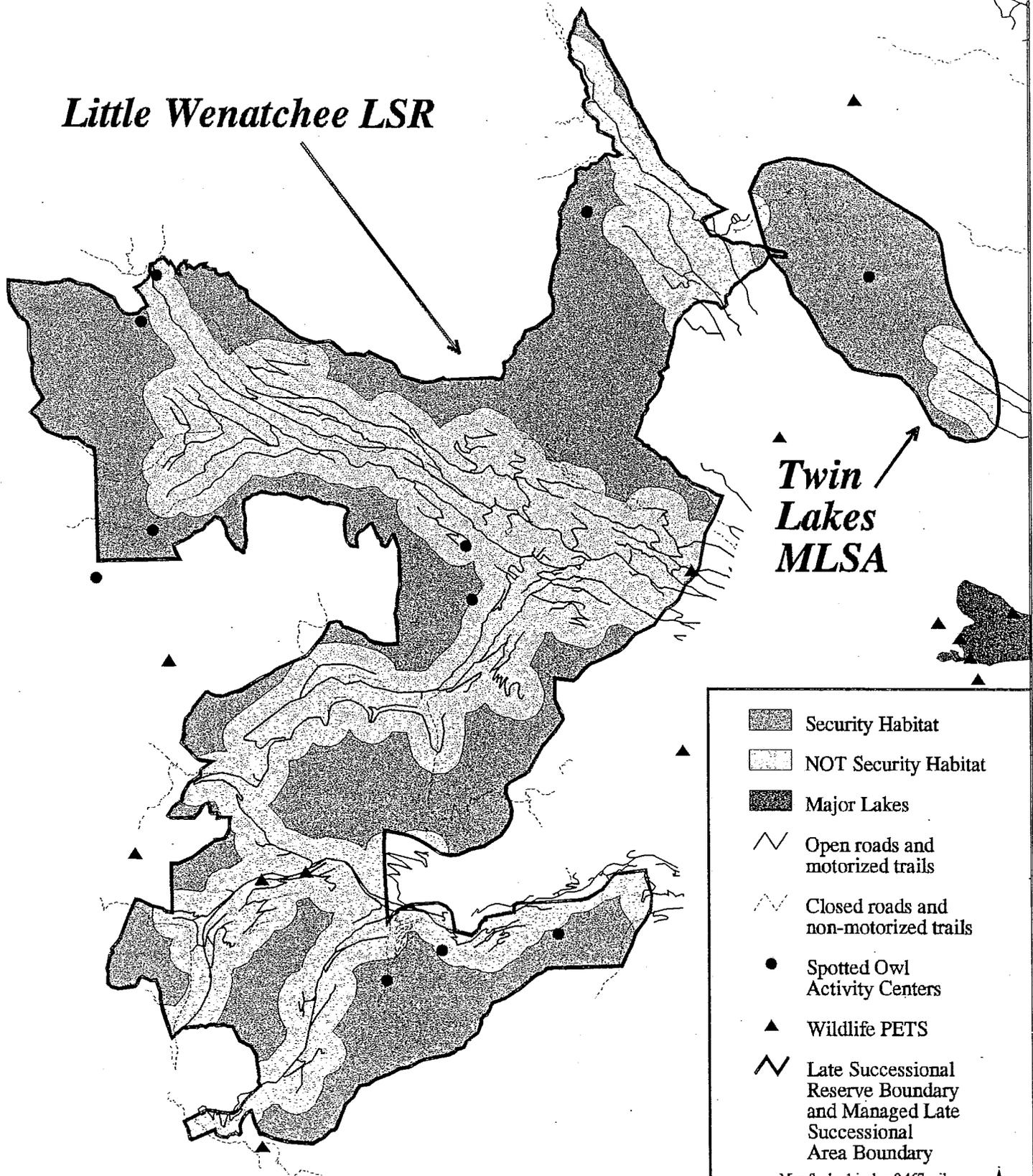
*Little Wenatchee Late Successional Reserve and  
Twin Lakes Managed Late Successional Area*  
**FOREST INTERIOR**



*Little Wenatchee Late Successional Reserve and  
Twin Lakes Managed Late Successional Area*  
**SECURITY HABITAT**

*Little Wenatchee LSR*

*Twin  
Lakes  
MLSA*



-  Security Habitat
-  NOT Security Habitat
-  Major Lakes
-  Open roads and motorized trails
-  Closed roads and non-motorized trails
-  Spotted Owl Activity Centers
-  Wildlife PETS
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

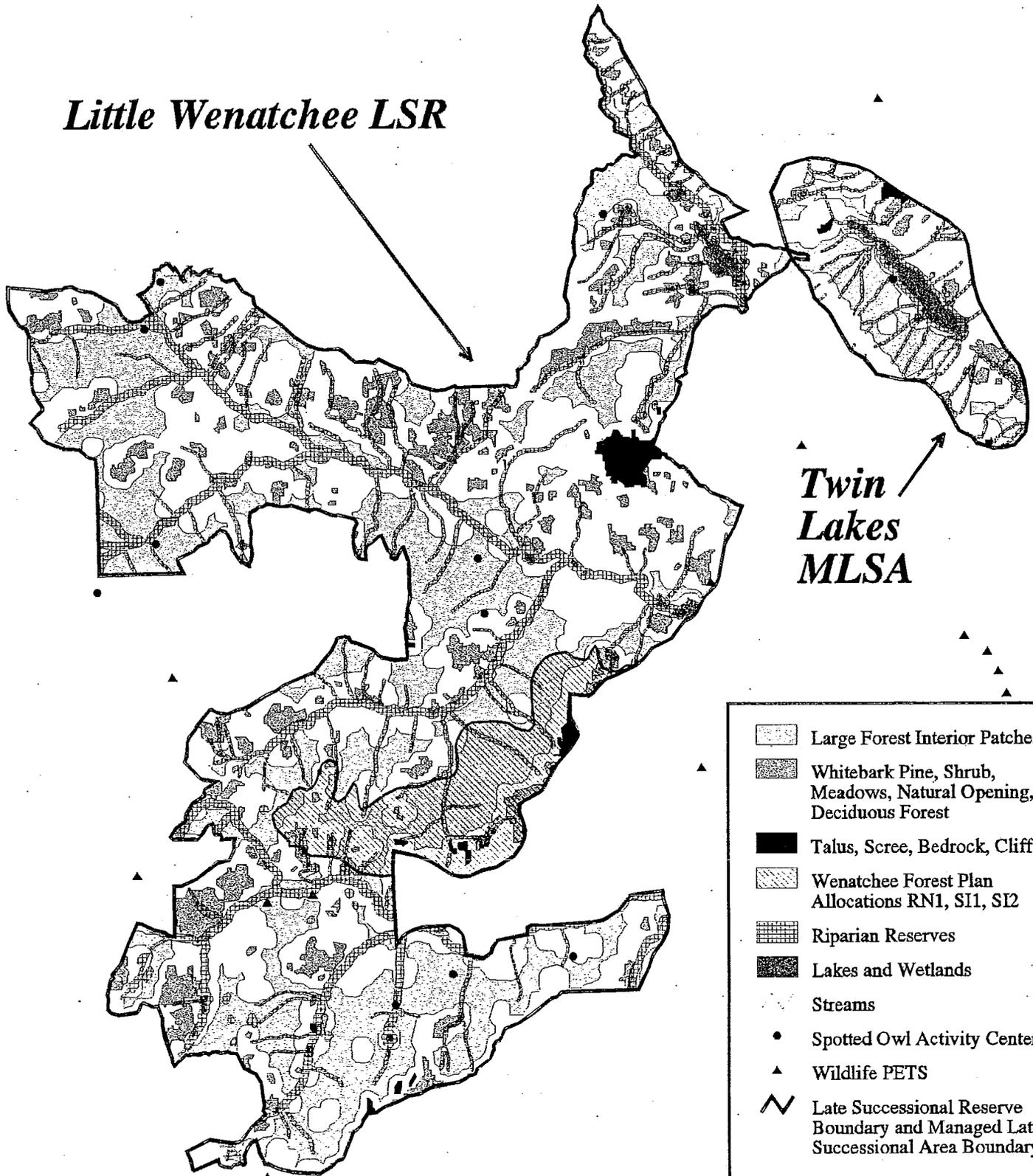
Map Scale: 1 inch = 0.467 miles



*Little Wenatchee Late Successional Reserve and  
Twin Lakes Managed Late Successional Area*  
**UNIQUE HABITATS**

*Little Wenatchee LSR*

*Twin  
Lakes  
MLSA*



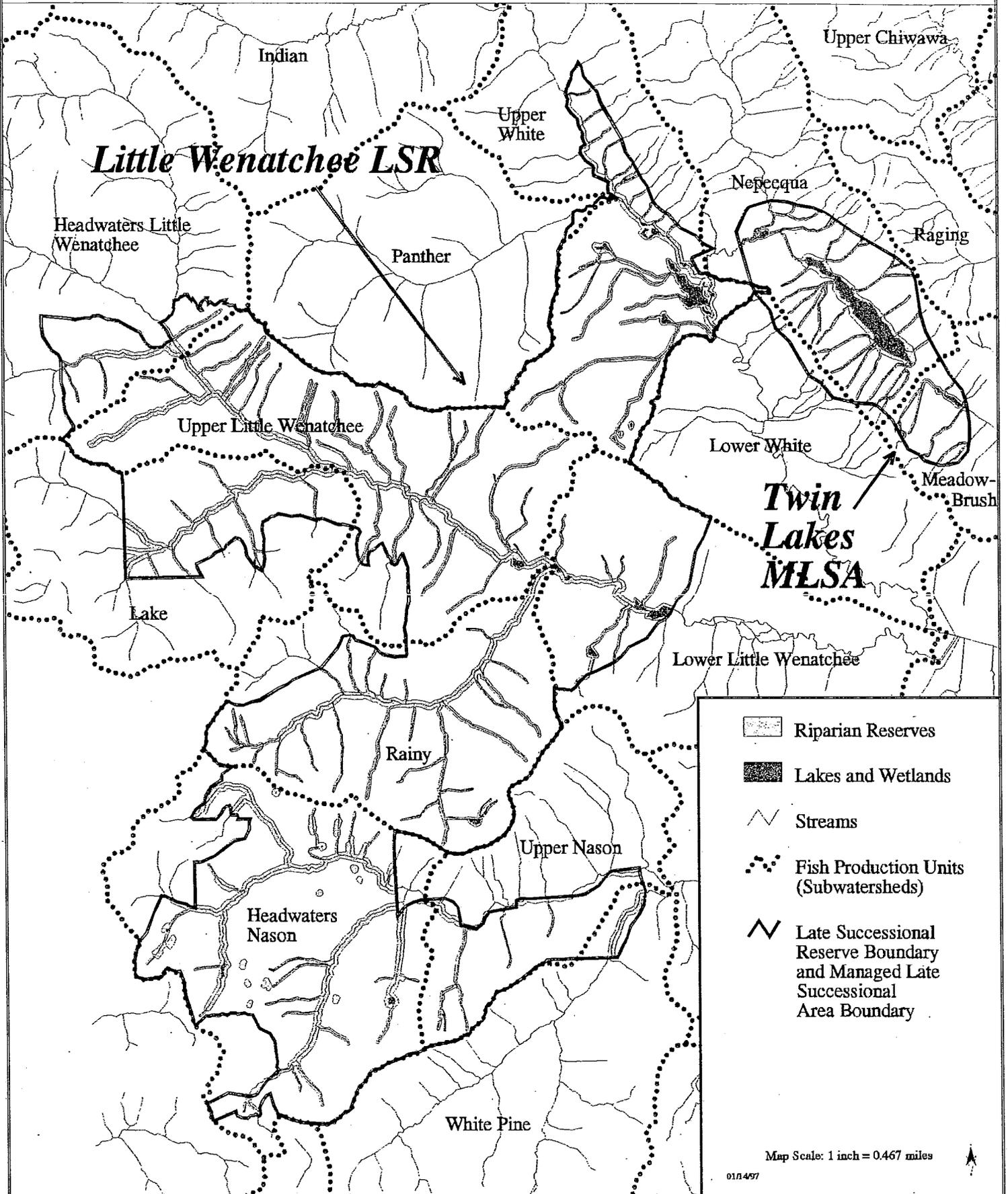
-  Large Forest Interior Patches
-  Whitebark Pine, Shrub, Meadows, Natural Opening, Deciduous Forest
-  Talus, Scree, Bedrock, Cliff
-  Wenatchee Forest Plan Allocations RN1, SI1, SI2
-  Riparian Reserves
-  Lakes and Wetlands
-  Streams
-  Spotted Owl Activity Centers
-  Wildlife PETS
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.467 miles

01/14/97



# Little Wenatchee Late Successional Reserve and Twin Lakes Managed Late Successional Area FISH PRODUCTION UNITS (SUBWATERSHEDS)



-  Riparian Reserves
-  Lakes and Wetlands
-  Streams
-  Fish Production Units (Subwatersheds)
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

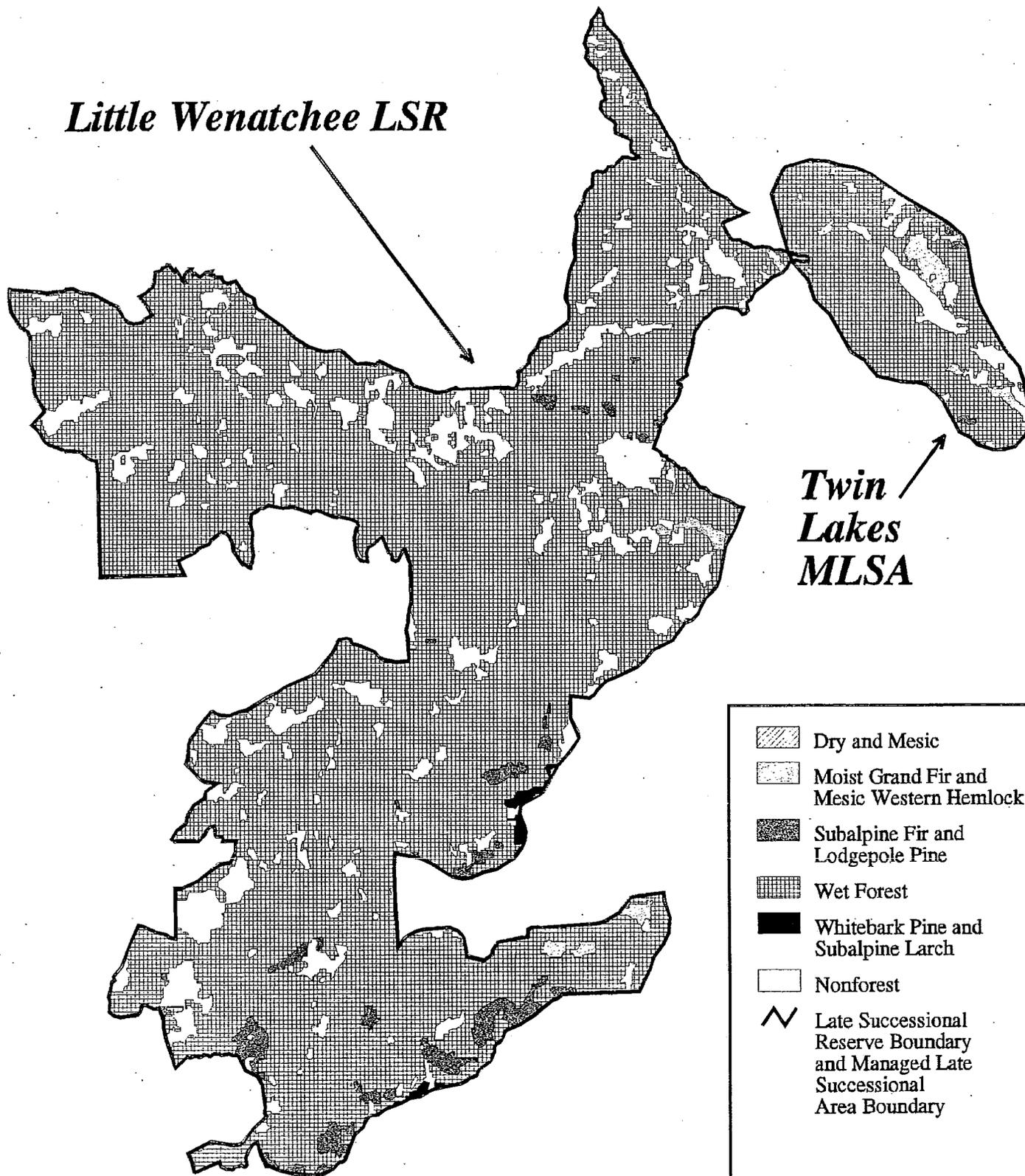
Map Scale: 1 inch = 0.467 miles

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*Little Wenatchee Late Successional Reserve and  
Twin Lakes Managed Late Successional Area*  
**VEGETATION SERIES**

*Little Wenatchee LSR*



*Twin  
Lakes  
MLSA*

-  Dry and Mesic
-  Moist Grand Fir and Mesic Western Hemlock
-  Subalpine Fir and Lodgepole Pine
-  Wet Forest
-  Whitebark Pine and Subalpine Larch
-  Nonforest
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

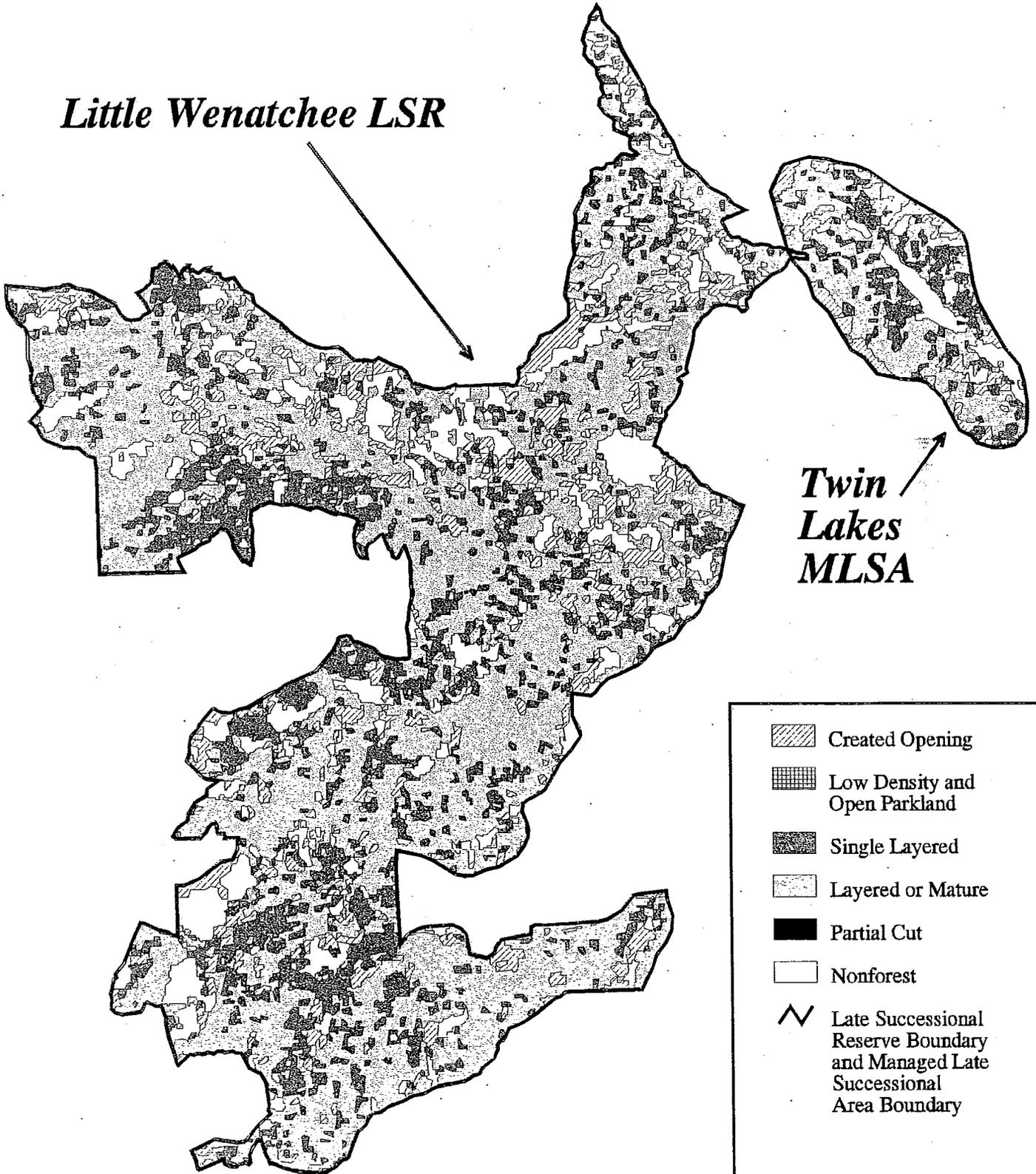
Map Scale: 1 inch = 0.467 miles

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*Little Wenatchee Late Successional Reserve and  
Twin Lakes Managed Late Successional Area*  
**VEGETATION STRUCTURE**

*Little Wenatchee LSR*



*Twin  
Lakes  
MLSA*

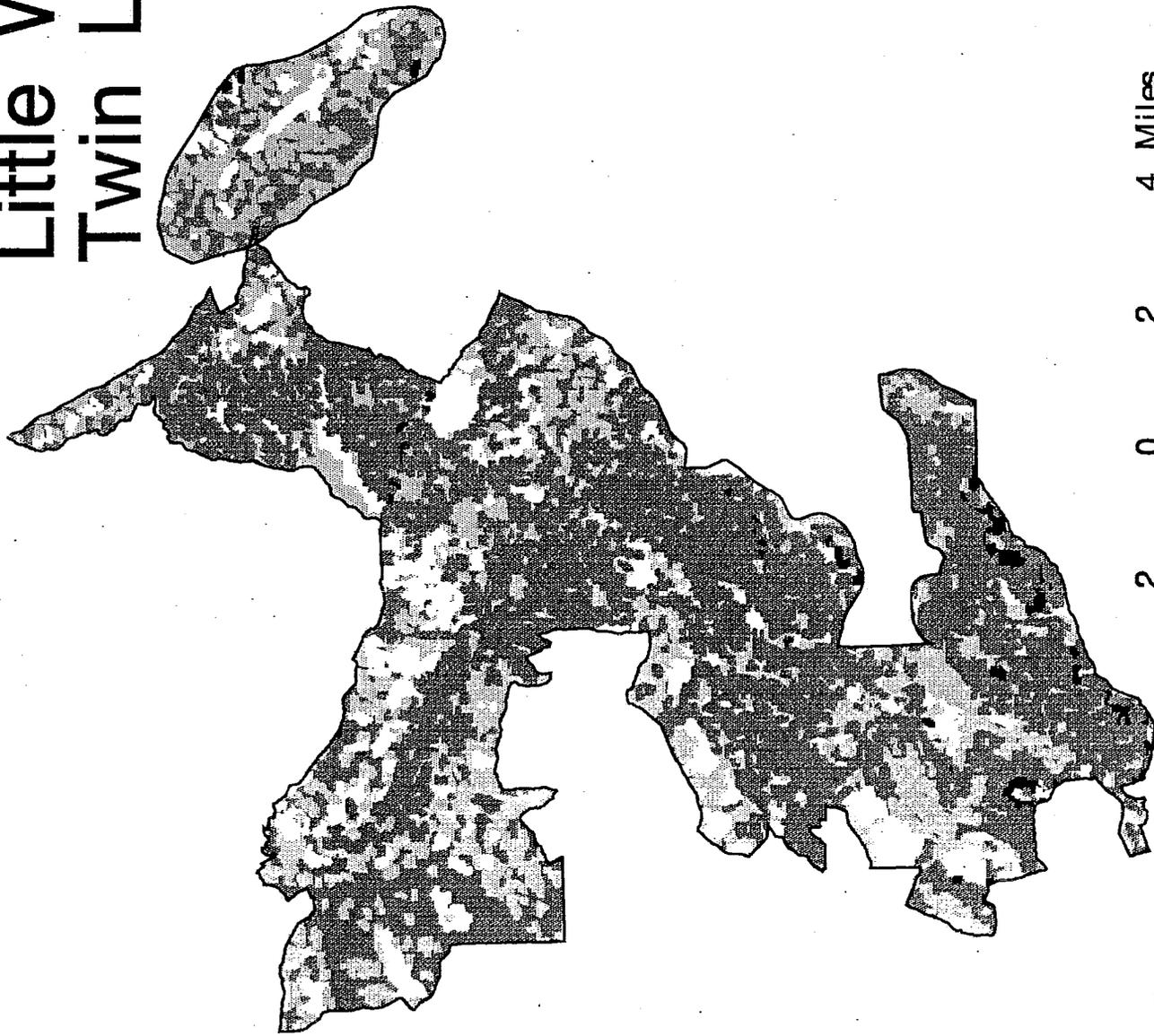
-  Created Opening
-  Low Density and Open Parkland
-  Single Layered
-  Layered or Mature
-  Partial Cut
-  Nonforest
-  Late Successional Reserve Boundary and Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.467 miles

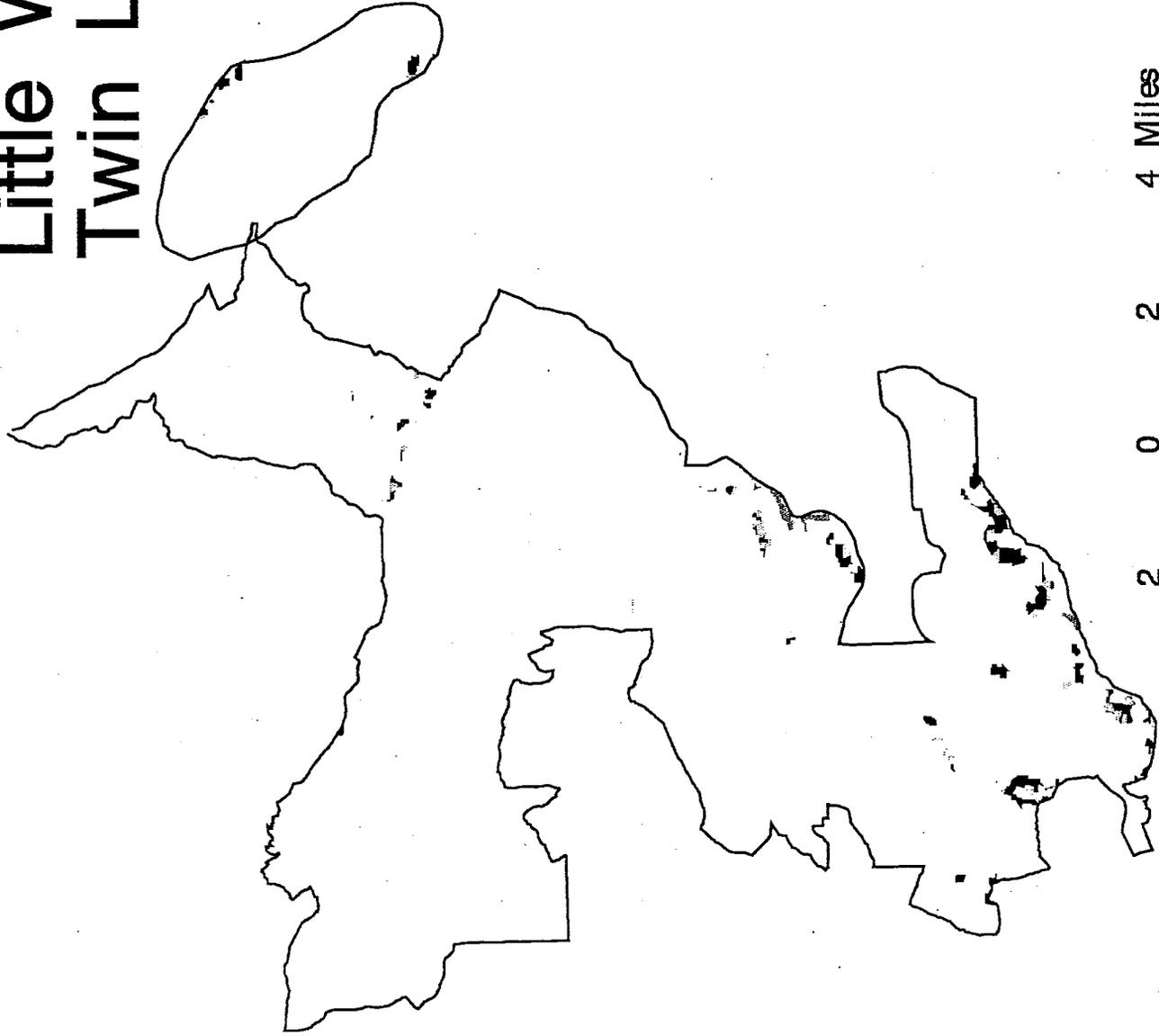
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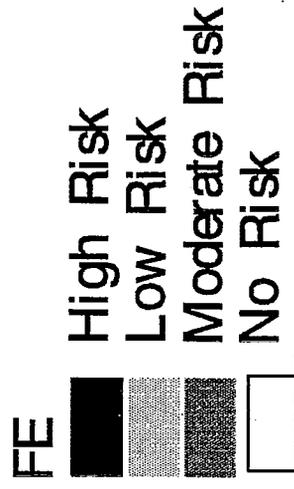
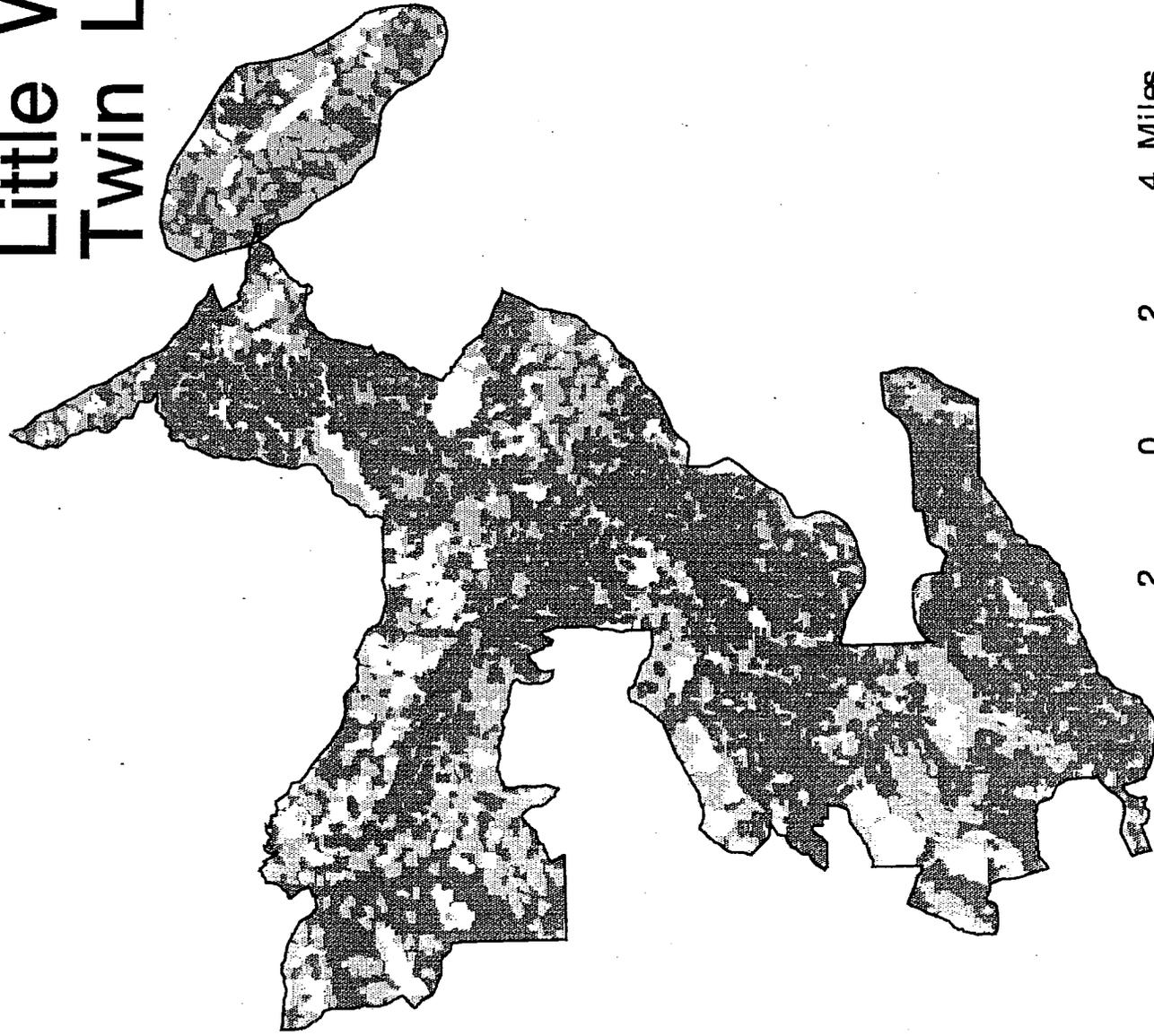
# Little Wenatchee LSR / Twin Lakes MLSA



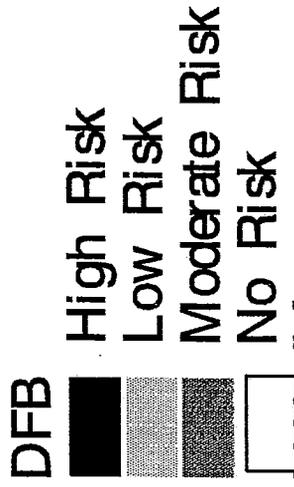
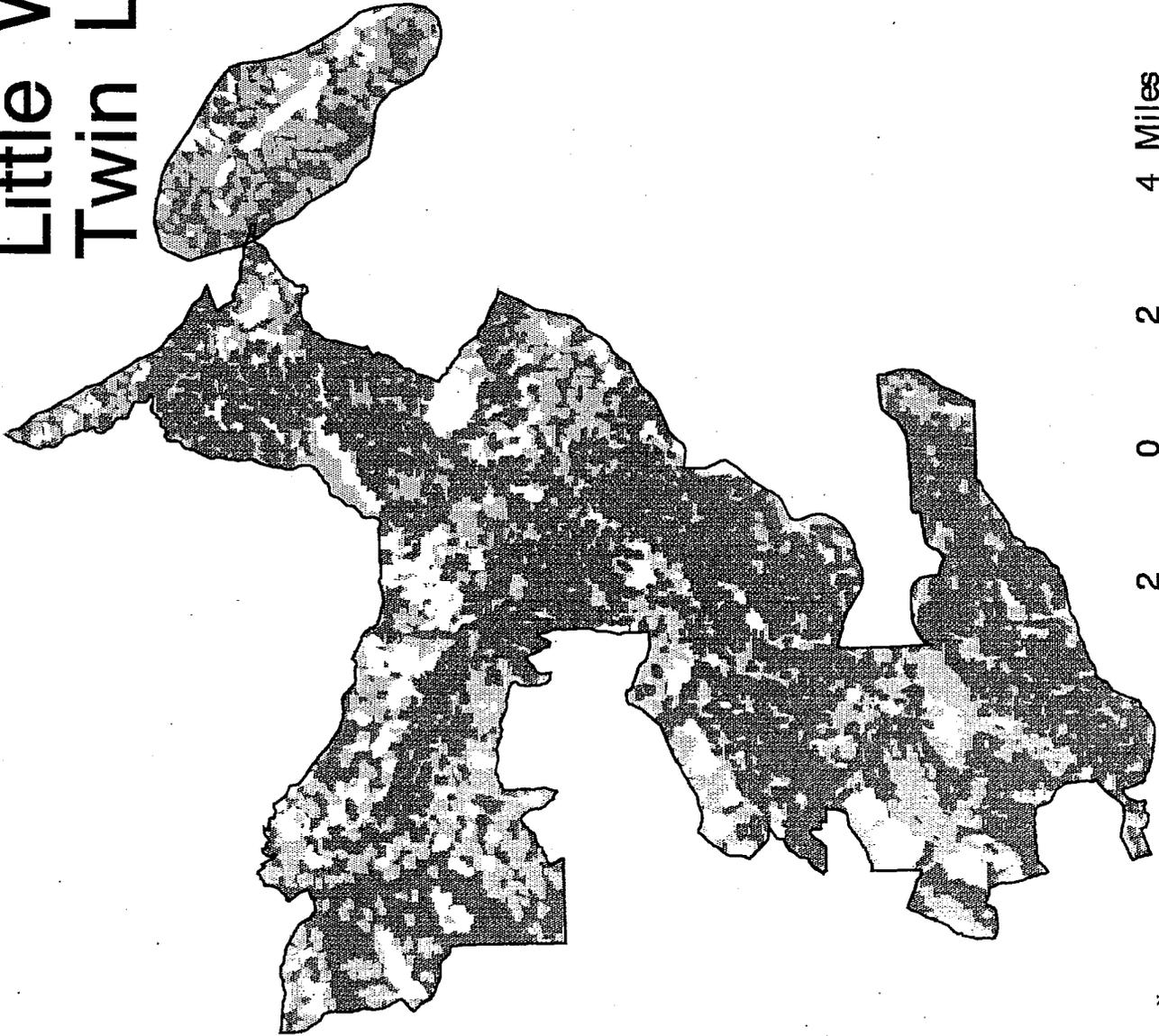
# Little Wenatchee LSR / Twin Lakes MLSA



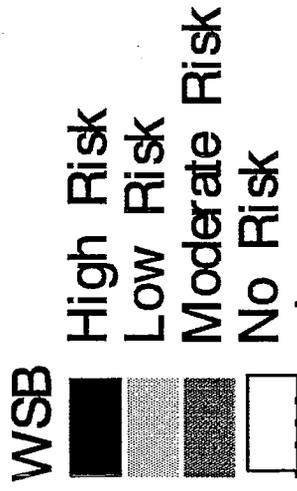
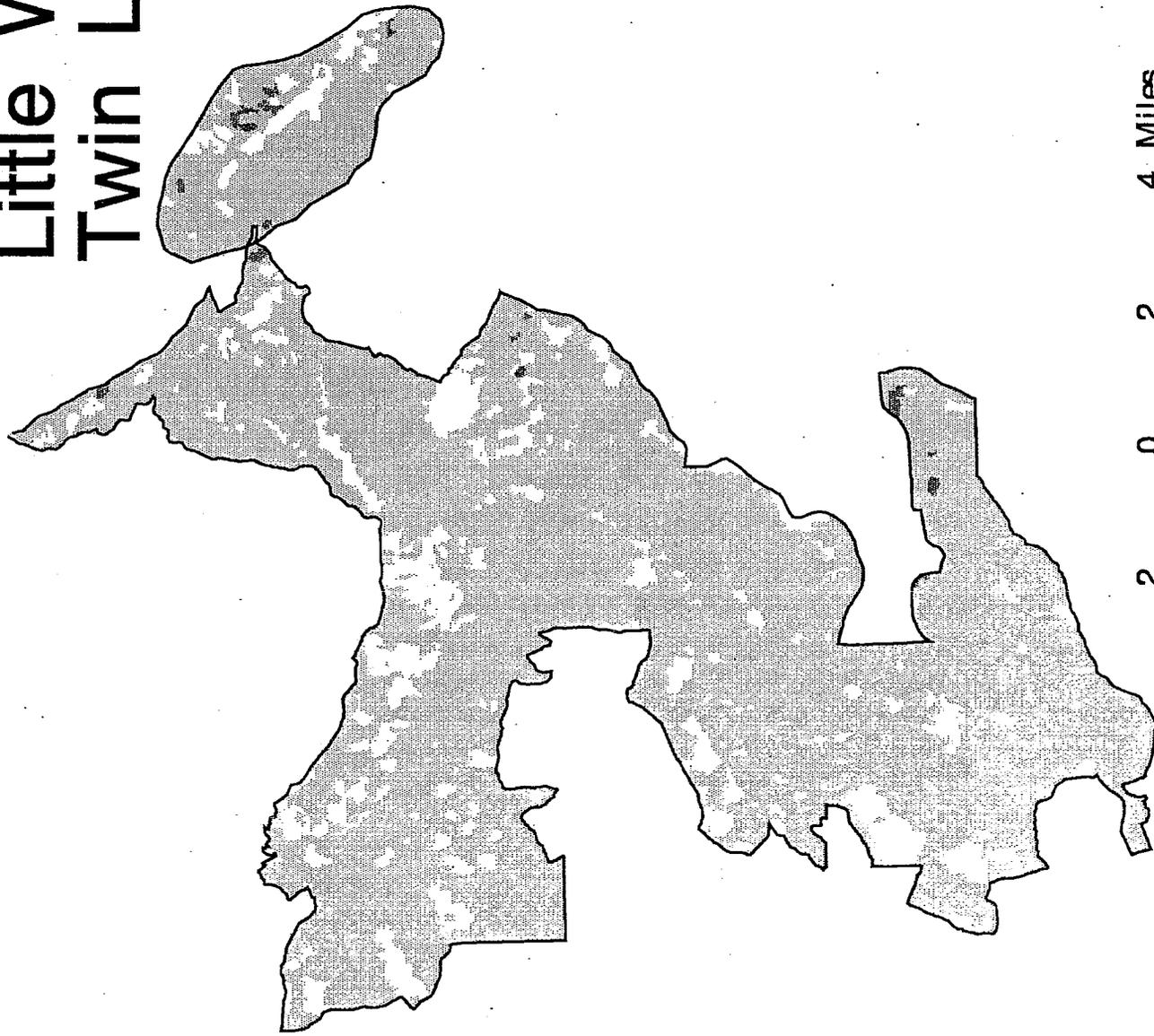
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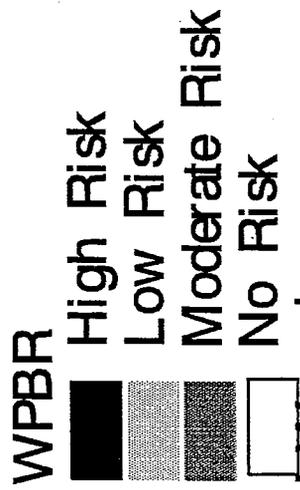
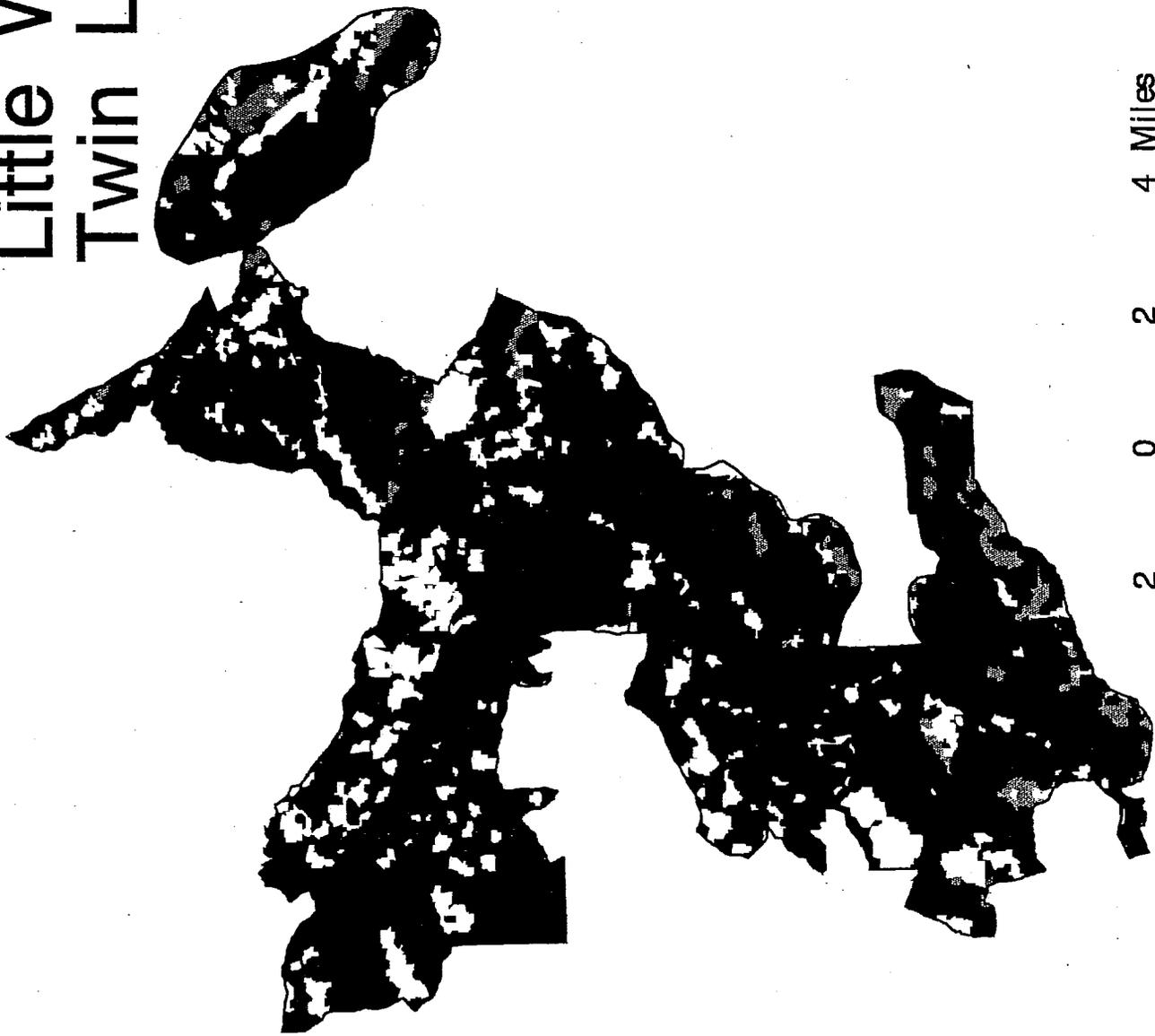
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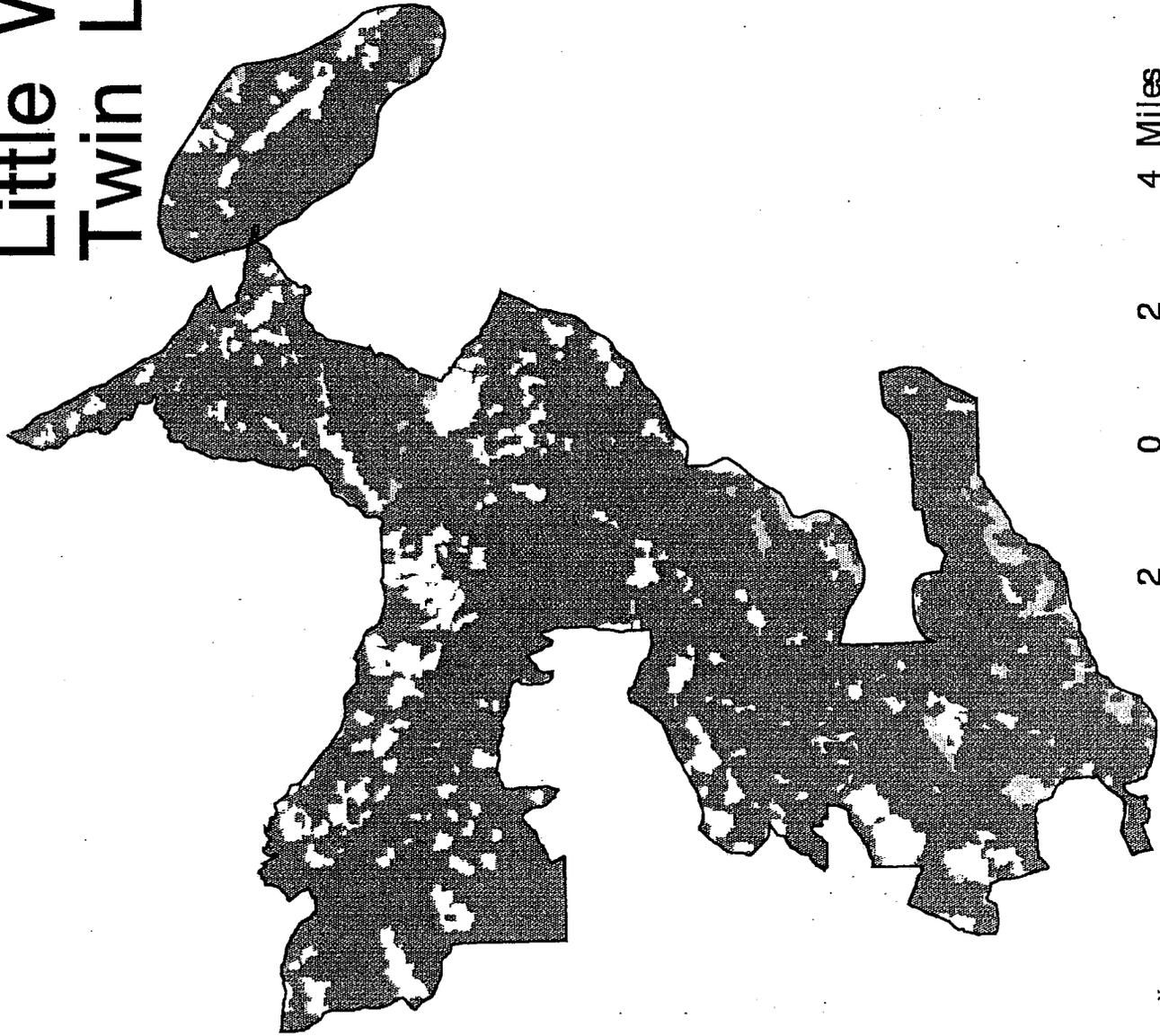
# Little Wenatchee LSR / Twin Lakes MLSA



# Little Wenatchee LSR / Twin Lakes MLSA



# Little Wenatchee LSR / Twin Lakes MLSA

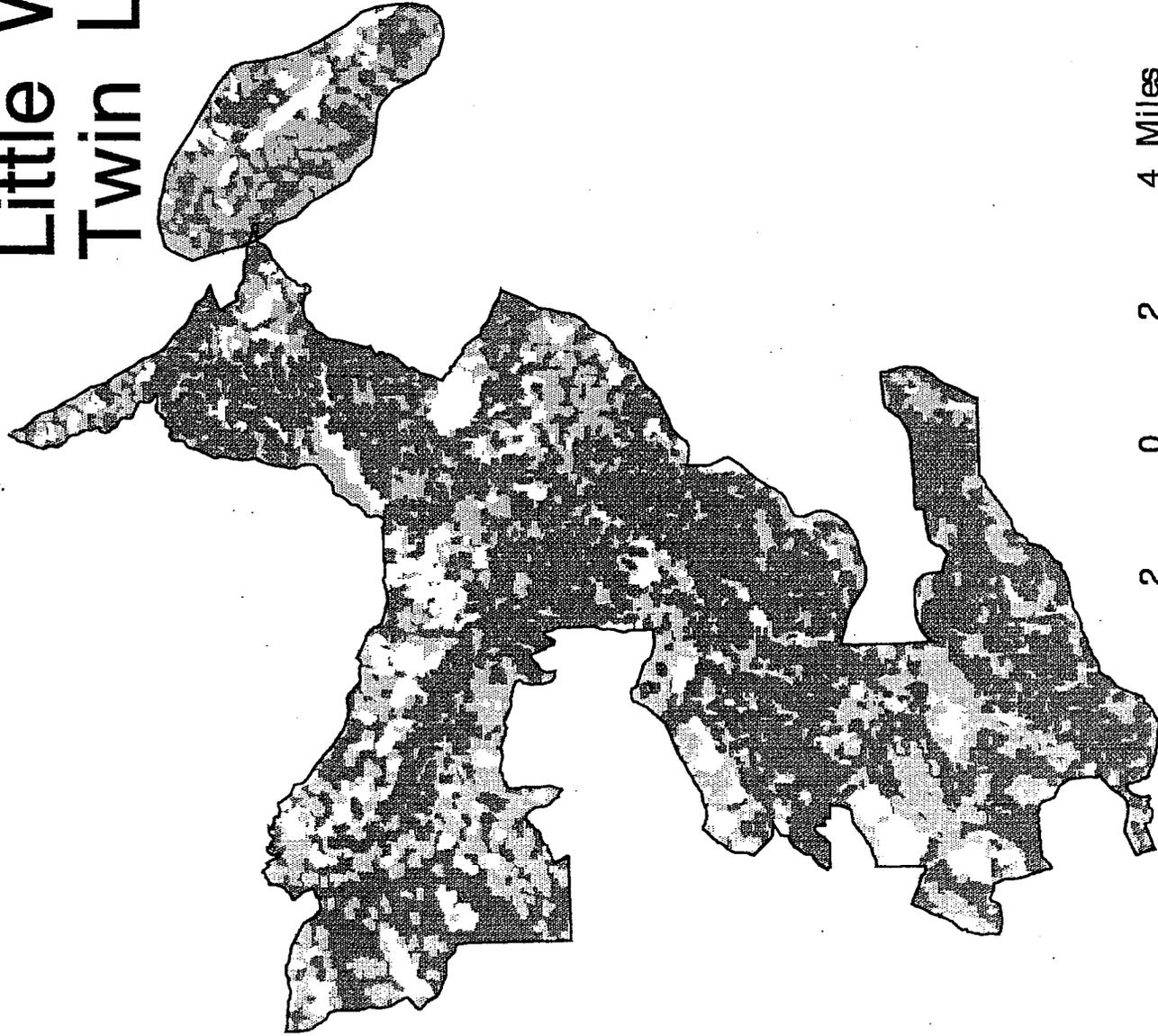


Root Disease PHWE  
High Risk  
Low Risk  
Moderate Risk  
No Risk

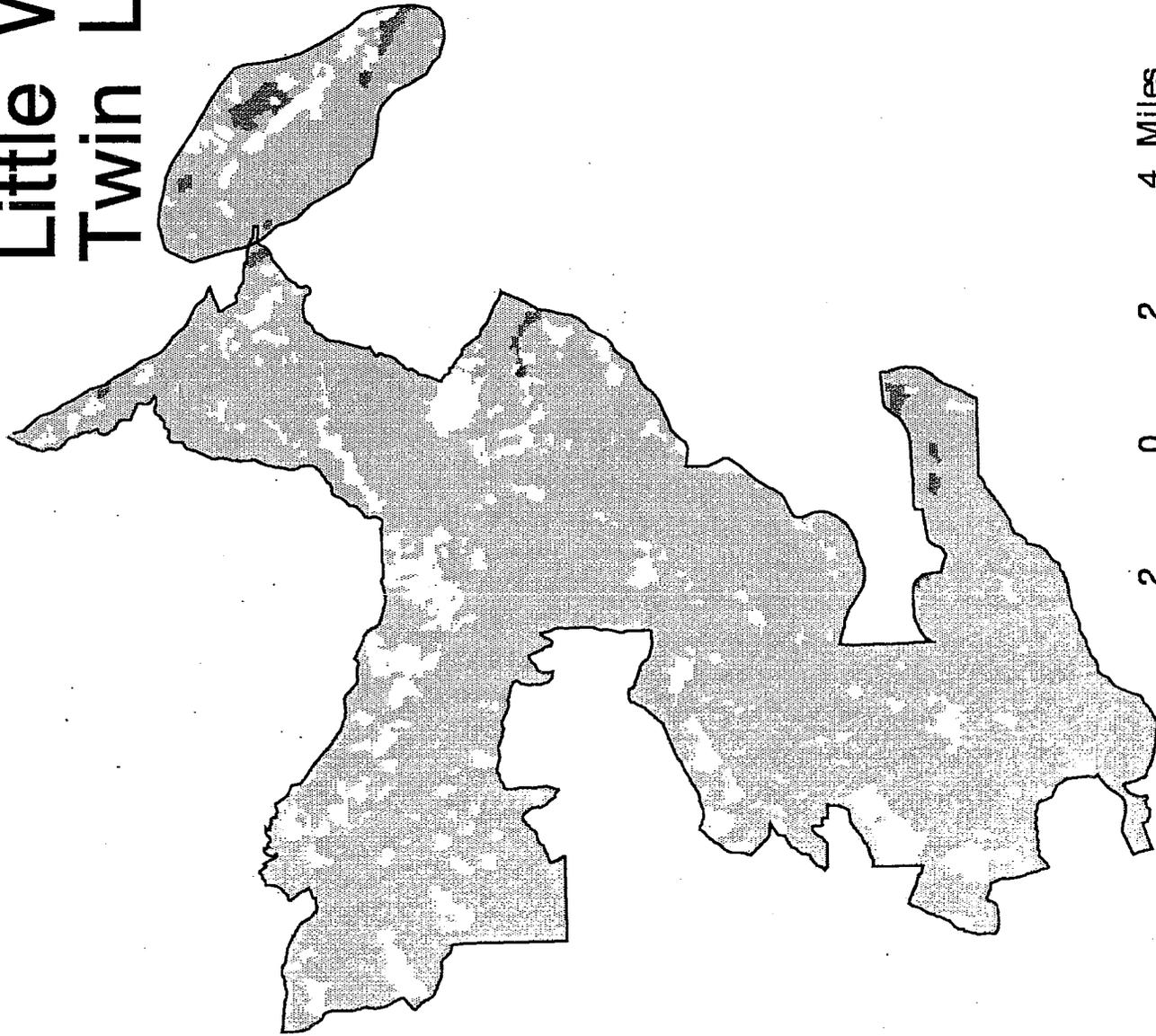
2 0 2 4 Miles



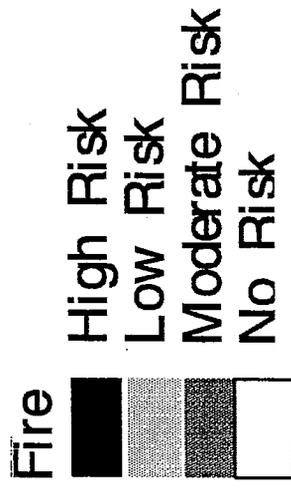
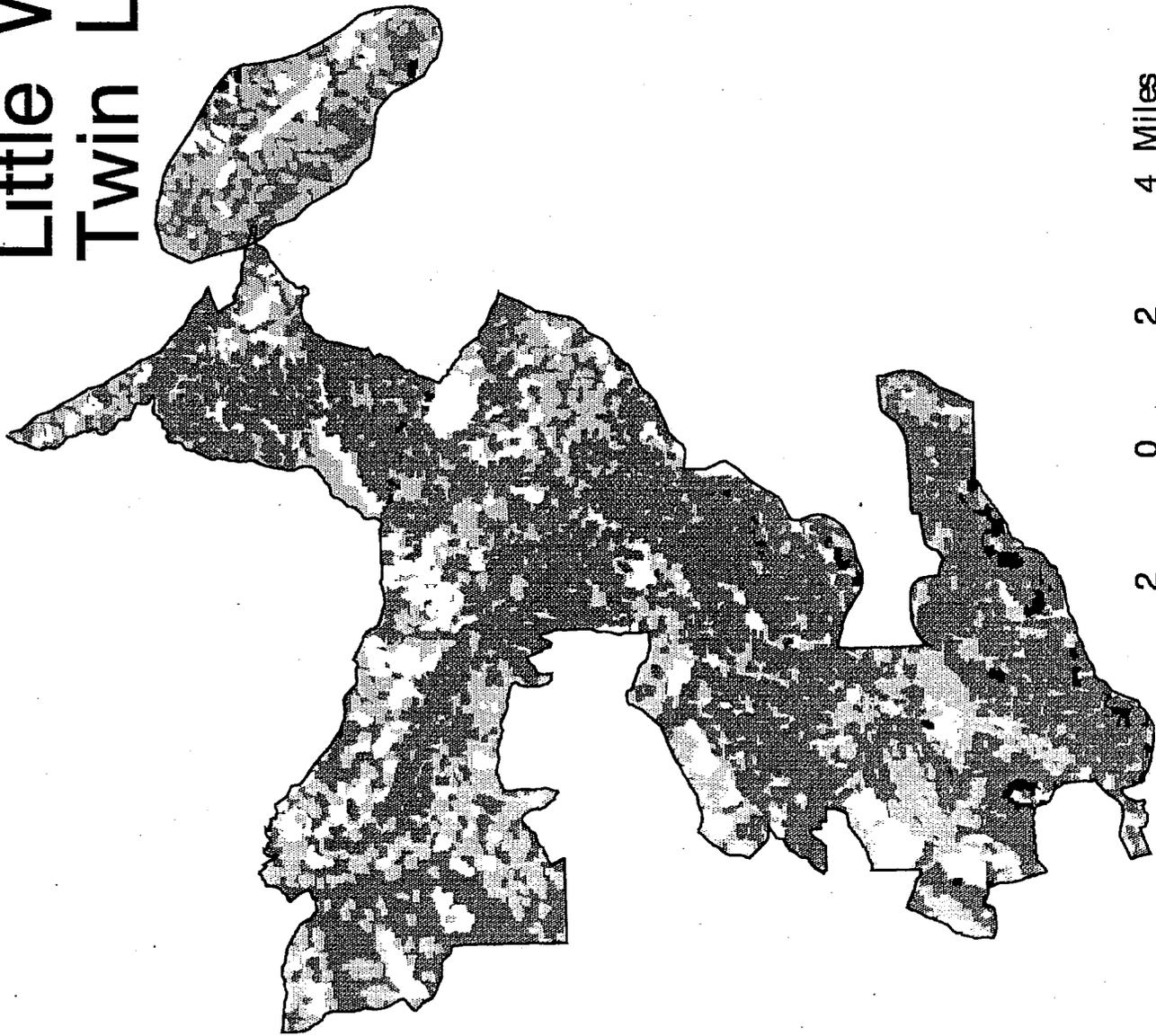
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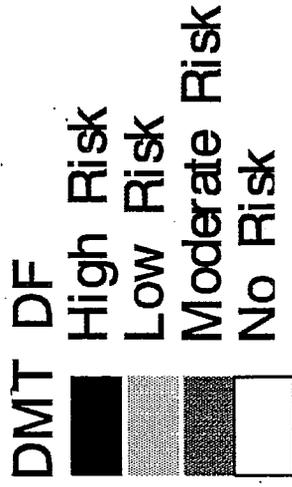
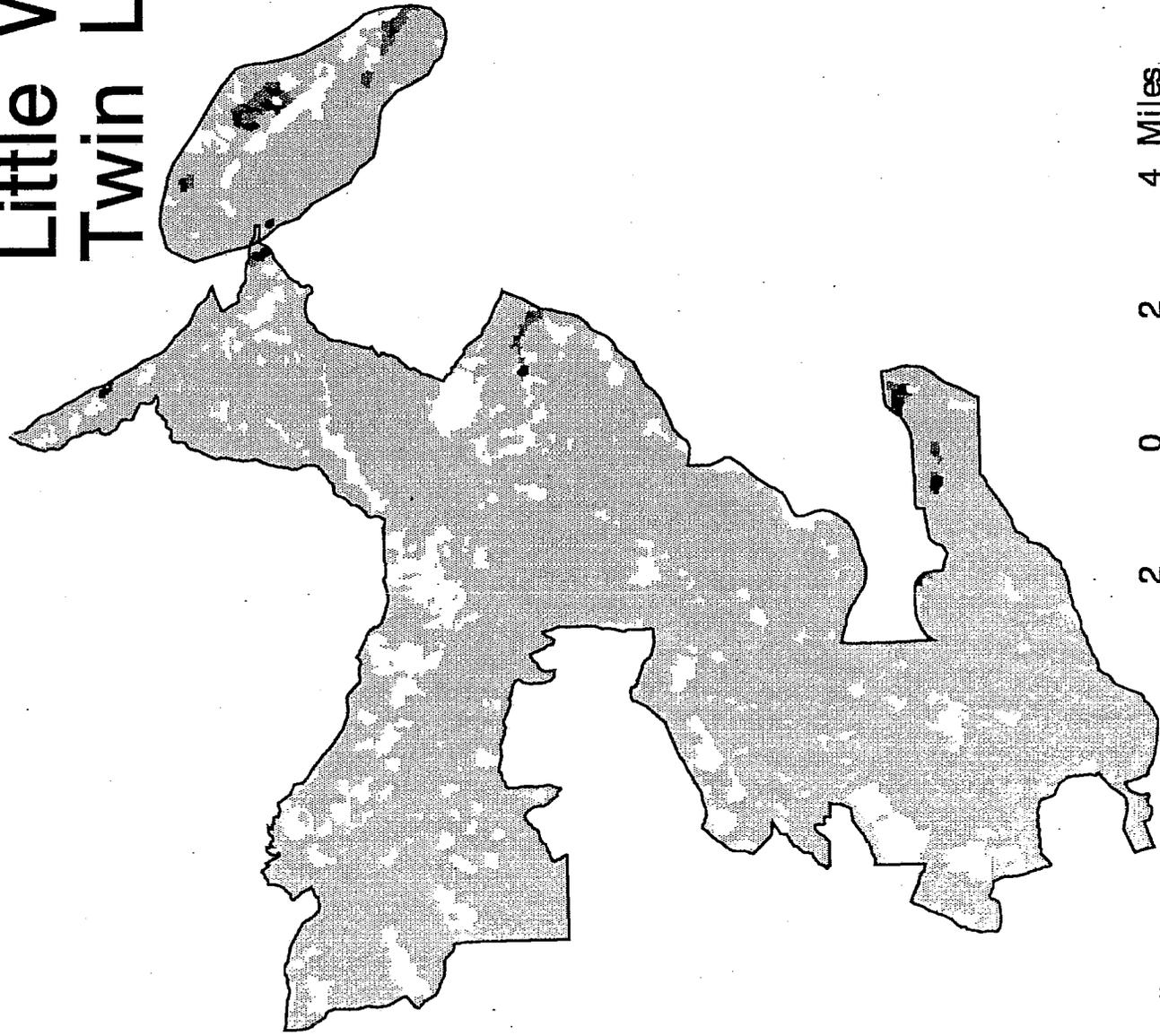
# Little Wenatchee LSR / Twin Lakes MLSA



# Little Wenatchee LSR / Twin Lakes MLSA



# Little Wenatchee LSR / Twin Lakes MLSA



2 0 2 4 Miles

